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SCHOOL OF ECONOMICS AND BUSINESS

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**CONSUMER CONFUSION AND ATTITUDE STRENGTH IN THE
PERCEPTION OF ONLINE NUTRITION INFORMATION**

DOCTORAL DISSERTATION

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Authors' signature:

I would like to open this work by stating gratefulness to my Dordo, whose main joys in life were his family, taking care of people and finding an appropriate joke for every situation (followed by, usually, sharing them one time too many). Together with my mother, sister and partner, he created a world of love and opportunities in which I am able to manage and thrive. For this, I will never be able to express appropriate level of gratitude.

I dedicate this dissertation to all the kind people I have met in my life (and am yet to meet). They kept my faith in humanity alive even when it, at times, faded. In essence, this is a work dedicated to humanity.

May we learn to live freely, and act responsibly.

SUMMARY

Consumer confusion is often discussed, but seldom empirically investigated (Fitzgerald, Donovan, Kees, & Kozup, 2019). As a result, the complexity of its comprehension for consumers seems to be passed on to researchers, as tackling this issue scientifically may often seem too challenging. As a phenomenon that can influence both consumers' capacity and willingness to perform a certain behavior, consumer confusion can be viewed in relationship with many concepts from psychology and marketing.

This dissertation brings together several important areas that have been predominantly explored in the marketing and social psychology literature. It offers a novel approach to **consumer confusion** by evaluating its impact on some of the most prominent concepts in the social psychology literature – **attitude (strength)** and **information processing**. To the best of our knowledge, at the time of this writing, this is the first research aimed at simultaneously evaluating these concepts (and their relationships) in the **context of online food and nutrition information**. This work not only provides a theoretical overview of the aforementioned scientific fields, but also evaluates their empirical connections. A somewhat less explored concept of consumer confusion is assessed in interplay with attitude strength and information processing in two empirical studies.

Since the attitude formation and information processing do not occur in a vacuum, elements of influence must also be considered. In this research, we used and evaluated one of the strongest heuristics in information processing, which is also the most commonly used by consumers— information carrier (i.e., **source**). In addition to the 4 main concepts, information sources were also evaluated and shown to be important in information processing, which is influenced by consumer confusion and affects the attitude formation and strength.

In this dissertation, we argue and provide empirical evidence for the problemat of information processing and attitude strength in the presence of consumer confusion. First, a brief overview of the four research fields (three **theoretical**: consumer confusion, attitude strength, heuristic-systematic model, and one **contextual**: online food and nutrition information) is presented using a bibliometric analysis. This analysis revealed that certain research fields (e.g., attitude strength and heuristic-systematic model of information processing) are closely related, confirming the interconnectedness of these relevant constructs. The analysis of the intersections of the given research areas also showed a lack of research that would connect these areas, supporting the need for this research and its contribution to science.

Systematic qualitative research is followed by three studies that provide an empirical overview of the four fields of literature. First, we introduce and test the relationship between

consumer confusion (caused by the inconsistency of information provided) and attitude strength. Understanding and demonstrating the detrimental effect of information inconsistency on attitudes and their strength through the occurrence of consumer confusion reinforced existing knowledge that suggested such effects theoretically.

Later, an overview of consumers' perceptions of the characteristics of various online information sources is provided. The results indicated that there are significant differences in perceptions of the characteristics of different sources. While popular online sources of information on food and nutrition such as social networks or forums provide greater hedonic value to users, credible sources of information such as official public and scientific websites are of higher informative value to consumers. This helped us understand how consumers evaluate different information sources and allowed us to dig deeper into potential differences in information assessment and related attitude formation.

Finally, the third experiment reveals the differences in information processing that emerge between processing information from different information sources in (without) the presence of consumer confusion. By obtaining significantly different results when processing information from different sources, we again draw attention to the importance of such cues (such as source) in determining the effort consumers are willing to invest in evaluating information. Even if consumers are confused (when confronted with inconsistent information) about hedonic information source, they are unwilling to invest additional effort and process information systematically. Instead, they take it as it is. Confusing content on informative sources triggers a systematic approach to information processing, and consumers make efforts to properly evaluate the information at hand.

Following the theoretical and empirical assessment of relevant areas of research, we bring this dissertation to a conclusion. The concluding section of this dissertation provides an overview of the thesis' findings and several conclusions that can be drawn from the results obtained, as well as a brief discussion of the implications, contributions and limitations of the thesis.

Keywords: consumer confusion, attitudes, attitude strength, attitude change, information processing, heuristic-systematic model, online information, food, nutrition, inconsistent information, online information sources

POVZETEK

O zmede porabnikov se pogosto razpravlja, a to temo se le redko empirično raziskuje (Fitzgerald, Donovan, Kees, & Kozup, 2019). Zdi se, da se kompleksnost razumevanja zmede pri porabnikih prenaša tudi na raziskovalce, saj se znanstveno raziskovanje in razumevanje tega vprašanja pogosto zdi preveč zahtevno. Kot pojav, ki lahko vpliva na zmožnost in pripravljenost porabnikov za določeno vedenje, lahko zmedo porabnikov obravnavamo v povezavi s številnimi koncepti iz psihologije in trženja.

Ta disertacija združuje več pomembnih področij, ki so pretežno raziskana v literaturi o trženju in socialni psihologiji. Ta raziskava ponuja nov pristop k zmede porabnikov z vrednotenjem njenega učinka na nekatere najvidnejše koncepte v literaturi o socialni psihologiji – stališča (jakost) in obdelovanje (procesiranje) informacij. Kolikor nam je znano, je to prva raziskava, ki je namenjena hkratnemu vrednotenju teh konstruktov (in njihovih odnosov) v kontekstu informacij o hrani in prehrani na spletu. Disertacija poleg teoretičnih pregledov omenjenih znanstvenih področij raziskuje tudi njihove empirične povezave. Nekoliko manj raziskan konstrukt zmede porabnikov je ocenjen v povezavi z jakostjo stališč in obdelovanjem informacij v dveh empiričnih študijah.

Oblikovanje stališč in obdelovanje informacij ne potekata izolirano, zato je treba upoštevati tudi elemente, ki lahko nanju vplivajo. V tej raziskavi smo uporabili in ovrednotili eno najmočnejših hevristik pri obdelovanju informacij, ki jo najpogosteje uporabljajo tudi porabniki – nosilce informacij (t.i. vir). Poleg štirih glavnih konceptov so raziskani tudi viri informacij in izkazali so se za pomembne pri obdelovanju informacij, na katero vpliva zmeda porabnikov, obdelovanje informacij pa vpliva na oblikovanje stališč in njihovo jakost.

V tej disertaciji argumentiramo in empirično podpremo problematiko obdelovanja informacij in jakosti stališč v prisotnosti zmede porabnikov. Najprej je s pomočjo bibliometrične analize predstavljen kratek pregled štirih raziskovalnih področij (tri teoretična: zmeda porabnikov, jakost stališča in hevristični sistematični model ter eno kontekstualno: spletne informacije o hrani in prehrani). Ta analiza je pokazala povezanost določenih raziskovalnih področij (npr. jakosti stališča in hevrističnega sistematičnega modela obdelovanja informacij), kar je potrdilo medsebojno povezanost teh relevantnih socialno-psiholoških konstruktov. Analiza presečišč danih raziskovalnih področij je pokazala tudi pomanjkanje raziskav, ki bi povezovale ta štiri področja, s čimer je dodatno podprla potrebo po takšnih raziskavah in njihov prispevek na področju znanosti.

Sistematični kvalitativni raziskavi sledijo tri študije, ki nudijo empirični pregled štirih področij literature. Najprej predstavimo in preverimo povezavo med zmedo porabnikov (povzročeno zaradi nekonsistentosti posredovanih informacij) in jakostjo stališč.

Razumevanje in prikazovanje škodljivega vpliva nedoslednosti in nekonsistentosti informacij na stališča in njihovo jakost s pojavom zmede porabnikov je okrepilo obstoječe znanje, kjer so takšni učinki že teoretično predlagani.

Nadalje je podan pregled zaznav porabnikov o značilnostih različnih spletnih virov informacij. Rezultati so pokazali, da obstajajo pomembne razlike v dojetanju značilnosti različnih spletnih virov. Medtem ko priljubljeni spletni viri informacij o hrani in prehrani, kot so družbena omrežja ali forumi, zagotavljajo uporabnikom večjo hedonistično vrednost, so verodostojni viri informacij, kot so uradne javne in znanstvene spletne strani, bolj informativne za porabnike. To nam je pomagalo razumeti, kako porabniki ocenjujejo različne vire informacij, in nam omogočilo, da se poglobimo v morebitne razlike v ocenjevanju informacij in oblikovanju stališč.

Tretji eksperiment razkriva razlike v obdelovanju informacij, ki se pojavijo med obdelavo informacij iz različnih virov informacij ob (brez) prisotnosti zmede porabnikov. S pridobivanjem statistično različnih rezultatov prizadevanj za obdelovanje informacij iz različnih virov lahko dejansko vidimo pomen takih namigov (kot je vir) za določanje napora, ki so ga porabniki pripravljene vložiti v vrednotenje in procesiranje informacij. Medtem ko so porabniki zmedeni (ko so soočeni z nedoslednimi informacijami) glede informacij iz hedonističnega vira, se še vedno niso pripravljene dodatno potruditi in sistematično obdelovati informacij. Namesto tega informacijo jemljejo takšno, kot je. Zmedena vsebina na informativnih virih sproži sistematičen pristop k obdelovanju informacij in porabniki si prizadevajo, da bi zaznane informacije pravilno ovrednotili in razumeli.

Po kvalitativni in empirični presoji relevantnih raziskovalnih področij to disertacijo zaključim s sklepom. Sklepni del doktorske disertacije ponuja pregled ugotovitev in več sklepov, ki jih je mogoče oblikovati na podlagi dobljenih rezultatov, ter kratko razpravo o implikacijah, doprinosih in omejitvah disertacije.

Ključne besede: zmeda porabnikov, stališča, jakost stališč, sprememba stališč, obdelovanje informacij, heuristično sistematični model, informacije na spletu, hrana, prehrana, nekonsistentne informacije, spletni viri informacij

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LIST OF ABBREVIATIONS

%	Percent
X^2	Chi-Square Goodness-of-Fit Test
&	And
AHA	American Heart Association
AMOS	Analysis of a Momentum Structures
ANOVA	Analysis of Variance
AS	Attitude Strength
AVE	Average Variance Extracted
BMC	BioMed Central
CC	Consumer Confusion
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMIN	Chi-square value
CR	Composite Reliability
CSV	Comma separated values
df	Degrees of Freedom
DOI	Digital object identifier
e.g.	exempli gratia
ELM	Elaboration Likelihood Model
et al.	et alia
F	F-statistics
FNO	Online food and nutrition information
GMO	Genetically Modified Organism
H	Hypothesis
HIP	Heuristic Information Processing
HSM	Heuristic-systematic Model
i.e.	id est
LC	Local Citations
LDA	Latent Dirichlet allocation
LDL	Low-Density Lipoprotein
LLCI	Lower Limit Confidence Interval
M_{AHA}	Mean for American Heart Association
M_{AHAc}	Mean for consistent information from American Heart Association
M_{AHAi}	Mean for inconsistent information from American Heart Association
MaxR(H)	Maximum Reliability
M_c	Mean of the control group
M_{FB}	Mean for Facebook
M_{FBC}	Mean for consistent information from Facebook
M_{FBI}	Mean for inconsistent information from Facebook
M_t	Mean of the treatment group

MANOVA.....	Multivariate Analysis of Variance
p.....	Page
pp.....	Pages
PA.....	Product attitude
PCLOSE.....	Probability of a Close Fit
PH.....	Attitude towards product healthiness
PhD.....	Doctor of Philosophy
p-value.....	Calculated probability
R ²	Coefficient of Determination
RMSEA.....	Root Mean Square Error Of Approximation
RQ.....	Research Question
SD _c	Standard deviation of the control group
SD _t	Standard deviation of the treatment group
SEM.....	Structural equation modelling
SPSS.....	Statistical Package for the Social Sciences
SRMR.....	Standardized Root Mean Square Residual
SUF.....	Source's usage frequency
t.....	t-statistics
TC.....	Total Citations
TLI.....	Tucker-Lewis Index
ULCI.....	Upper Limit Confidence Interval
US.....	United States
USDA.....	United States Department of Agriculture
VOSviewer.....	Visualization of Similarities viewer
vs.....	Versus
WOM.....	Word of mouth
WoS.....	Web of Science
α.....	Cronbach's alpha coefficient

INTRODUCTION

Today, humanity lives in a world of information. Information is generated at an amazing pace, as the amount of information created in several days surpasses the amount that used to require several decades to be created only half a century ago (Marr, 2018). Information is created within minutes, shared even faster, and has the potential to be consumed instantly. Even the information consumption produces information, which is stored and later analyzed in order to generate new information (Vanhala et al., 2020).

Such an atmosphere has a very positive impact on consumers' daily lives. Consumers can access information within seconds, evaluate different options, and even experience the functionality of products digitally before deciding to make a purchase, which decreases risk for consumers and opens a space for more informed choices. The accessibility of information on news and educational and entertainment content and services has also improved significantly with the increasing importance of information in today's world (Bartikowski, Laroche, Jamal, & Yang, 2018).

However, certain issues brought by the increase in the amount and availability of information should be mentioned as well. While more information is generally appreciated, its increase also means a need for greater processing efforts to make an informed decision. The exponential proliferation of information with the Internet has contributed not only to the quantity of information available, but also to creating information that is not concise and sometimes even contradictory (Nagler, 2014; Pollard, Pulker, Meng, Kerr, & Scott, 2015). The abundance of online information and the lack of control over the quality and consistency of posted food and nutrition information and advice given have contributed significantly to the state of confusion amongst consumers (Vijaykumar, McNeill, & Simpson, 2021).

In such an environment, consumers still need to access and process information and, consequently, form attitudes and engage in certain behaviors. The aim of this thesis is to evaluate these steps and to empirically test the relationship between the relevant constructs, as explained in the following subchapters. The context selected for this study is one in which there is an increasingly high level of consumer confusion: online food and nutrition information (Zhang, Sun, & Xie, 2015).

Topic of this PhD thesis

The main idea of this thesis revolves around **consumer confusion** about **online food and nutrition information**. While consumers have become accustomed to the abundance and inconsistency of information, this environment is not without its challenges. Although gaining in importance in both the popular and scientific outlets, consumer confusion remains underresearched (Fitzgerald et al., 2019).

As a strong factor that influences both the affect and cognition of individuals, consumer confusion has multiple consequences for their attitudes and behaviors (Fitzgerald et al., 2019; Mitchell & Papavassiliou, 1999). For instance, confused consumers face an array of unpleasant feelings, such as uncertainty, anxiety, bewilderment, and frustration (Mitchell & Papavassiliou, 1999). In addition, these feelings are usually accompanied by cognitive overload when consumers are confronted with confusing situations (Fitzgerald et al., 2019). Not surprisingly, forming attitudes and guiding behavior in such an atmosphere is a challenging task for cognition. Confusion can therefore be blamed for hesitation, decreased attitude certainty, difficulty in information processing and attitude formation or development, and the postponement or failure to perform the behavior (Mitchell & Papavassiliou, 1999).

In addition to influencing attitudes and intentions, how consumers approach information (i.e., how they **process information**) can also be greatly affected by consumer confusion. The effort of careful information processing have been shown to increase in situations where consumers are confused and do not know whether the information presented is true or false because it contains inconsistent or even conflicting statements and facts (Yang, Chu, & Kahlor, 2019; Kaye & Johnson, 2021). However, even the most motivated and eager consumers are found to have difficulty processing information and reaching the desired (or optimal) decisions when they are confused (Vogrincic-Haselbacher et al., 2021).

Therefore, information processing is another relevant topic that is explored in this dissertation. Processing inconsistent information can be very challenging for individuals, as one of the main characteristics of humans is the need for consistency in their cognition (Festinger, 1957; Gawronski, 2012). Although information processing has been considered using several different theories, the **dual process theories** seem to dominate the research. While these theories sometimes use different terminology, they share a common core (Evans, 2009). In essence, they suggest that people process information either slowly and with a significant deal of effort—which is characteristic of the analytic or central route—or largely automatically, quickly, and with little effort—which is characteristic of the heuristic or peripheral route (Evans, 1984; Evans, 2009; Petty & Cacioppo, 1986).

Descriptions of these two manners of processing vary throughout the literature, usually reflected in the names of the processing routes, including deliberative, analytical, and rational for the systematic route, and automatic, intuitive, and experiential for the heuristic processing route (Epstein, Pacini, Denes-Raj, & Heier, 1996). The proposed research mainly aims to integrate Chaiken's (1980) view, as her work is very closely related to attitudes, attitude change, and attitude strength, allowing for the simultaneous presence of routes. The proposed **heuristic-systematic model (HSM)** is based on the distinction between systematic (effortful) and heuristic (automatic) routes used to process information in attitude formation and attitude change.

In the process of thinking and decision making, individuals form their attitudes, beliefs, and opinions, which are influenced by many internal and external experiences and events (Eagly & Chaiken, 1993). Cognitive and affective drivers of attitude formation (i.e., attitude bases) are most widely recognized in the literature, both independently and simultaneously (Fabrigar & Petty, 1999; Van den Berg, Manstead, van der Pligt, & Wigboldus, 2006). Formed attitudes can vary in their stability and **strength**, meaning that they have a different impact on the behavior of individuals and are easier or harder to change (Krosnick & Petty, 1995).

In order to measure and evaluate these constructs in accordance with real-life conditions, we introduced another relevant element in our study—the online information **source**. Introducing the information source as part of our context helped us develop appropriate manipulations that allowed us to empirically assess the degree of confusion and information processing that occurs across different online information sources.

This research was conducted in the context of online food and nutrition information, which is one of the most relevant topics that concern individuals personally. Today, consumers pay significant attention to nutrition and its impact on overall health and well-being (Román, Sánchez-Siles, & Siegrist, 2017). The topic of proper nutrition is becoming increasingly important and well-represented in the mass media, and the new, digital media are a very important source of information for consumers (Carpenter et al., 2016).

However, the increase in available information often leads to inconsistent recommendations, greater consumer confusion, doubts about the product's genuine nutritive value and healthiness, and lower trust in recommendations in general (Nagler, 2014; Ward, Henderson, Coveney, & Meyer, 2012; Carpenter et al., 2016). Existing research shows that inconsistent information about healthiness can be found about almost any food or its ingredients, and the majority of consumers can recall seeing such contradictions (Nagler, 2014; Lee, Nagler & Wang, 2018). At the same time, research on consumer confusion has devoted limited efforts to examining confusion caused by information ambiguity (Fitzgerald et al., 2019; Walsh, Hennig-Thurau, & Mitchell, 2007).

As part of this dissertation, reviews of **four fields of literature**—consumer confusion, the HSM of information processing, and attitude strength, which all capture theoretical concepts, and online information on food and nutrition, which provides the context for this research—were conducted. As this thesis investigates an area that represents an overlap between these four research fields, understanding the ways in which these fields already work together—that is, how they are jointly scientifically researched—is of the utmost importance. In order to obtain this information, a thorough evaluation of existing publications was necessary. To obtain a structured overview and better estimate relationships between these research areas, we conducted a **bibliometric analysis of these four fields**. To the best of our knowledge, none of these four research areas has been

evaluated using bibliometric methods at the time of writing this dissertation. Therefore, we provide quantified and visualized analysis of these four areas and the research conducted within them, and we later assess them together to ground the relevance of this research and show its uniqueness.

These qualitative and bibliometric reviews were followed by **three empirical evaluations**. The goal of this dissertation is to provide a better understanding of information processing and attitude strength in situations where consumers are confused by food and nutrition information provided online. While discussing these constructs, the dissertation takes into account the differences between online information sources, their nature, and their role in information processing.

Purpose, aim, and research objectives

In a world where information processing is becoming increasingly difficult due to the abundance and ambiguity of that information, it is important to understand confusion from as many perspectives as possible (Fitzgerald et al., 2019). Due to the lack of research in this field, this thesis **aims** to explore confusion and its possible outcomes for information processing and attitude strength in the context of online food and nutrition information.

By applying several research techniques, this thesis aims to contribute to the advancement of knowledge in the **literature on social psychology** and **consumer research**. The goal of the research is to gain a better understanding of the influence that consumer confusion caused by information inconsistency can have on information processing, consumer attitudes, and the strength of those attitudes. The thesis focuses on confusion and attitude strength in the context of food and nutrition information online.

In the existing **literature on consumer psychology**, consumer researchers have devoted substantial efforts to understanding consumer attitudes and behaviors, including those related to healthy food and nutrition (Wansink & Chandon, 2006; Finkelstein & Fishbach, 2010; Raghunathan, Naylor, & Hoyer, 2006; Suher, Raghunathan, & Hoyer, 2016), as well as consumer confusion in this aspect (Spiteri Cornish & Moraes, 2015). **Social psychologists** have paid much attention to attitudes and their strength (Pomerantz, Chaiken, & Tordesillas, 1995; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Petty & Krosnick, 1995) and information processing (Evans, 1984; Petty & Cacioppo, 1986), while attitudes' relationship to consumer confusion has yet to be examined and fully understood. Therefore, this research intends to add to the existing body of knowledge by providing more in-depth explanations and foundations for understanding the information processing and attitudes—with an emphasis on attitude strength—that arise in situations where confusion is present.

The research objectives of this thesis extend to several areas that complement these concepts and the context described earlier (i.e., the studies include an assessment of online information sources in addition to the main constructs). The main research objectives are the following:

- examine the effects of information inconsistency on the state of consumer confusion and the formation of attitudes;
- evaluate the relationship between consumer confusion and attitude strength in the context of online food and nutrition information;
- examine the distinction between online food and nutrition information sources and their characteristics; and
- offer more insight into the processing of information accessed via different online sources.

Structure of the thesis

This thesis aims to provide a comprehensive overview of the processing of online food and nutrition information and attitude strength in situations where consumers face confusion. In order to convey both theoretical and empirical knowledge, this dissertation is divided into eight chapters.

The first chapter provides a presentation of literature on consumer confusion. As a frequent consequence of information overload and inconsistency, **consumer confusion** is relevant to the examination of consumer behavior in the digital environment. Therefore, **Chapter 1** provides a concise theoretical introduction of this concept, while some of the later chapters contain its empirical testing.

Then, **Chapter 2** explores the literature on **attitude strength** in a consumer setting. Consumer attitudes are essential to consumer research due to their expected proximity to intentions and behavior (e.g., Ajzen, 1996; Ajzen & Fishbein, 2005). Attitude characteristics, such as attitude strength, however, are not as frequently researched in consumer studies; rather, this concept is significantly present in social psychology research.

The theoretical foundation of this research is grounded in social psychology literature. Apart from the examination of attitude strength, information processing is investigated in this PhD thesis. For the theoretical background of information processing, the **HSM** was used. Prior to assessing it empirically in Chapter 6, a literature review—both qualitative and bibliometric—of the existing research on the HSM is offered in **Chapter 3**.

Chapter 4 delves into the contextual setting of this thesis. The research was set in the **context of online food and nutrition information**, which offers the ideal setting for the study of consumer confusion and information processing. The online information on this

topic is abundant, and it is frequently inconsistent (e.g., Nagler, 2014). Given the influence of food and nutrition on individuals' health and well-being, the interest in being properly informed and obtaining enough information is high (Walters & Long, 2012). The combination of this need for information and its inconsistency somewhat complicates information processing and consequent attitude formation.

Each of the four examined perspectives (three theoretical and one contextual) is accompanied by a bibliometric overview of the relevant literature. This was conducted in order to identify the topics relevant to the given fields and to discover potential connections of relevant terms, both within and between the fields. In the final theoretical section, **Chapter 5**, these four theoretical fields are investigated for intersections and studies that belong to several of them. Studies that belong to at least two of these fields are briefly presented. This analysis also demonstrates the **uniqueness of this research**, showing that the existing literature does not include a study covering consumer confusion, attitude strength, the HSM, and the online food and nutrition information context at the same time.

Following their theoretical summary, empirical testing of the relationships between the four fields of literature is the focus of **Chapter 6**. First, we elaborate on the **relationship between consumer confusion and attitude strength** from an empirical point of view. This subchapter provides an overview of Study 1, the first experimental study of this PhD research. In an experimental setting, we tested the effect of consumer confusion caused by inconsistent information about product healthiness on attitude strength in an online food and nutrition information setting (i.e., in online mobile apps). Then, the effects of consumer confusion are empirically assessed and further discussed.

Afterward, we provide more information about the pre-study conducted as part of Study 2, which explains how consumers **differentiate among different online food and nutrition information sources**. By enabling the respondents to evaluate online information sources according to several characteristics (e.g., cognitive, affective, hedonic, and informative), we set grounds for the in-depth differentiation of online food and nutrition information sources and their further exploration in the context of information processing.

Finally, we evaluate **information processing in an inconsistent—as opposed to a consistent—information environment**. In addition to examining information consistency and consequent consumer confusion, Study 2, which is presented as the last study in Chapter 6, was intended to discover differences between information coming from different online information sources by using the results from the pre-study to separate criteria.

This thesis concludes with several sections that have been built up through the development of the thesis. **Chapter 7** offers a general discussion and conclusions of the theoretical and empirical research conducted in the process of writing this dissertation. **Chapter 8** includes several sections that provide more information about the thesis's contributions and

implications. Limitations of this research and directions for future scholarly undertakings are also provided.

1 CONSUMER CONFUSION LITERATURE

This chapter explores the concept of consumer confusion in the marketing and consumer research literature. While it is not among the most prominent concepts in this literature field, this subfield nonetheless opens and examines relevant consumer-related questions. With the increase in information available to consumers on every subject and its decreased consistency, the effects that such an environment can have on consumers and their attitudes and behaviors has naturally drawn the attention of both public and scientific researchers to consumer confusion. In this thesis, consumer confusion literature is briefly introduced through its definition, main characteristics, and findings. Furthermore, a quantitative evaluation of this research field is provided via bibliometric analysis in the last section of this chapter.

1.1 Theoretical overview of consumer confusion

Humans' need to be informed and have more choices, along with their environment, which is characterized by the exponential proliferation of data, can be considered the main triggers and contributors to the emergence of consumer confusion. As the number of options available to consumers increases, consumers are becoming more uncertain about the quality of their choice and their preferences (Schwartz, 2004). Some consumers try to obtain as much information as possible to make informed choices, but those choices might be out of their reach due to the enormous amount of information available today on any topic. Such attempts might make them feel overwhelmed due to this information overload (Mitchell, Walsh, & Yamin, 2005).

By being overwhelming for consumers and by influencing their decisions, confusion has attracted the interest of researchers. In the beginning, it was mostly considered **brand confusion** due to the similarity of the originals and their copies. Products and brands that tried to resemble already established ones did not care to distinguish themselves too much from the existing brands, leading to consumer confusion caused by similarity (Miaoulis & d'Amato, 1978; Loken, Ross, & Hinkle, 1986). Consequently, consumers were not always able to differentiate products of well-established brands from their copycats. This research also attracted some of the considerations from the legal perspective (e.g., Kapferer, 1995; Miaoulis & d'Amato, 1978).

With the increase in information available to consumers on a daily basis at the beginning of the 21st century, the interest of researchers in this topic reemerged. In the recent body of literature, confusion has been examined in various fields. Apart from examining similarity, the literature on confusion has investigated other potential **triggers**, fostered by the technological changes in consumers' environments. The information that individuals

receive—namely, its amount, similarity, and inconsistent nature—is proven to lead to confusion in education as well (Drummond, 2004). When it comes to consumer confusion in particular, some efforts have also been made to understand it from a legal standpoint (e.g., Humphreys et al., 2017a; Humphreys et al., 2017b).

Consumer psychology, branding, and marketing literature provide a very diverse overview of the confusion concept that emerges in consumption. Because of these research efforts, the attention of the research community has been drawn to the emergence and existence of consumer confusion in multiple areas, including the mobile phone industry (Turnbull, Leek, & Ying, 2000), online mass-customized environment (Matzler, Stieger, & Füller, 2011), education (Drummond, 2004), tourism (Lu, Gursoy, & Lu, 2016), green behavior and greenwashing (Chen & Chang, 2013), eco product certification and labels (Brécard, 2014; Moon, Costello, & Koo, 2017), drugs and their effects (Amoozegar, Rupert, Sullivan, & O'Donoghue, 2017), food and dietary behavior (Patterson, Sadler, & Cooper, 2012; Spiteri Cornish & Moraes, 2015), organic and natural labelling (Henryks & Pearson, 2010; Kuchler, Bowman, Sweitzer, & Greene, 2020), and food labelling in general (Leek, Szmigin, & Baker, 2015; Liu et al., 2017).

1.2 Conceptualizations of consumer confusion

For a long period of time, attempts to measure consumer confusion and its effects on consumers' choices and decision-making processes were made, while the clear **definition** of it was not formulated. Consumer confusion was generally explained through its sources and causes, which has led to the identification of different types of confusion (e.g., Mitchell & Papavassiliou, 1999; Jacoby, 1984)—as explained in Section 1.4—while the definition remained missing.

Due to the complexity of the concept of consumer confusion and its operationalization, many authors have tried to contribute to better the understanding of consumer confusion. As a concept, it has not been unanimously defined in literature for decades (Walsh et al., 2007). In one of the first definitions of consumer confusion in the modern research wave, Mitchell and Papavassiliou (1999, p. 327) addressed consumer confusion as “a state of mind which affects information processing and decision making.” Following this definition, Turnbull et al. (2000, p. 145) provided a much more focused explanation of this phenomenon, primarily considering the consumers' **ability** to interpret information: “[consumer confusion is a] consumer failure to develop a correct interpretation of various facets of a product/service, during the information processing procedure. As a result, this creates misunderstanding or misinterpretation of the market.”

Walsh (1999, p. 24) provided another definition that put **information processing** in the spotlight. Most heavily researched in marketing and consumer psychology fields, consumer confusion has often been examined in the context of consumer decision-making and

purchasing scenarios. Walsh's definition reflects this as well, identifying consumer confusion as "an uncomfortable state of mind that primarily arises in the pre-purchase phase and which negatively affects consumers' information processing and decision-making abilities and can lead to consumers making suboptimal decisions." In one of his later studies (Walsh & Mitchell, 2005, p. 282), confusion was conceptualized in a somewhat simpler but widely applicable manner as "having difficulty in deciding when confronted with too similar, too much or unclear information." This conceptualization is directly related to the three main causes of consumer confusion, as described in Section 1.4.

In one of the recent studies, consumer confusion was defined as "negatively valenced state of mind with emotional and cognitive components in which consumers lack comprehension or understanding of marketplace stimuli" (Fitzgerald et al., 2019, p. 306). Following this attempt to draw attention to the relevance of both **cognitive and affective components** when it comes to consumer confusion, Garaus, Wagner, and Kummer (2015, p. 1004) also aimed at achieving a comprehensive understanding of consumer confusion. Apart from cognitive and affective, they also included the conative point of view. Their definition was created to reflect all three, as they regarded consumer confusion as "three-dimensional, temporary mental state consisting of the cognitive effort necessary to deal with confusion (cognition), emotions reflecting the discomfort associated with confusion (emotion), and restricted behavioral intentions (conation)."

In one of the novel definitions of consumer confusion, authors Ermeç Sertoğlu and Kavak (2017, p. 4) introduced a different perspective, bringing the attention to the novel issues that influence the level of confusion. In their study, they conceptualized consumer confusion as the "difficulty in consumer decision making because of environmental stimuli, situational factors, and consumer's personal characteristics."

From the conceptualizations and definitions proposed in the previous studies presented in this chapter, we conclude that, while different, the definitions of consumer confusion aim at emphasizing **difficulties and challenges of information processing and decision making** to consumers **due to the uncertainty** and the risk of misunderstanding that it involves. These characteristics—that is, the consequences—of consumer confusion are considered the most relevant for this PhD research. Therefore, we understand and evaluate consumer confusion with respect to these descriptions, relying mostly on the definition by Fitzgerald et al. (2019), with the addition of the acknowledgement of challenging aspects that consumer confusion adds to information processing. The concept of consumer confusion is further explored through empirical testing in this thesis.

1.3 Operationalizations of consumer confusion in the existing research

Operationalizing and measuring consumer confusion opens up interesting questions for the prospects of this construct's evolution in the future. Leek and Kun (2006) developed a scale

measuring consumer confusion in technological settings—namely, computers and mobile phones. Their scale divided confusion into three types based on its sources: unclarity confusion, similarity confusion, and over-choice confusion. The three categories are comparable to the common confusion classification that is well-established in the literature—that is, **ambiguity confusion, similarity confusion, and overload confusion.**

Later, Walsh et al. (2007) developed a scale for measuring **consumer confusion proneness**—that is, how easily a consumer gets confused—as a consumer characteristic. This scale is widely used, and in the current literature, it has helped researchers demonstrate the relationship between consumer confusion (proneness) and decision making (Walsh et al., 2007), decision satisfaction (Wang & Shukla, 2013), word of mouth, trust (Walsh & Mitchell, 2010), and loyalty (Walsh et al., 2007).

Walsh et al.'s (2007) scale aimed at assessing the proneness to all three types of confusion—similarity, overload, and ambiguity—using items that best collect cognitive aspects of confusion proneness perception. However, the ability of confusion to genuinely disturb individuals and their perception of what they thought they knew and to actually change their attitudes also calls for the inclusion of emotional components (Fitzgerald et al., 2019).

Ermeç Sertoğlu, and Kavak (2017) took a different approach to scale development, aiming at capturing a comprehensive overview of confusion in consumption situations, including the selection and purchase of products. The scale they developed includes items meant to measure *confusion stemming from the presence of others or others' thoughts, personal characteristics, price confusion, and product confusion.* The items in this scale are also mainly cognitive in nature.

Consumer psychology researchers usually regard consumer confusion as cognitive or behavioral and use instruments or items in scales to measure it as such. **The affective aspect** of consumer confusion has mostly been neglected in both researching and defining consumer confusion, despite its unquestionable relevance (Mitchell et al., 2005). Some research, however, has aimed at assessing confusion from an affective point of view. This research mainly originates from the educational and psychological literature, which is concerned with assessing the confusion of individuals in general terms, not in consumption or purchase decision-making situations. Scales used to measure confusion in these cases include purely affective attributes to measure the feeling of uncertainty, unclarity, and confusion that an individual faces (e.g., Lehman, D'Mello, & Graesser, 2012; Efron & Miller, 2012).

Although the fragmented approach—that is, the separate estimation of cognitive and affective aspects—to assess confusion is not the most appropriate, the existence of multiple measurement instruments allows researchers to combine approaches or focus on the aspect of confusion that is most useful for the problem at hand. For instance, a recent study by Fitzgerald et al. (2019) drew attention to the importance of incorporating both the cognitive

and affective aspects and proposed a scale for this purpose. This study concluded that consumer research might benefit from the application of more affective measures of consumer confusion in order to assess the feelings and cognitive perceptions of consumers, while research in psychology could include additional cognitive elements when assessing confusion.

The intention to understand consumer confusion from **three aspects**—affective, cognitive, and behavioral—has led to additional research. Research efforts by Garaus and Wagner (2016) resulted in the scale meant to capture consumer confusion from all three dimensions in a retail shopping context. The scale consists of three parts that measure *emotion* (i.e., affective feelings of discomfort caused by confusion), *cognition* (i.e., thought-related consequences of exceeding processing capabilities), and *behavior* (i.e., restrictions in a consumer’s behavioral intentions). The scales measuring consumer confusion mentioned in this section are presented in Appendix 1.

Apart from measuring consumer confusion through consumer-reported assessments, previous studies have also attempted to capture biological reactions to confusion. For example, Rozin and Cohen (2003) detected asymmetric facial expressions in respondents that are specific to the state of confusion. Confusion can also be identified and predicted by the eye movements of confused consumers, as was shown in another study (DeLucia, Preddy, Derby, Tharanathan, & Putrevu, 2014).

1.4 Causes of consumer confusion

As mentioned in Section 1.1, the first attempts to capture consumer confusion and its specificities in marketing and consumer research started from brand confusion. When assessing the causes of brand confusion, the **similarity** of products was emphasized as the most prominent one (Kapferer, 1995). Confusion by similarity was shown not only to be cognitive, but to very often lead to behavioral confusion—that is, buying the wrong product unintentionally (Kapferer, 1995).

Mitchell and his colleagues (Mitchell & Papavassiliou, 1999; Mitchell et al., 2005) provided the grounds for studying consumer confusion in the modern, often overwhelming conditions and environment. By taking into account the environment in which modern consumers make their decisions and going beyond similarity, they **broadened** the spectrum of potential causes for the emergence of consumer confusion. In their conceptualization, they identified three main situations in which consumer confusion arises: *similarity* of products, *overload* of choice between products and stores, and *ambiguous*, misleading, or inadequate information conveyed through marketing communications. While each of these confusion sources is enough to create consumer confusion, they can also appear simultaneously. These three confusion sources are briefly discussed below.

Similarity of products and brands. The similarity of products and brands is the earliest cause of consumer confusion that drew the attention of the marketing academic and research communities. Namely, in 50s and 60s, the proliferation of production happened, and numerous new brands did not aim to distinguish themselves or their trademarks. Their similarity with the existing, successful products might have brought them higher sales numbers, but it also confused consumers, especially in cases where their expectations of product quality were not reached (Mitchell & Papavassiliou, 1999). Therefore, researchers have studied this type of confusion from marketing, psychological, and legal points of view to investigate this sort of brand appearance and functioning.

Research has mainly focused on brand similarity confusion, which has directed the definition of this type of consumer confusion to “a lack of understanding and potential alteration of a consumer’s choice or an incorrect brand evaluation caused by the perceived physical similarity of products or services” (Mitchell et al., 2005, p. 143). Nevertheless, the additional studies suggest that similarity confusion occurs at other levels as well. Some of the examples include the product prices, product claims (e.g., healthy or sustainable products using appealing colors or claims), and eco labels (Moon et al., 2017).

Overload. In a world where information is gathered in a matter of seconds and clicks, overload and burdensome information processing is not uncommon. Consumers are overwhelmed with information on almost every topic and in many situations, even without looking for it. Such an environment of abundance and overload of information can overwhelm and confuse consumers, resulting in frustration, stress, and sub-optimal choices (Mitchell & Papavassiliou, 1999). In previous research, overload confusion has been defined as “a lack of understanding caused by the consumer being confronted with an overly information rich environment that cannot be processed in the time available to fully understand, and be confident in, the purchase environment” (Mitchell et al., 2005, p. 143).

Overload is also reflected in the number of options available to consumers for satisfying the same need (i.e., “product clutter”), where consumers are not necessarily better off if they are choosing between dozens of options instead of just a few. Additionally, the corporate product policies, which promote the proliferation and maintenance of greater numbers of options for consumers to increase the probability of a purchase, fuel the issue of confusion (Mitchell & Papavassiliou, 1999).

Ambiguity (unclear). The increasing amount of information available to consumers is not only problematic from the point of view of overload. The large amount of information and its sources, whose credibility cannot always be properly assessed, increases ambiguous—and, often, contradictory—information. For example, research in health information in media has shown that over 70% of consumers notice contradictions and inconsistencies in the information available from mass media (Nagler, 2014; Lee et al., 2018). Such information creates difficulties in the decision-making process by fostering unclarity and

confusion. In the literature, ambiguity confusion is defined as “a lack of understanding during which consumers are forced to re-evaluate and revise current beliefs or assumptions about products or the purchasing environment” (Mitchell et al., 2005, p. 143).

Apart from obvious inconsistencies in information, several other characteristics of information and products themselves can trigger confusion by ambiguity. The complexity of products and poor product usage instructions have also been shown to introduce ambiguity in consumers’ decision-making process. Similar effects can be seen in the presence of non-transparent pricing or misleading signals sent through communication channels (Mitchell et al., 2005).

1.5 Consequences of consumer confusion

Consumer confusion has several consequences. From the **affective** point of view, confusion is regarded as exclusively negative because consumers experience it as unpleasant. Therefore, only negative emotions—such as anger, irritation, anxiety, dizziness, and frustration—are expected to arise in situations where consumers are confused (Garaus & Wagner, 2016; Walsh et al., 2007) and can negatively influence consumer goal attainment (Garaus et al., 2015). Feeling upset and frustrated due to dissatisfaction or dissonance are other emotional consequences of consumer confusion that have been confirmed in existing research (Hall-Phillips & Shah, 2017).

When it comes to **cognitive** information processing, confusion can lead to exceeding cognitive capacities and reduce the efficiency of decision making (Garaus & Wagner, 2016). Additional cognitive consequences of consumer confusion include an increase in perceived risk and lower consumer perceptions of trustworthiness (Hall-Phillips & Shah, 2017), information’s scientific certainty, product quality, and credibility (Fitzgerald et al., 2019).

Behavioral consequences of consumer confusion are numerous. As humans prefer cognitively easier environments for their decision making, cognitively demanding situations in which confusion is present are known to trigger changes in consumer choice and behavior. The existing research has identified the following negative outcomes of consumer confusion on consumer choice (Mitchell & Papavassiliou, 1999).

(1) Choice timeliness

- The choices that consumers make can be significantly **delayed**. In a state of confusion, consumers are prone to try to clarify the choice and understand the situation and the options available. This process can be lengthy and delay decision making.
- Confusion can create **decision paralysis**, which is often a result of the consumer feeling overwhelmed by the decision and the information available. Subsequently,

consumers are unable to make a choice, and—unless the purchase is important or urgent—the choice is not made.

(2) Choice change

- Confusion can **implicitly alter** a consumer's choice, which is especially the case for the brand choices that consumers make. When faced with confusion, especially that triggered by the similarity of the products, consumers are unsure of the selection they should make. While they may want to stay loyal to a certain brand, the similarity might make this difficult and even unwillingly alter their choice.
- Confusion can also **explicitly alter** consumer choice, especially due to a lack of understanding. When lacking comprehension and clarity, consumers tend to express promiscuity in their choices and purchase behavior. This can result in changed behavioral patterns, buying on a budget, or buying multi-task products to simplify the purchase and choice task.

(3) Unchanged choice

Consumers may end up making the same choice, even in the state of confusion. Nevertheless, the choice made in this situation:

- can be followed with significant amounts of **uncertainty**, frustration, and dissonance;
- can result in poor or **non-optimal** product usage due to the lack of, or inadequate amount of, understanding; and
- can create **misinformation** that the consumer shares with others—in other words, when confused, consumers are more likely to confuse other consumers by sharing too much unclear, irrelevant, or incorrect information.

Apart from having a direct impact upon consumer choice and decision making, confusion has been shown to have additional behavioral consequences. Some of the consequences frequently examined in the existing literature are consumer enjoyment (i.e., fun perception) (Matzler et al., 2011), satisfaction (Wang & Shukla, 2013), WOM, trust (Walsh & Mitchell, 2010; Matzler et al., 2011), intention for repeated visit (Garaus & Wagner, 2016), loyalty (Walsh et al., 2007), and the return of products (Hall-Phillips & Shah, 2017). These studies demonstrated negative effects of consumer confusion on these constructs.

1.6 Consumer confusion research: Bibliometric field analysis

Our first bibliometric analysis was dedicated to the evaluation of the consumer confusion literature field. This study was conducted to provide a better understanding of the literature field, as well as to identify the existing relationships of consumer confusion with other relevant concepts for this thesis. Before providing more insights into the results obtained,

we first offer the description and relevant information about the method itself and the procedure undertaken.

1.6.1 Bibliometric analysis of the field: Method description

Bibliometric methods are frequently used to investigate the existing knowledge in a research field and its hidden patterns and connections, as well as to quantify the descriptive knowledge available in the literature. These methods are known for using bibliographic data from publications available in the existing databases, including Scopus and Web of Science (WoS). Based on this data, bibliometric methods then construct structural images, visuals, and dynamics of the scientific fields (Župič & Čater, 2015). In this process, underlying connections between authors, the importance and impact of publications, and trends and relevant topics in scientific areas are revealed. The ability to introduce quantitative rigor into the qualitative literature and its evaluation has established the relevancy of bibliometric methods in scientific field reviewing. In addition to structuring the existing knowledge and field characteristics (e.g., authors, underlying dialogs, collaborations, etc.), bibliometric methods are usually employed for the identification of the hidden areas of research, emerging subjects, and hotspots and emerging trends in research fields (Pritchard, 1969).

Visual bibliometric maps use graphs and networks to depict the connections among items. Nodes and edges are used to visualize the networks underlying literature fields. **Nodes** represent the items of importance (i.e., journals, publications, authors, or keywords), while edges indicate the relations between the nodes. The size of the node indicates its frequency of appearance in the data set—larger nodes show that the given item was more frequently mentioned in the data set and, as such, has more weight for the network and literature—while the thickness of an edge shows the strength of a relation between two nodes. The distance between the nodes and clusters they form, usually marked by *color*, shows the frequency of their mutual presence in research presented by nodes (Van Eck & Waltman, 2014).

For a detailed study of the four research areas relevant to this thesis (i.e., consumer confusion, attitude strength, the HSM, and food and nutrition information online), two established bibliometric methods have been used: **co-citation** and keyword co-occurrence. In the literature, co-citation analysis is defined as the frequency with which two units are cited together (Small, 1973). A larger number of items cited together—that is, co-cited—implies a stronger co-citation relationship between the two units (Small & Griffith, 1974). This analysis can be used to measure the similarity and above-mentioned frequency between documents, journals (sources), and authors. While *document co-citation* analysis creates connections between specific published documents (e.g., articles, books, or other published material), *journal (source) co-citation* analysis identifies latent relationships between scientific journals (sources) cited in the data set (Župič & Čater, 2015).

Keyword co-occurrence is a technique that aims at building a conceptual structure of the field by establishing relationships between the words in documents or, in case of bibliometric methods, publications. While co-citation uses the metadata (i.e., references, authors, journals, etc.) of documents to make connections between them, keyword co-occurrence is a method that uses *actual content* of the document to measure similarity and create a network between relevant keywords. The main aim of this analysis is to create a network of themes and their relationships that represents the conceptual space of a scientific field (Župič & Čater, 2015).

1.6.2 Bibliometric analysis of the field: Procedure description

The process of collecting and preparing data for bibliometric analysis consists of several relevant steps. The process described in this chapter was implemented for all four bibliometric analyses, presented in Chapters 1–4. In the initial phase of the analysis, several established standard procedures in bibliometrics (e.g., Župič & Čater, 2015) were used to collect materials (i.e., data) and create a data set.

(1) Data collection

- *Selecting database of scientific publications.* In order to collect publications and their metadata for bibliometric analysis for this PhD thesis, the **Scopus** and **WoS** databases were consulted due to their comprehensiveness.
- *Identification of relevant publications.* In search of relevant publications, specific queries were used. The results of the search were then adjusted by specific parameters—namely, language and type of publication—and **manually cleaned** to avoid the inclusion of irrelevant publications.

(2) Data analysis and data visualization

- *Selecting the software.* The development of a technological solution for the scientific research of the literature enlarged the selection of tools available for different purposes and specific analyses in bibliometric methods. In this research, co-citation and keyword co-occurrence analyses were conducted using **VOSviewer**, while sample characteristics and the specific analysis of authors and journals were explored using biblioshiny from the bibliometrix package in the **program R**.
- *Creating and saving the metadata of the selected publications in the appropriate format.* For data analysis in R and VOSviewer, different data formats were used. Data sets consisting of publication selection bibliographic data (i.e., titles, keywords, authors, abstracts, and references) were saved in **.csv** format for the analysis in VOSviewer and **BibTex** format for analysis in bibliometrix by R.

- *Cleaning and adjusting data.* Saved data was **screened and corrected** for potential duplicate values or inconsistencies (e.g., the usage of both journal abbreviations and full names, which would create bias in the analysis).
- *Conducting analysis and obtaining results.* After the data search and preparation steps, the data set was **imported** into the programs. Analyses of annual scientific production, the most relevant sources and authors, keyword co-occurrence, and source co-citation were conducted with biblioshiny in the bibliometrix package of R version 4.0.2 (Aria & Cuccurullo, 2017) and VOSviewer 1.6.15.0 (van Eck & Waltman, 2010).

The last stage of the proposed bibliometric study workflow is *obtaining and interpreting the results* (Župič & Čater, 2015). Important findings about the development of the research in relevant study areas and topics are discussed in the following chapters.

1.6.3 Bibliometric analysis of consumer confusion literature

Consumer confusion is a complex concept in consumer psychology. As such, it attracts researchers with different approaches and areas of interest, all of which contribute to this field due to its wide set of problems. In order to better establish and understand the state of the art in the existing consumer confusion research, a bibliometric study was conducted. The research conducted aimed at better understanding and answering the following questions about the consumer confusion literature field, all of which are further discussed.

- How has research on consumer confusion developed over time?
- Who are the most influential authors in the consumer confusion literature?
- What topics have been researched in the consumer confusion literature?
- What journals (sources) have published research on consumer confusion?

1.6.3.1 Data collection

Data collection was performed in August 2020. To study the consumer confusion literature field, queries in Scopus were made. **Scopus** is an electronic scientific database published by Elsevier, and it is considered an appropriate, reliable, and comprehensive source of publications for bibliometric studies (Mishra et al., 2016; Latino, Menegoli, & Corallo, 2019). In addition, Scopus's scope of publications is wider than other databases that are frequently used in bibliometric studies (Mongeon & Paul-Hus, 2016).

In order to collect as many relevant publications as possible, apart from the search for the term "*consumer confus**", the term "*customer confus**" was also used. These two terms have been identified in a previous manual literature search as the most commonly used when dealing with consumer confusion in the literature.

As a result of this search, 3,279 pieces were identified. The search was then narrowed to articles, reviews, and early-access articles written in English and in the literature fields of business, management and accounting, social sciences, and psychology—the fields that most frequently contain research on consumers. As a result, 1,306 articles that satisfy given criteria were found. These articles—in particular, their titles and abstracts—were manually screened for their content. Only 375 articles genuinely tackled the issue of consumer confusion and were used for further analysis. The main reasons for article exclusion were related to the usage of the word *confusion* in the abstract or title that indicated that article did not deal with consumer confusion. For example, some articles mention confusion as the side effect of medication, using the phrases “not to be confused with,” “theoretical confusion,” or “conceptual confusion” in both consumer and non-consumer-related studies.

Metadata for **375 selected publications**—that is, their references, titles, abstracts, authors, document details (i.e., journal, year of publication, DOI, etc.), and keywords—were downloaded in BibTex and .csv format and used for further analysis. The main general overview of the sample (i.e., the articles used) is available in Appendix 2.

1.6.3.2 Development of the literature field: Annual publications overview

An annual production of the consumer confusion literature shows an increase in the number of articles published. The estimated overall annual growth rate of the literature is set at a moderate 8.2%. The first studies were published in the 60s and 70s, when the focus of consumer confusion research was on **brand confusion** due to the similarity of original products and their copycats. This problem was researched from both the business and marketing perspectives, as well as from the *legal aspects* of trademark infringement. In the 80s, brand confusion was still the focus of researchers’ interest. However, in this period, *information overload* became relevant in consumer confusion research after a couple of studies conducted by Jacoby (1977, 1984).

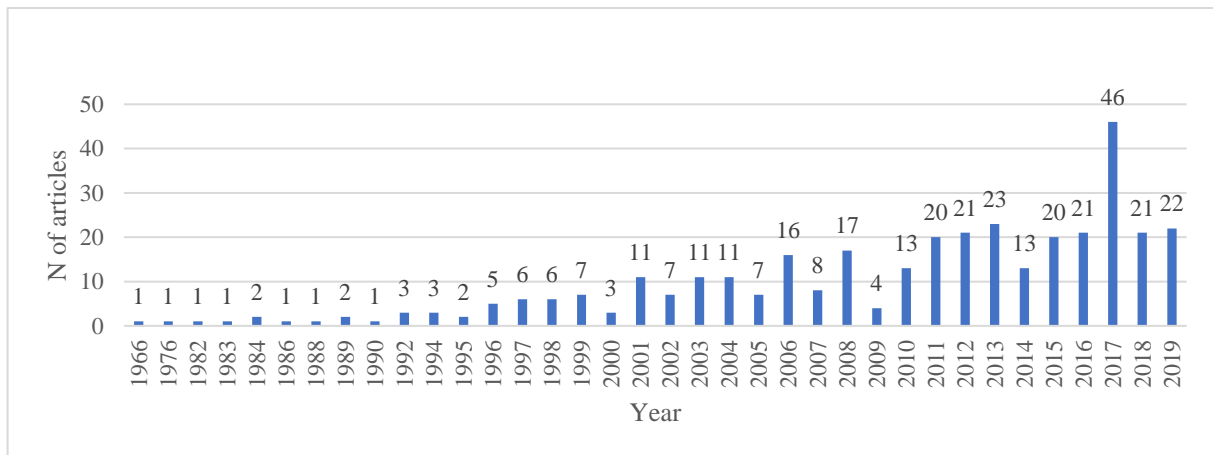
A significant increase in the number of publications dealing with consumer confusion is noticeable from the 90s onwards. After conceptual articles by Mitchell and Papavassiliou in 1999 and Mitchell et al. (2005), in which the concept of consumer confusion and its antecedents and consequences were thoroughly developed, the number of publications escalated. The increase in article production became relatively stable, and annual production in the last 10 years has been an average of 19.8 articles per year (ranging from 13 to 46).

Figure 1 shows a significantly higher number of publications in 2017 compared to the years before and after. An analysis of the publications from that year indicates an increased interest in environmental topics and consumer confusion related to them. The elections in the United States in 2016 and rapid reformation of one of the most developed country’s environmental policies (Popovich, Albeck-Ripka, & Pierre-Louis, 2020) might have triggered the increase

in research on confusion as well, as misunderstanding of the severity of the situation might have caused people’s agreement with such drastic changes. In addition, several notorious climate change records were broken in the previous year as a result of the extreme weather conditions in many parts of the world, predominantly in Asia and Africa, and the accelerated rate of anomalous events throughout the Arctic (Herring et al., 2019). This might have inspired researchers to start exploring confusion as one of the important factors that inhibit behavioral change for the betterment of the environment.

As the data collection was conducted in August 2020, data for 2020 and subsequent years was not included in Figure 1 in order to avoid creating bias. Nevertheless, 17 articles written in 2020 were identified in the data set and used for other bibliometric analysis in this chapter. Those 17 articles indicate that the interest in consumer confusion research remains present and that the trend of stable article production growth is likely to continue.

Figure 1. Consumer confusion: Annual scientific production (in publications).



Source: Own work

1.6.3.3 Most relevant sources for consumer confusion studies

In Table 1, the top 20 journals that published consumer confusion research over the past 6 decades are presented. Journals from **business and marketing research** prevail. As these areas include research in the consumer behavior field more frequently than other fields, this is not a surprising result. Several highly positioned journals in this list focus their publications in the field of food (e.g., *British Food Journal* and *Appetite*), implying that a significant amount of research in the consumer confusion field has dealt with the confusion arising in the food and nutrition environment. The context of food in this research mostly concentrated on food and nutrition labels, claims on products, and controversial categories of food (e.g., GMO products, local origin, product naturalness). Some research was devoted to understanding consumer confusion about organic and natural products and labels, as well as eco labels of products available to consumers. The last topic also attracted some publications in journals like *Sustainability* and *Journal of Business Ethics*.

Table 1. Top 20 journals by the number of publications in consumer confusion field.

Sources	Number of articles
British Food Journal	16
International Journal of Consumer Studies	10
Appetite	9
Sustainability	9
Psychology & Marketing	9
Journal of Consumer Marketing	7
Journal of Consumer Policy	6
Journal of Product & Brand Management	6
Journal of Business Ethics	5
Journal of Business Research	5
Journal of Consumer Affairs	5
Journal of Public Policy and Marketing	5
IIC International Review of Intellectual Property and Competition Law	4
International Journal of Retail and Distribution Management	4
International Review of Retail Distribution and Consumer Research	4
Journal of Food Products Marketing	4
Journal of International Consumer Marketing	4
Journal of Marketing Communications	4
Journal of Marketing Research	4
Journal of Retailing and Consumer Services	4
Journal of The Academy of Marketing Science	4

Source: Own work

1.6.3.4 Most cited authors in consumer confusion literature

The analysis of the 15 most cited authors proved the importance of the new consumer confusion conceptualization to the consumer confusion research field's development (Table 2). In particular, **Mitchell and Walsh** appeared as the two most cited authors in the consumer confusion database collected for this research. These two authors have researched consumer confusion in the beginning of the 21st century and contributed to its conceptualization as we know it today. Mitchell and Walsh have reviewed and redefined the concept of consumer confusion (Walsh, Hennig-Thurau, & Vincent-Wayne, 2002; Mitchell et al., 2005), and they have developed a *scale* for measuring consumer confusion proneness (Walsh et al., 2007). Together with **Hennig-Thurau**, they have also invested a significant amount of research effort to facilitating a better understanding of consumer decision-making styles, which can be more or less prone to confusion (Walsh, Mitchell & Hennig-Thurau, 2001; Walsh, Hennig-Thurau, Mitchell & Wiedmann, 2001). Mitchell has also researched marketing causes and implications of consumer confusion (Mitchell & Papavassiliou, 1999).

Other authors from the list have also conducted established research in consumer psychology. **Leek** conducted extensive research on putting the concept of consumer

confusion into practice and actually measuring it in different contexts—such as the mobile phone market, personal computers market, and nutritional labels (Turnbull et al., 2000; Leek & Kun, 2006; Leek et al., 2015)—while **Berger and Foxman** researched brand confusion (Foxman, Muehling & Berger, 1990; Foxman, Berger & Cote, 1992). **Jacoby** and **Malhotra** are known for their work related to information load and overload and its influence on decision-making processes and outcomes (Jacoby, 1977; Jacoby, 1984; Malhotra, 1982), while Grunert has extensively researched consumer perceptions and information understanding, frequently in food and nutrition contexts (Grunert, 2005; Grunert, Wills & Fernández-Celemín, 2010).

Keller published relevant articles in the field of brands, branding, and brand equity (Keller & Lehmann, 2006; Keller, 1993), **Sproles** investigated consumer decision-making styles (Sproles, Geistfeld & Badenhop, 1978; Sproles & Sproles, 1990), **Petty** and **Bettman** researched information processing and persuasion (Petty & Cacioppo, 1986; Bettman, 1970), and Babin explored consumer value, satisfaction, and word of mouth (Laroche, Babin, Lee, Kim & Griffin, 2005; Babin, & Griffin, 1998; Babin, Darden, & Griffin, 1994). While very diverse, all of the areas that these authors researched are of high importance to consumer confusion research and the establishment of the literature in this field as we know it today.

Table 2. Top 15 locally cited authors in consumer confusion literature.

Authors	Citations
Mitchell, V.W.	247
Walsh, G.	165
Jacoby, J.	100
Hennig-Thurau, T.	59
Leek, S.	56
Papavassiliou, V.	54
Grunert, K.G.	52
Keller, K.L.	52
Malhotra, N.K.	52
Foxman, E.R.	51
Sproles, G.B.	50
Petty, R.E.	49
Babin, B.J.	49
Bettman, J.R.	46
Berger, P.W.	45

Source: Own work

1.6.3.5 Overview of co-citations within consumer confusion literature

In order to better understand consumer confusion literature and its underlying connections, **reference co-citation** was conducted. In the database of 375 articles used for this

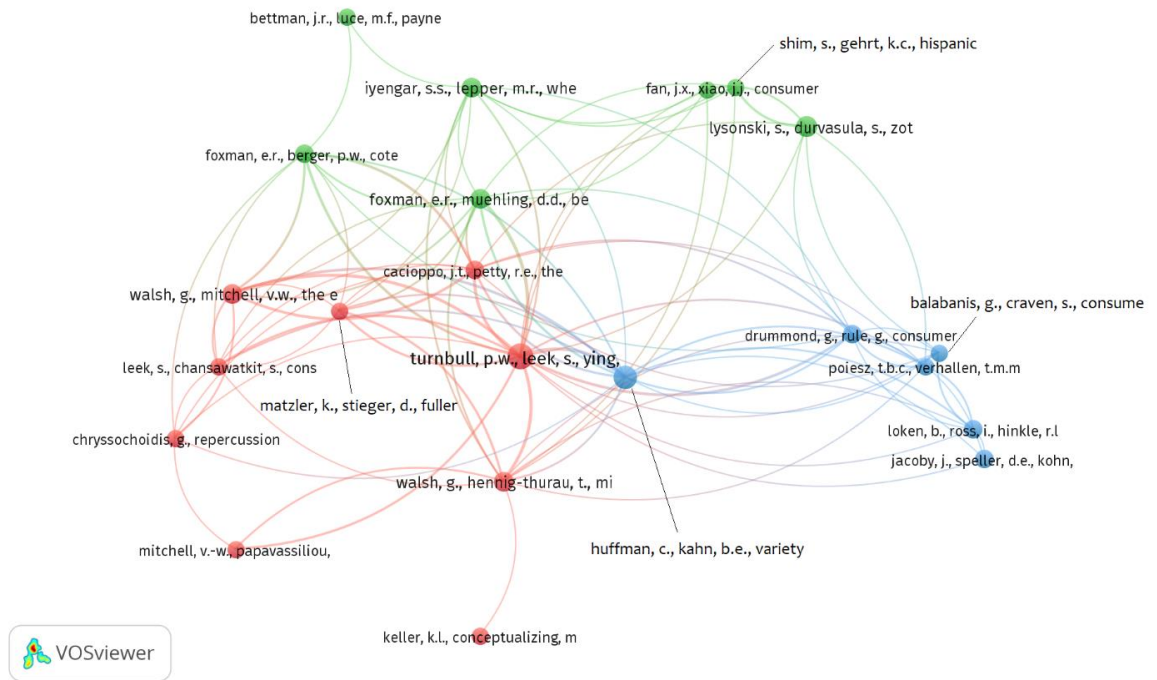
bibliometric study, over 10,000 references were found, while 26 publications were detected to have at least five citations (threshold) and were used for further analysis. One additional publication (Fornell & Larcker, 1981) has more than five citations but was excluded, as it was a methodological rather than a conceptual article. The list of the publications per cluster is available in Appendix 2.

Using VOSviewer reference co-citation analysis, three clusters of publications were identified (Figure 2). The biggest cluster, marked in **red**, consists of nine publications, all of which belong to consumer psychology literature. Most of these articles directly investigate **consumer confusion and its characteristics, causes, and consequences** (e.g., Mitchell & Papavassiliou, 1999; Walsh & Mitchell, 2010). As this bibliometric co-citation study focused on consumer confusion, this result comes as no surprise. However, it does provide a brief overview of the articles from this field that have achieved the most influence.

In the second largest cluster, represented in **green**, seven articles from—at a first glance—quite diverse areas of **consumer psychology and behavior** literature have been clustered together. The main string that connects most of the publications from this cluster is research focused on consumer decision making and choices. Publications placed in this cluster examine consumer decision-making styles and compare them among countries (Fan & Xiao, 1998; Lysonski, Durvasula, & Zotos, 1996), as well as their choice processes in different contexts and situations (Bettman, Luce, & Payne, 1998; Shim & Gehrt, 1996; Iyengar & Lepper, 2000).

Finally, the third cluster (**blue**) consists of six publications primarily focusing on **brand confusion** research. These articles include some of the first articles from the 70s and 80s that drew attention to confusion between brands that can emerge due to the high similarity of copycat products to the originals, as well as the dangers to brand selection brought by too many choices and information options (Jacoby, Speller, & Berning, 1974; Loken et al., 1986; Poiesz & Verhallen, 1989).

Figure 2. Reference co-citation network: Consumer confusion literature field.



Source: Own work

1.6.3.6 Consumer confusion: Keyword co-occurrence analysis

Keyword co-occurrence analysis was conducted in VOSviewer to assess the most frequent topics and keywords that appear in the existing consumer confusion literature. A threshold of **five occurrences** of a keyword had to be met for it to be selected for further analysis and visualization. The consumer confusion database contained 1,015 keywords, 17 of which met this condition. The graphical representation of the consumer confusion keyword co-occurrence field shows a central position of the keyword “*consumer behavior*,” which facilitates communication between clusters.

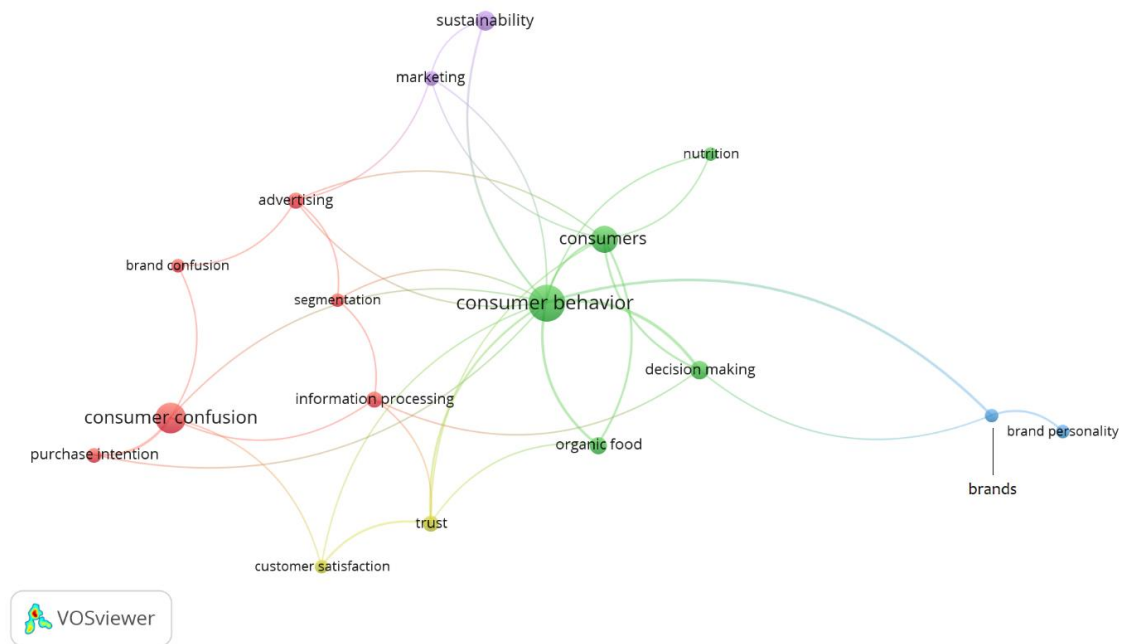
The keywords formed five clusters (Figure 3), all of which are briefly discussed below.

- (1) **Consumer confusion (and its effects)**. This is the biggest cluster identified by keyword co-occurrence analysis. Six keywords were attributed to this cluster (**red**): *consumer confusion*, *purchase intention*, *information processing*, *segmentation*, *advertising*, and *brand confusion*. Such a distribution of keywords in this sub-theme implies strong research efforts in the present marketing literature to understand the effect of consumer and brand confusion on information processing (Balabanis & Craven, 1997; Hufmann & Kahn, 1998) and consumers’ purchase intentions (Hoque & Alam, 2020; Mann, 2018).
- (2) **Consumer behavior and food**. The second largest cluster (theme) in this keyword co-occurrence analysis consists of five keywords (**green**): *consumer behavior*,

consumers, nutrition, decision making, and organic food. The sub-theme of nutrition and food emerges as relevant for this cluster, and it points out the research efforts in consumer confusion and consumer behavior research to explain and understand consumer attitudes towards the category of organic food, which is often connected with misunderstandings and unclear information available to consumers (Kuchler et al., 2020; Fitzgerald et al., 2019; Granvik, Joosse, Hunt, & Hallberg, 2017). Information about nutrition and diet online has also been researched in relation to consumers' confusion and behavior due to such information's abundance and accessibility (Im & Huh, 2017; Spiteri Cornish & Moraes, 2015).

- (3) **Sustainability marketing.** This small theme is represented by two keywords (**violet**): *sustainability* and *marketing*. The publications using these keywords explore, among other topics, greenwashing (Parguel, Benoît-Moreau, & Larceneux, 2011; Martínez et al., 2020), sustainability labels (Hamza, Dalmarco, & Veloso, 2018; Delmas & Lessem, 2017), and sustainable food production and management (Bhaskaran, Polonsky, Cary, & Fernandez, 2006) in relation to consumer confusion. The variety of the topics in sustainability and information dissemination through marketing in which the researchers showed their interest proves the relevance and need for deeper investigation of the triggers of consumer confusion that often include unclear or untrue information or the promotion of a company's sustainability and responsibility.
- (4) **Trust** cluster. The second mini cluster contains two keywords (**yellow**): *trust* and *customer satisfaction*. A direct connection between consumer confusion and customer satisfaction shows the importance of the research on the diminishing effects that too many choices and consequent confusion can have on customer satisfaction (Tang, Hsieh, & Chiu, 2017; Walsh & Mitchell, 2010). Confusion has also been shown to increase levels of dissatisfaction and distrust, as it results in negative emotions towards the product (Moon et al., 2017) and an increase in perceived risk (Chen & Chang, 2012).
- (5) **Brands** cluster. This last cluster (**blue**), consisting of keywords *brands* and *brand personality*, identifies a research branch of consumer confusion in which brands are investigated, most commonly in regard to consumer behavior and decision making (Pappas, 2015; Hall-Phillips & Shah, 2017). Problems of brands, copycat behavior, and their legal aspects have also been discussed (Humphreys et al., 2017a; Humphreys et al., 2017b; Mann, 2018). However, it is important to mention that the keyword *brand confusion* is placed in the first cluster due to the common addressing of the two keywords—that is, *consumer confusion* and *brand confusion*—together by authors. In this cluster, consumer confusion in relation to brands, including brand confusion, is usually discussed in relation to additional consumer behavior measures, such as brand recognition (Aribarg & Schwartz, 2020; Harrison, Moorman, Peralta, & Fayhee, 2017), purchase intention (Mann, 2018), and loyalty (Rutter, Chalvatzis, Roper, & Lettice, 2017).

Figure 3. Keyword co-occurrence analysis of consumer confusion literature.



Source: Own work

1.6.3.7 Discussion and conclusions

Confusion research might be reaching historic levels of its greatest importance. The amount of information and stimuli that individuals face is increasing, while the processing capacity cannot be biologically increased at the same pace. Consumer confusion is no exception, as the number of options, producers (and the similarity of their brands or offers), and inconsistencies in the available product information is greater than ever.

From the brief bibliometric analysis presented, research efforts in consumer confusion are evident. The number of publications is on the rise, and the **topics** covered are widening, as journals from different fields, including food science, marketing and consumer science, law, public policy, sustainability, and ethics, have already accepted manuscripts that investigate consumer confusion. The overview of the co-citation practices in this field implies that the decision-making and brand similarity literature is also relevant for the development and current state of the consumer confusion field. Additional analysis aimed at revealing patterns of topics' connections in the consumer confusion literature confirmed the importance of research on decision making and branding while adding several other important topics that emerged in the existing research, including consumer satisfaction, trust (often researched as an outcome of consumer confusion), and consumer behavior (most often researched in the context of food and nutrition).

As a complex problem, researching consumer confusion should be examined from different perspectives. The existing research shows that consumer confusion has been investigated in **different contexts**, where its effects on consumers have been confirmed. When it comes to

food references in consumer confusion literature, the most attention has been paid to the confusion that emerges from nutrition recommendations and labels (Hasler, 2008; Moon et al., 2017), both on products and mass media (e.g., Nagler, 2014; Basso, Bouillé, Le Goff, Robert-Demontrond, & Oullier, 2016).

The relevance of the connection between **consumer confusion and information processing** can also be observed from the keyword co-occurrence analysis (Subsection 1.6.3.6). In addition, analysis of the most locally cited authors in the consumer confusion literature identified Richard Petty—founder of the elaboration likelihood model (ELM) of persuasion, one of the most used theoretical information processing models—as one of the 15 most cited researchers. So far, the studies have mostly suggested consumer confusion as a consequence of information processing (e.g., Mitchell & Papavassiliou, 1999; Feiereisen, Wong, & Broderick, 2008). Nevertheless, novel research has proposed that consumer confusion also has the potential to influence information processing (Fitzgerald et al., 2019).

While **attitudes** also depend on information processing, the current state of research on consumer confusion does not offer a deeper investigation of its relationship with this concept. However, a strong connection to decision making (Subsection 1.6.3.6) can be seen. This is most likely a consequence of great research efforts to understand consumer confusion in marketing by analyzing purchasing situations where decisions must be made and where researchers mainly examine decision making instead of attitude formation.

The growth of the consumer confusion literature over time implies that the topic is gaining importance. More research in the area, including on how to successfully measure consumer confusion using different contexts and methods, is welcome in order to obtain the **holistic picture** of the phenomenon and be able to give recommendations for its reduction from both theoretical and practical perspectives. While the previous research opened questions relevant to this thesis, finite answers have not yet been offered, opening a space and creating the need for such research.

2 ATTITUDE STRENGTH LITERATURE

This chapter explores the concept of attitude strength, a relevant concept predominantly researched in social psychology literature. An extensive amount of research has been dedicated to understanding the formation of strong attitudes. The strength of attitudes determines their stability and influence on intentions and behaviors (Krosnick & Petty, 1995). Still, the stability and strength of attitudes are significantly influenced by personal characteristics, but also environmental factors that describe the situation in which attitudes are formed (Conway, et al., 2008; Shestowsky, Wegener, & Fabrigar, 1998).

In this thesis, attitude strength is discussed in relation to consumer confusion and information processing. As consumer confusion creates a challenging environment for all

cognitive processes, understanding how it affects attitudes and their strength is one of the logical steps of this research. The introduction of attitude strength in this chapter includes its definition, dimensions, and main characteristics. Furthermore, a quantitative evaluation of this literature field is offered in the bibliometric analysis presented in the last section of this chapter.

2.1 Theoretical overview of attitude strength

As one of the most relevant concepts in psychology research, attitudes have been thoroughly studied in the previous decades. Usually, **attitudes** are considered *general evaluations that individuals have regarding people, places, objects, and issues* (Petty & Briñol, 2010, p. 217). Their characteristics, bases, creation, change, and relationship with actual behavior motivated an evolution of a whole branch of literature.

While attitudes are generally conceptualized as relatively stable and enduring assessments that people make (Petty, Briñol, & DeMarree, 2007), these traits are not present in all attitudes, as some are quite malleable (Achen, 1975; Schwarz, 2007). Formed attitudes can vary in stability and strength, have varying degrees of influence on individuals' behavior, and are easier or harder to change (Krosnick & Petty, 1995). As unstable attitudes do not predict future behavior, stability is considered a key quality of strong attitudes (Luttrell, Petty, & Briñol, 2016).

As an attitude characteristic, **attitude strength** has been referred to throughout the development of attitude research in the 20th century, while the construct itself was not precisely defined (Krosnick & Petty, 1995) until the book titled *Attitude strength: Antecedents and consequences* **defined** it as “the extent to which attitudes manifest the qualities of durability and impactfulness” (Krosnick & Petty, 1995, p. 3). In general, strong attitudes have been referred to as *more stable attitudes, harder to change and more influential on information processing and the actual behavior of individuals* (Ajzen, 2001; Krosnick & Petty, 1995).

Four aspects of attitude strength described in the given definitions are therefore considered to be of crucial importance: *resistance, persistence, impact on decision making, and guiding behavior*. Their presence is necessary for an attitude to be referred to as strong. While all of these aspects are conceptually different, they exhibit a tendency of showing up together and even reinforcing each other. For example, a strong connection between attitude stability (shown through the resistance and persistence of an attitude) and the ability of attitude to influence and guide behavior has been claimed in the literature (Krosnick & Petty, 1995).

The **four aspects of attitude strength** are easily visible and represented with attitude attributes (i.e., dimensions) that are often operationalized and examined in attitude strength literature. Attitude strength is generally a complex construct to understand and

operationalize in research. While the reported valence—that is, the number on a measurement instrument that a respondent chooses—of the attitude seems straightforward, it takes more than this to genuinely understand and grasp all of the layers that attitude strength actually has. Krosnick and Petty (1995) divided the strength-related dimensions of attitudes into the following four categories (aspects) that indicate the main focus of the dimension.

(1) Aspects of the attitude itself

Strength-related attributes from this category hold the information about the attitude itself, and they directly describe it. *Attitude extremity* is one example, where the value respondents use to assess it directly shows attitude valence.

(2) Aspects of the cognitive structure of the attitude and attitude object

Dimensions from this category primarily focus on the attitude structure and facilitate the associative links that connect attitudes in memory to other cognitive elements. Several studies in attitude literature have proposed that attitude can be considered a link between the representation of an attitude object and its evaluation in memory of an individual (Fazio, 1986; Pratkanis, 1989; Fazio, 2007). *Knowledge* about an attitude object and *attitude ambivalence* are examples of dimensions belonging to this category.

(3) Subjective beliefs about the attitude and attitude object

This category captures strength-related attitude attributes that stem from an individual's perceptions of the attitude, sometimes referred to as metajudgmental attitude strength attributes (Bassili, 1996). These attributes are often criticized with an argument that people are often unable to judge their own thoughts and are even occasionally unaware of their existence (Bassili, 1996). *Personal relevance* of the attitude object, *attitude importance*, and *certainty* belong to this category. As attitude certainty is one of the most researched attitude strength dimensions that influence resistance to change and behavior (Briñol & Petty, 2012), skepticism about the relevance of attributes from this category is not always justified.

(4) Cognitive processes by which the attitude is formed

The cognitive processes category primarily targets a better understanding of the cognitive process behind attitude formation instead of the attitude itself or its structure, as seen in previous categories. *Elaboration*, which assesses the amount of thinking invested in attitude objects' evaluation, is placed in this category.

2.2 Dimensions of attitude strength

In the attitude literature, authors usually refer to 10 different dimensions of attitude strength. The first attitude strength attributes proposal described 10 attitude dimensions: extremity, intensity, ambivalence, salience, affective salience, cognitive complexity, overtness, embeddedness, flexibility, and consciousness (Scott, 1968). An extended version by Raden from 1985 included additional properties, such as accessibility, evaluative-cognitive consistency, certainty, direct behavioral experience, importance, latitudes of acceptance and rejection, and vested interest. As the research in attitude strength developed, additional attitude strength dimensions were proposed and examined (e.g., knowledge). All of them have their mechanisms of influence in shaping, maintaining, and changing consumer attitudes and their strength. While some of them are correlated and overlap to a certain extent, their distinctiveness has been shown (Krosnick et al., 1993).

Krosnick and Petty (1995) thoroughly examined each of the dimensions proposed by previous researchers. Due to some similarities in the dimensions (e.g., overtness and accessibility), they proposed a novel classification of attitude strength dimensions while taking into account already-established dimensions in the literature. **Ten dimensions** that they proposed have been both theoretically and empirically studied and accepted in the modern attitude strength literature, and they are presented and further discussed in the next ten sections. These dimensions are attitude extremity, elaboration, vested interest, attitude importance, personal involvement, attitude accessibility, working knowledge, attitude ambivalence, attitude certainty, and structural consistency.

2.2.1 Attitude extremity

Attitude extremity can be defined as “the extent to which an individual’s evaluation of an attitude object deviates from neutrality, usually measured by self-placement on a numerical scale of attitude position, varying from extremely negative to extremely positive” (Abelson, 1995, p. 38). While it can be a result of multiple unrelated factors (e.g., circumstances, personality, etc.), certain situations are known to influence the extremity of attitudes. These include controversial issues and group polarizations, commitment and suffering due to a particular attitude, and the time and dedication invested in thinking about a certain attitude and the extent to which it is linked to an individual’s identity (Abelson, 1995).

As an attitude dimension related to strength, attitude extremity **effects attitude strength** and its attributes (i.e., resistance, persistence, etc.). The extremity of attitudes mostly leads to their increased strength. Studies have also demonstrated the lower susceptibility of more extreme attitudes to persuasion, as well as their greater consistency with behavior (Sarat & Vidmar, 1976; Fazio & Zanna, 1978) and attitude accessibility (Downing, Judd, & Brauer, 1992), all of which are indicators of the strength of an attitude.

Studies that have examined the relationships among the dimensions of attitude strength have reported a correlation and mutual reinforcement between attitude extremity and attitude certainty (Krosnick et al., 1993; Gross, Holtz and Miller, 1995). The relationship with attitude accessibility has also been confirmed. More extreme attitudes were found to be more easily accessible in memory (Fazio & Williams, 1986). In addition, researchers have made connections between the dimensions established by different authors (e.g., Scott, 1968; Raden, 1985). Hence, attitude extremity has been used as a proxy for measuring attitude intensity on some occasions (McDill, 1959).

2.2.2 Elaboration

Attitude elaboration is frequently referred to as either “the amount of issue-related thinking the person has done about the attitude object” (Petty, Haugtvedt, & Smith, 1995, p. 94) or the “extent of thoughtful processing an individual directs *towards* an attitude object or issue, including their scrutiny of the information contained in a persuasive message or retrieved or generated from memory” (Barden & Tormala, 2014, p. 17). The relevance of elaboration in the formation and change of attitudes is best seen from the ELM, which is a dual process theory that examines how different levels of elaboration lead to different attitudes and persuasion effectiveness (Petty & Cacioppo, 1986). An effortful route of information processing that involves high elaboration **leads to stronger attitudes** that also show greater influence on behavior (Petty et al., 1995). Ability and motivation are of crucial relevance to the level of elaboration employed by the individual (Petty et al., 1995). These two factors can be influenced by multiple contextual variables, such as personal interest, issue-relevant knowledge, and the need for cognition (Barden & Tormala, 2014).

The reinforcement that elaboration provides to attitude strength may be a result of several other **processes** (Petty, et al., 1995). For example, *knowledge acquisition* that results from greater elaboration can lead to an increase in attitude strength. Extensive elaboration may also result in the *structural consistency* of attitude in such a way that elaborated thinking about the attitude reconciles thoughts and feelings so that they all fall in line with each other and remain consistent, thereby increasing attitude strength. Two attitude strength dimensions are found to have a similar mediating role in the relationship between elaboration and attitude strength.

Attitude accessibility can also be a result of elaboration. Namely, the more an individual thinks about the attitude object, the more salient and accessible their attitude is expected to become, which positively affects the attitude strength aspects, such as resistance and persistence (Fazio & Zanna, 1978; Barden & Tormala, 2014). On the other hand, attitude certainty, as a metacognitive construct, influences elaboration through the feeling of conviction and confidence. The correlation between attitude certainty and elaboration has already been established (Krosnick et al., 1993).

2.2.3 Vested interest

Vested interest aims to grasp “the extent to which an attitude object is hedonically relevant to the attitude holder” (Crano, 1995, p. 132). Several components and influences of vested interest have been identified in the literature. These include the personal consequence or stake for attitude holder in attitude object, the salience of the attitude object, the certainty or probability that an individual attaches to the consequences of the attitude object (i.e., how probable it is that the consequences of the attitude object will actually happen, as assessed by the attitude holder), the immediacy of the attitude object’s consequences, and the self-efficacy (individual’s perception of ability to behave consistently with the implications of attitude object). The greater the magnitude of these components, the greater the vested interest and, consequently, attitude strength and attitude-behavior consistency (Crano, 1995).

Highly vested attitudes are **stronger attitudes** often reflected in behavior. Vested interest is closely related to the personal importance of the attitude to the individual, where important attitudes widen the spectrum from personally relevant matters of interest to national, international, and even abstract matters (Crano, 1995). Vested interest is also closely related to the attitude strength dimensions of attitude accessibility—highly vested attitudes seem more important, and as such, they are more accessible in the individual’s memory (Holbrook, Berent, Krosnick, Visser, & Boninger, 2005; Krosnick, 1988b)—and personal involvement—the two dimensions have similar effects on attitude change and formation (Crano, 1995).

2.2.4 Attitude importance

Attitude importance can be defined as “an individual’s subjective sense of the concern, caring and significance he or she attaches to an attitude” (Krosnick, 1988b, p. 932). Important attitudes usually show greater stability over time, and their resistance to persuasion is higher (Krosnick, 1988b). They are considered to be strongly linked with other psychological elements, attitudes, beliefs, and values that individuals hold in their memory (Krosnick, 1988a). Important attitudes are also found to influence individuals’ behavior (Visser, Krosnick, & Simmons, 2003).

Important attitudes tend to be more elaborated upon and, as a consequence, more extreme (Tesser, 1978; Krosnick, 1988b). Attitude importance also impacts information processing. Namely, the strength of important attitudes is reinforced by their ability to increase information processing motivation. Consequently, increased information processing influences accessibility, extremity, and knowledge (e.g., Holbrook et al., 2005), all of which positively influence the strength of the given attitude.

2.2.5 Personal involvement

Personal involvement with something reflects “the extent to which it affects, impinges on, reflects, or is otherwise associated with the self” (Sherif, 1979, as cited in Thomsen, Borgida, & Lavine, 1995). Several aspects of the self—namely, material, social, and spiritual—can trigger personal involvement (James, 1890; Thomsen et al., 1995). Additionally, the following three types of personal involvement have been observed, all of which can increase the motivation to process information, influence persuasion, and change particular attitudes.

- (1) **Value-relevant involvement** “refers to the psychological state that is created by the activation of attitudes that are linked to important values” (Johnson & Eagly, 1989, p. 290).
- (2) **Impression-relevant involvement** is the level of involvement invested in order to create the impression that an individual has on others depending on motivation (Johnson & Eagly, 1989).
- (3) **Outcome-relevant involvement** is the level of involvement by the relevance of an issue to an individual’s currently important goals or outcomes (Johnson & Eagly, 1989).

While research has shown that involvement inhibits attitude change and enhances **attitude stability** (Johnson & Eagly, 1989), the information processing itself might be enhanced (i.e., effortful) when personal involvement is high (Petty & Cacioppo, 1986; Chaiken, 1980). In addition to this, attitudes in which individuals are highly involved may influence their other attitudes and judgments to a greater extent than vice versa (Thomsen et al., 1995).

When it comes to its link to other attitude strength dimensions, personal involvement is closely related to attitude importance, with which it partially overlaps (Thomsen et al., 1995). High levels of involvement are also found to trigger greater elaboration and increase attitude accessibility (Bargh, Chaiken, Govender, & Pratto, 1992).

2.2.6 Attitude accessibility

Attitude accessibility has been defined as “the likelihood that the attitude will be activated from memory automatically when the object is encountered” (Fazio, 1995, p. 248). Repetition, sensory experience with an attitude object, emotional reaction to an attitude object, and previous experience are considered attitude accessibility determinants (Powell & Fazio, 1984; Fazio, 1995). More accessible attitudes have a greater role in attitude-behavior consistency (translating attitudes into actual behavior) (Fazio, Chen, McDonel, & Sherman, 1982; Fazio, Powell, & Williams, 1989), and they have the **ability to bias information processing**, judgment, and decision making in favor of the accessible attitude (Fazio, 1995). They tend to lead to the increased elaboration of information (Houston & Fazio, 1989). Attitude stability and persistence are also encouraged by the accessibility of an attitude (Houston & Fazio, 1989).

Attitude accessibility is shown to be moderately related to attitude importance (Krosnick, 1989), where greater importance triggers the accessibility of the attitude (Bizer & Krosnick, 2001), which in turn influences metacognitive attitude strength dimensions such as attitude certainty (Holland, Verplanken, & van Knippenberg, 2003).

2.2.7 Working knowledge

Knowledge as an attitude strength dimension mainly indicates working knowledge—that is, “the amount of attitude-relevant information one can retrieve from memory” (Wood, Rhodes, & Biek, 1995, p. 285). While it is mostly a cognitive dimension resulting in more extensive elaboration (Wood, 1982), working knowledge is rare in the attitude strength literature that emphasizes the importance of emotions and affect in attitudes. **Strong attitudes** are built on a structure of intertwined information (i.e., knowledge) and feelings (i.e., affect) in memory (Wood et al., 1995).

This connection between the information and feelings, crucial for attitude formation and strength, frequently biases information processing and attitude change. For example, a mild affective component leads to lower motivation for information processing, regardless of the knowledge. In such circumstances, objective information processing is possible. Conversely, where the affective component is very high and the knowledge is low, biased information processing occurs, guided by the affect (Wood et al., 1995).

2.2.8 Attitude ambivalence

Attitudinal ambivalence “refers to the degree to which an attitude object is evaluated positively and negatively at the same time” (Jonas, Broemer, & Diehl, 2000, p. 35). It encompasses the “simultaneous existence of positive and negative beliefs or emotions with regard to the same object in an individual’s attitudinal basis” (Jonas et al., 2000, p. 41). Attitudinal ambivalence reminds that the attitudes are not exclusively unidimensional, as is sometimes believed; instead, they can include several dimensions that can differ among themselves and contribute to the attitude (Jonas et al., 2000). This implies that certain evaluative inconsistencies exist in ambivalent attitudes (Kaplan, 1972; Thompson, Zanna, & Griffin, 1995). Positive and negative evaluations of a single attitude object do not cancel each other out to achieve neutral or near-neutral attitudes. Instead, inconsistencies remain in ambivalent attitudes, as their origins can be different attitude objects’ characteristics that cannot be compared or neutralized (Jonas et al., 2000).

Attitudinal ambivalence influences aspects of **attitude strength** differently. The persistence of attitudes is expected to decrease in case of ambivalent attitudes, while their resistance to change seems to increase due to the lower power of additional arguments on already complex attitudes consisting of multivalent counterarguments (Jonas et al., 2000). Information processing in ambivalent attitudes and new information received about attitude

objects seem more objective, while the effect that these attitudes have on behavior might be difficult to assess, as reported attitudes might not grasp the entire complexity and valence of the attitude, hence decreasing attitude-behavior relationship trackability (Jonas et al., 2000).

The ambivalence of attitudes can be regarded in relation to other strength-related attitude dimensions. For instance, it is generally negatively correlated with attitude extremity (Kaplan, 1972) and consistent knowledge (Thompson et al., 1995). Because of the degree of ambiguity that both have, the link between attitude ambivalence and attitude certainty is frequently studied and considered to be, at least partially, overlapping. The two dimensions of attitude strength interact, help predict future behavior (Luttrell et al., 2016), and influence attitude stability (Luttrell, Petty, & Briñol, 2020). Neurological studies have managed to distinguish between the regions tracking these two dimensions of attitude strength and show their uniqueness (Luttrell et al., 2016).

2.2.9 Attitude certainty

Attitude certainty is one of the most commonly researched strength-related attitude dimensions. It is conceptually defined as “a subjective sense of conviction or validity about one’s attitude or opinion” (Gross et al., 1995, p. 215). Since it represents a thought about the thought, it is a metacognitive aspect of attitudes (Bassili, 1996). Due to its complexity, attitude certainty is considered a multidimensional concept. Studies have proposed measuring attitude certainty by using two distinct dimensions: attitude clarity, reflecting “one’s feeling as though one knows what one’s true attitude on a topic really is,” and attitude correctness, which reflects confidence “that the attitude is correct, valid, or justified” (Petrocelli, Tormala, & Rucker, 2007, p. 31). In addition to this, it can be regarded as another strength-related dimension that has both cognitive and affective components.

A major research effort has been made to explain the uniqueness of both attitude certainty and attitude ambivalence. Arguments include the claim that a person can be certain of their attitude even if it is **ambivalent**—for instance, smokers can be certain that their attitude towards smoking is contradictory (Tormala & Rucker, 2007). Additionally, presenting individuals with both positive and negative sides of an attitude object, while highlighting incongruent information and causing ambivalence, can also increase attitude certainty (Rucker & Petty, 2004).

Attitude certainty can be **supported by different factors**, including other strength-related dimensions, such as knowledge (including direct experience), elaboration, and attitude accessibility (Gross et al., 1995). Repetition and the type of processing can also influence certainty (Tormala & Rucker, 2007). Social factors, such as social influence, consensus, and social support, are among the most effective factors for reducing uncertainty in individuals and their attitudes (Gross et al., 1995; Tormala & Rucker, 2007).

The consequences of attitude certainty include the need for confirmation in the form of additional obtaining and seeking of information (Gross et al., 1995), greater attitude-behavior consistency—an increase in attitude certainty has been found to increase the attitude’s ability to guide behavior (Fazio & Zanna, 1978; Bizer, Tormala, Rucker, & Petty, 2006)—and greater resistance to persuasion and change (Tormala & Rucker, 2007).

2.2.10 Structural consistency

The consistency of attitudes as a strength-related dimension was first examined as the affective-cognitive consistency of attitudes since the affect was used synonymously with evaluation (Chaiken, Pomerantz, & Giner-Sorolla, 1995). When investigating structural consistency in the modern attitude strength dimension research, authors have mainly referred to it as evaluative-cognitive consistency, which is defined as “the degree of consistency that exists between a person’s overall, abstract evaluation of an attitude object and the evaluative meaning of his or her beliefs about the object” (Chaiken et al., 1995, p. 388).

Similar to other attitude strength dimensions, the structural consistency of an attitude, if high, can aid **attitude stability**, resistance to influences, and persuasion and strengthen the attitude-behavior relationship (Chaiken et al., 1995; Chaiken & Yates, 1985; Millar & Tesser, 1989). Interestingly enough, while other strength-related dimensions usually correlate with each other and show certain levels of overlap, structural consistency does not appear to be associated with other attitude strength dimensions (Krosnick et al., 1993); rather, it has a distinct mechanism of influencing strength of an attitude.

2.3 Attitude strength research: Bibliometric field analysis

As attitude strength is one of the relevant concepts for this research and for attitude research in general, it is important to summarize the knowledge of the field and get a better starting point for future research. To get a better grasp of the attitude strength literature and its general characteristics, a bibliometric study was designed and conducted. Several research questions were developed and examined to visualize and organize the existing attitude strength research.

- Who are the most influential authors in the literature on attitude strength?
- What topics have been explored in the literature on attitude strength?
- What sources (journals) have published attitude strength research?

In the process of answering these questions, the data about the existing publications in this research field was first collected. The collected data was then cleaned, organized, and assessed to visualize the attitude strength literature and draw conclusions that make it possible to quantitatively summarize its relevant characteristics. The methodology of bibliometric procedures used is described in Subsection 1.6.2.

2.3.1 Data collection

A search for the term “*attitude strength*” was conducted in WoS in October 2020. Although a search for separate strength dimensions was not conducted, the articles dealing with the specifics of these dimensions within the attitude strength literature were included in the final database. The search resulted in a pool of 10,750 articles, which was narrowed down to 4,717 once the field of research was set to psychology, management, business, economics, and social science—the fields with the most research interest in attitudes. Only 4,384 articles, reviews, and book chapters written in English were finally selected before the manual revision of articles. Titles and abstracts were screened in November 2020, and **258 publications** were included in the final selection used for further analysis of the field. The main reasons for exclusion were the lack of a strength component when researching attitudes (e.g., job attitudes, brand attitudes, product attitudes measured without reference to their strength) and measuring the strength of unrelated objects (e.g., argument strength, relationship strength).

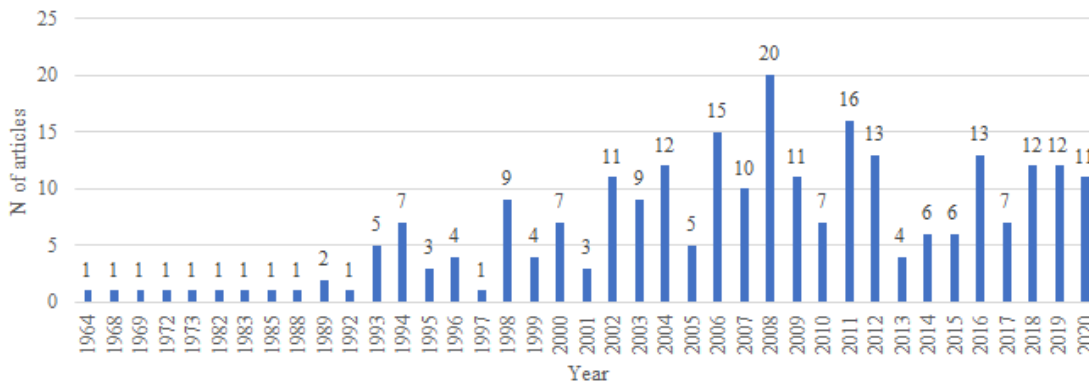
After the publications’ selection, their descriptive data (i.e., titles, authors, references, journal of publication, year of publication, author keywords, abstract) was downloaded. This metadata was later used for the bibliometric mapping of the attitude strength literature using VOSviewer (van Eck & Waltman, 2010) and R biblioshiny software in the bibliometrix package (Aria & Cuccurullo, 2017). The results obtained are discussed below, and general sample characteristics are available in Appendix 3.

2.3.2 Development of the literature field: Annual publications overview

Over time, the attitude strength literature has grown consistently (Figure 4). However, due to the significant increase in the number of publications on the majority of the topics, a relatively **small growth** in the attitude strength literature over the years might be considered peculiar. The first publications in this field appeared in the 60s, when attitude research in general was flourishing (Briñol & Petty, 2012). Research interest in attitude strength and its dimensions increased in the 90s and early 2000s, when the book summarizing the most important realizations in this field was published (Petty & Krosnick, 1995).

After this publication, there was a period when attitude strength and its dimensions were extensively researched. The interactions between attitude strength dimensions were also researched during this period (e.g., Visser et al., 2003; Haddock, Rothman, Reber, & Schwarz, 1999). Attitude certainty emerged as one of the most researched attitude strength dimensions (Tormala & Petty, 2004; Cheatham & Tormala, 2015), followed by attitude ambivalence (Brömer, 1998; Armitage & Conner, 2000). The highest publication production in this area was recorded in the first decade of the 21st century, after which the number of yearly publications fell and stabilized at an average of 11 publications per year over the last five years.

Figure 4. Attitude strength literature: Annual scientific production (in publications)



Source: Own work

2.3.3 Most cited authors in attitude strength literature

The analysis of the most locally cited authors brought up 15 well-known names from the social psychology literature (Table 3). Due to their common interest in attitudes, attitude strength, and its dimensions, multiple collaborations and co-authorships are understandable. **Richard Petty** is known for his work on attitude strength, along with other relevant topics in this area (see the next chapter). Together with colleague **Jon Krosnick**, he edited the book *Attitude strength: Antecedents and consequences* (Petty & Krosnick, 1995), which conducts a comprehensive investigation of attitude strength, its dimensions, and their relationships with one another. Among other relevant contributions to social psychology literature, he is also known for his research on attitude change with **Cacioppo** (Cialdini, Petty, & Cacioppo, 1981; Petty & Cacioppo, 1986).

Fazio extensively researched the relationship between attitudes, attitude strength dimensions, and behavior (Fazio et al., 1982; Fazio, 1986), while **Tormala** devoted most of his research efforts to studying attitude certainty (Tormala & Petty, 2002; Tormala & Rucker, 2018). **Bassili** and **Visser** researched attitude strength dimensions and their measures (Bassili, 1996; Bassili & Krosnick, 2000; Visser & Krosnick, 1998; Visser, Bizer, & Krosnick, 2006), and **Chaiken and Eagly** contributed significantly to knowledge of the psychology of attitudes and attitude structure (Eagly & Chaiken, 1993; Eagly & Chaiken, 1998). **Skitka** examined the role of moral conviction in attitudes and their strength (Skitka, Bauman, & Sargis, 2005; Skitka, 2010), **Abelson** investigated attitudes in general and their extremity as a strength dimension (Abelson, 1972; Abelson, 1995), and **Priester** investigated attitude bases, change, and strength in both social psychology and marketing (Park et al., 2010; Priester & Petty, 2003).

Several authors from this list have also contributed some of the most relevant theories in social psychology. Apart from Petty, Cacioppo, and Chaiken, who contributed substantially to our knowledge on dual process theories (Chaiken, 1980; Petty & Cacioppo, 1986), **Ajzen and Fishbein** are well-known for their groundbreaking work on the relationship between

beliefs, attitudes, intentions, and behavior, their theory of planned behavior, and their theory of reasoned action (Ajzen, 1991; Fishbein & Ajzen, 1975; Ajzen & Fishbein, 2005; Ajzen & Fishbein, 1980). **Festinger** also developed and assessed the theory of cognitive dissonance (Festinger, 1957).

Table 3. Attitude strength literature: Top 15 most locally cited authors.

Authors	Citations
Petty, R.E.	489
Fazio, R.H.	445
Krosnick, J.A.	324
Tormala, Z.L.	170
Bassili, J.N.	156
Chaiken, S.	128
Eagly, A.H.	127
Cacioppo, J.T.	100
Visser, P.S.	94
Ajzen, I.	92
Priester, J.R.	90
Festinger, L.	81
Skitka, L.J.	80
Fishbein, M.	78
Abelson, R.P.	78

Source: Own work

2.3.4 Most locally cited publications in attitude strength literature

Table 4 summarizes the top 20 articles from the attitude strength database used for this research by the number of citations acquired locally (LC)—that is, the 20 articles in the database that have been most frequently cited by other publications in the database. Most articles were published in the *Journal of Personality and Social Psychology*, once again firmly positioning the attitude strength field in the social psychology literature. The total number of citations (TC) confirms the relevance of these publications, as 13 of them have more than 100 citations.

Fourteen of the 20 most locally cited articles were written by at least one of the most cited authors from the attitude strength literature (discussed in the previous section). The articles were published between 1985 and 2008. Half of the articles primarily deal with attitude strength, while the other half highlight its dimensions—individual or combined.

Table 4. Attitude strength literature: Top 20 most locally cited publications.

Authors (journal of publication)	Title	Year	LC	TC
Krosnick et al. (<i>Journal of Personality and Social Psychology</i>)	Attitude strength: One construct or many related constructs?	1993	98	427
Bassili (<i>Journal of Personality and Social Psychology</i>)	Meta-judgmental versus operative indexes of psychological attributes: The case of measures of attitude strength	1996	87	373
Pomerantz et al. (<i>Journal of Personality and Social Psychology</i>)	Attitude strength and resistance processes	1995	47	242
Raden (<i>Social Psychology Quarterly</i>)	Strength-related attitude dimensions	1985	40	117
Tormala and Petty (<i>Journal of Personality and Social Psychology</i>)	What doesn't kill me makes me stronger: The effects of resisting persuasion on attitude certainty	2002	32	194
Fazio et al. (<i>Journal of Experimental Social Psychology</i>)	Attitude accessibility, attitude-behavior consistency, and the strength of the object-evaluation association	1982	31	383
Petrocelli et al. (<i>Journal of Personality and Social Psychology</i>)	Unpacking attitude certainty: Attitude clarity and attitude correctness	2007	30	146
Visser and Mirabile (<i>Journal of Personality and Social Psychology</i>)	Attitudes in the social context: the impact of social network composition on individual-level attitude strength	2004	25	156
Armitage and Conner (<i>Personality and Social Psychology Bulletin</i>)	Attitudinal ambivalence: A test of three key hypotheses	2000	24	188
Visser et al. (<i>Advances in experimental social psychology</i>)	Exploring the latent structure of strength-related attitude attributes	2006	23	109
Visser et al. (<i>Journal of Experimental Social Psychology</i>)	Distinguishing the cognitive and behavioral consequences of attitude importance and certainty: A new approach to testing the common-factor hypothesis	2003	20	96
Roese and Olson (<i>Journal of Experimental Social Psychology</i>)	Attitude importance as a function of repeated attitude expression	1994	19	50
Haddock et al. (<i>Personality and Social Psychology Bulletin</i>)	Forming judgments of attitude certainty, intensity, and importance: The role of subjective experiences	1999	19	109
Rucker and Petty (<i>Journal of Personality and Social Psychology</i>)	When resistance is futile: Consequences of failed counterarguing for attitude certainty	2004	18	79
Barden and Petty (<i>Journal of Personality and Social Psychology</i>)	The mere perception of elaboration creates attitude certainty: Exploring the thoughtfulness heuristic	2008	18	88
Lavine, Huff, Wagner, and Sweeney (<i>Journal of Personality and Social Psychology</i>)	The moderating influence of attitude strength on the susceptibility to context effects in attitude surveys	1998	17	69
Visser and Krosnick (<i>Journal of Personality and Social Psychology</i>)	Development of attitude strength over the life cycle: surge and decline	1998	16	128
Bize and Krosnick (<i>Journal of Personality and Social Psychology</i>)	Exploring the structure of strength-related attitude features: The relation between attitude importance and attitude accessibility	2001	15	69
Holland et al. (<i>Journal of Experimental Social Psychology</i>)	From repetition to conviction: Attitude accessibility as a determinant of attitude certainty	2003	14	72
Skitka et al. (<i>Journal of Personality and Social Psychology</i>)	Exploring the structure of strength-related attitude features: The relation between attitude importance and attitude accessibility	2005	14	325

Source: Own work

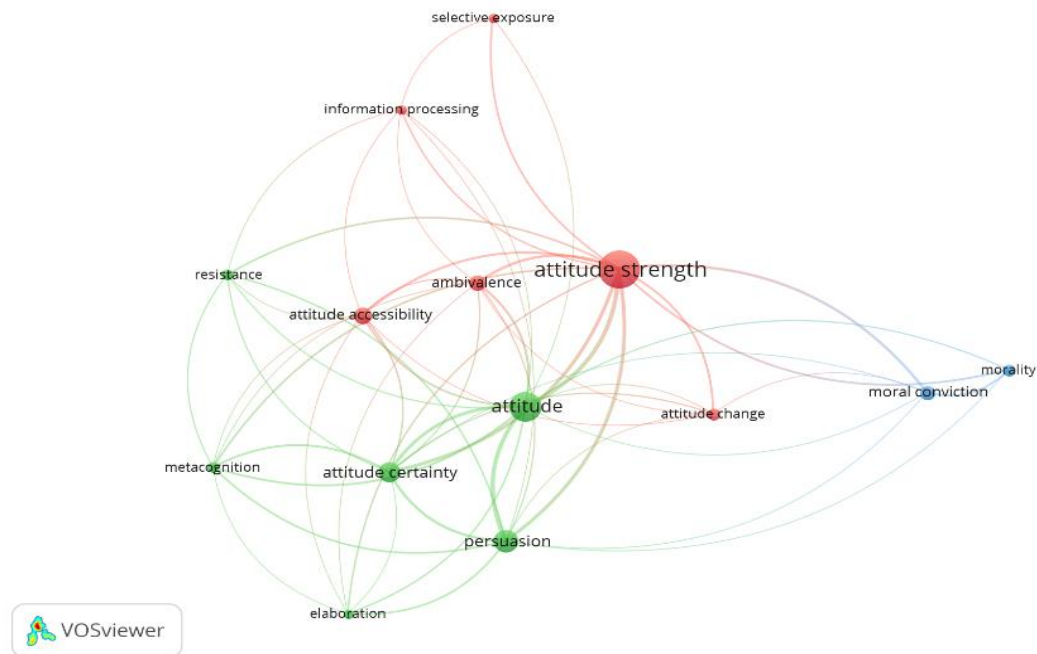
2.3.5 Attitude strength: Keyword co-occurrence analysis

In mapping the attitude strength literature and relevant topics that emerge within it, a **keyword co-occurrence analysis** was conducted. The attitude strength publications database contained 433 keywords, out of which 14 had five or more occurrences across publications. These **14 keywords** were included in the co-occurrence analysis due to their frequent usage. All of the identified keywords represent relevant constructs in social psychology.

Three clusters (topics) were identified in the keyword co-occurrence analysis (Figure 5).

- (1) **Attitude strength.** This **red** cluster is home to the central keyword of this keyword co-occurrence analysis, **attitude strength**, which is represented with the largest dot. Five additional keywords belong to this cluster: *ambivalence*, *attitude accessibility*, *attitude change*, *information processing*, and *selective exposure*. Attitude ambivalence and attitude accessibility are two dimensions of attitude strength, and they are frequently researched as factors influencing attitude strength (e.g., Fazio et al., 1982; Thompson et al., 1995). Individuals' decision to selectively expose themselves to new information, especially that which is inconsistent with their attitudes, is related to the strength of the attitude (Brannon, Tagler, & Eagly, 2007), biasing information processing, and attitude change (Smith, Fabrigar, Powell, & Estrada, 2007).
- (2) **Attitude-persuasion research.** This **green** cluster is closely related to attitude research. In particular, it is dominated by the keywords specific to **persuasion** research, a branch of attitude research closely related to attitude strength and attitude change (Pomerantz et al., 1995). Six keywords represent this theme: *attitude*, *attitude certainty*, *persuasion*, *elaboration*, *resistance*, and *metacognition*. Several publications connect all of the keywords from this cluster, and their results suggest that resistance to persuasion due to high elaboration increases attitude certainty (Tormala & Petty, 2004a; Barden & Petty, 2008) and metacognition as the awareness of individuals' own cognitive states and processes is used to explain this relationship (Tormala & Petty, 2004b).
- (3) **Morality.** This **blue** cluster consists of two author keywords: *morality* and *moral conviction*. While portrayed in a separate cluster, these keywords are frequently researched as influencers of attitude strength. Attitudes perceived as **moral** are rated as stronger by their holders (Luttrell, Petty, Briñol, & Wagner, 2016; Skitka, Bauman, & Sargis, 2005). Such moral attitudes also show greater resistance to persuasion, as well as increased attitude-intention consistency (Luttrell et al., 2016). The appearance of this cluster demonstrates the importance of morality and its effects on attitudes for this field of research.

Figure 5. Attitude strength literature: Keyword co-occurrence analysis.



Source: Own work

2.3.6 Attitude strength literature: Source co-citation analysis

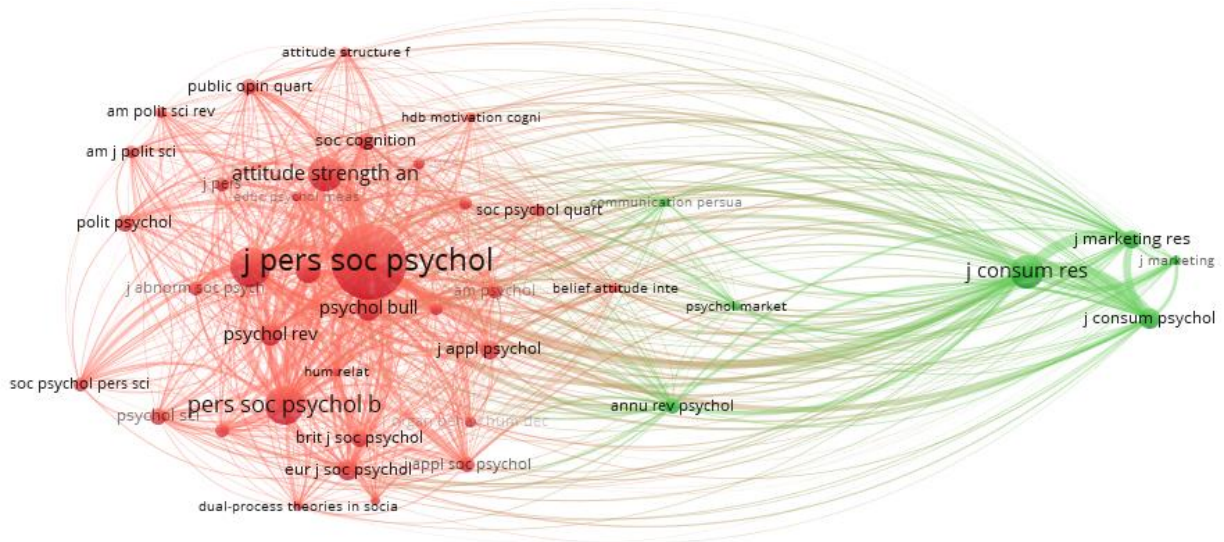
While the literature clearly positions attitude research in the fields of psychology and social psychology, the knowledge that it provides is highly relevant to other disciplines. In order to identify the fields that publish relevant attitude strength articles, a **source co-citation** analysis was conducted. In the database, over 2,000 sources were found, while only 41 had over 40 citations and were selected for further analysis.

The source co-citation analysis in VOSviewer detected **two distinct clusters** of publication sources in the attitude strength literature (Figure 6). The main cluster (red) contains four times more sources than the second cluster (green). The list of all sources is available in Appendix 3.

The **red** cluster predominantly consists of journals from *psychology and social psychology*. These sources publish articles with both theoretical and empirical (mainly experimental) approaches to researching attitudes, their strength, and outcomes for social psychology. Additionally, several handbooks were detected in this cluster, such as *Attitude Strength: Antecedents and Consequences*, edited by Petty and Krosnick (1995), and *Handbook of motivation and cognition: Foundations of social behavior* by Sorrentino and Higgins (1986). A strong connection between the red cluster and sources from the green cluster can be observed. Sources from this cluster are mainly published articles from *marketing and*

consumer psychology literature. Due to the relationship of attitude strength with behavioral intention and behavior, the interest of consumer-oriented research and the sources that publish it in understanding attitude strength in situations involving brands, consumption, and product selection is understandable.

Figure 6. Attitude strength literature: Source co-citation analysis.



Source: Own work

2.3.7 Discussion and conclusions

The complexity of attitudes and their relationship with behavior has inspired research, primarily in psychology-related fields. Consequently, attention and research has also been devoted to the properties of attitudes that enhance this relationship, such as attitude strength. Researchers have aimed to better understand attitude strength and its mechanisms of influence on behavior, its dimensions, and the mechanisms' ability to reinforce each other and attitude strength.

Important research has been conducted in the attitude strength literature over the years. Although this research field has not followed the pattern of extensive growth evident in most areas due to the proliferation of scientific publications in general, the research published in this area is impactful in multiple disciplines of psychology. Several authors (e.g., Petty, Fazio, and Krosnick) have proven their expertise in the field, and their publications demonstrate a broad knowledge of attitude strength and the specifics of its dimensions and their interplay. Apart from attitude strength and its dimensions, the research in this field seems to value morality and moral conviction as well, drawing attention to its influence on attitudes and their strength.

The extensive literature on attitude strength has aimed at evaluating its determinants, links, and effects in various contexts, and it flourished at the beginning of the 21st century. Most

of the research on attitude strength remained in the domain of social psychology, while other disciplines that investigate attitudes (e.g., consumer studies) have yet to examine the effects that the stimuli available to individuals in these settings can have on attitudes and their strength. The research of **attitude strength** in cognitively overwhelming scenarios that individuals now experience on a daily basis (i.e., in a digital environment) is only starting, and it is promising a somewhat novel perspective on the existing knowledge and its applicability to the online world of information, its processing, and attitude formation (van Strien, Kammerer, Brand-Gruwel, & Boshuizen, 2016).

Investigation of author keywords (Subsection 2.3.5) indicates that attitude strength has already been researched in relation to **information processing**, a concept described in the following chapter (Chapter 3). In the existing research, attitude strength has been found to influence information processing; since stronger attitudes are harder to change, information processing can be biased by attitude strength (Pomerantz et al., 1995; van Strien et al., 2016). In turn, the amount of information processing can also positively influence consumers' attitude strength through the perception of greater elaboration and effort (Barden & Tormala, 2014).

While the keyword analysis did not reveal that consumer-related constructs are of interest in the field's core (including consumer confusion), the analysis of sources (source citation, as discussed in Subsection 2.3.6) indicated that **marketing and consumer psychology** literature is in fact relevant to attitude strength research. The analysis identified consumer psychology literature as one of the two most important areas of publication on attitude strength, implying a link to consumer research.

Following the obvious connection between attitude strength and information processing, we further investigate this relationship empirically (Chapter 6, Study 2). In addition, we introduce the concept of **consumer confusion**, and by evaluating its relationship with attitude strength, we help improve the understanding of the relationship between social psychology and marketing. The context that we selected, **online food and nutrition information**, has already attracted some research interest in attitude strength literature (Schäfer, 2020). While that study puts knowledge and information sources in the spotlight, this thesis provides a somewhat broader perspective with the inclusion of consumer confusion and information processing as crucial elements.

3 HEURISTIC-SYSTEMATIC INFORMATION PROCESSING LITERATURE

This chapter elaborates on yet another theoretical concept relevant for this thesis: information processing. Extensively researched in psychology, mechanisms and ways of information processing continue to draw the attention of marketing and consumer researchers as well. The modern environment, which fosters consumer confusion, is an

additional challenge for effortful and thorough information processing. This chapter focuses on a specific dual process theory of information processing: the **HSM**. After providing a brief introduction of the literature field, this chapter offers an overview of the quantitative characteristics of the existing research in form of a bibliometric study.

3.1 Theoretical overview of dual process theories

While the interest in the mind and cognition of humans originates from ancient times, the visions of information processing from older periods have been assessed as not crucially influential to the emergence and development of the modern dual process theories (Frankish & Evans, 2009). Instead, dual process theories in social and cognitive psychology stem from the research by Schneider and Shiffrin (1977), who proposed a distinction between controlled and automatic processes in attention.

One of the first **dual process theories** was proposed by Evans (1984). In essence, it suggests that people cognitively process information either in a **slow manner** and with a lot of effort, or the processing is more or less automatic, **fast**, and low in required effort (Evans, 1984; Frankish & Evans, 2009). The development of the dual process theory and its thought brought different interpretations of the two manners of information processing, later also called systems and routes of information processing.

For example, Reber (1993) suggested that the implicit, effortless, and unconscious cognition and information processing is a default and dominant system, while the explicit, conscious system is unique to humans and, due to its cognitive demandingness, is used only from time to time—much less frequently than commonly assumed. In this interpretation of dual processing, the implicit system and the frequency of its usage are not highly variable across humans because it is independent from intelligence. Epstein (1994) proposed an integration of the Freudian dual process distinction of primary and secondary process thinking with the **cognitive** nature of the unconscious system, which resulted in the first attachment of emotional processing to dual process theories. This emotional element was envisioned to belong to the fast, unconscious route of information processing. In his research, he made a clear distinction between “the existence of a conscious, deliberative, analytical system that could reasonably be labeled a rational system”—widespread in many processing theories—and an experiential system “not limited to nonverbal processing of information, as emotion-arousing verbal stimuli also evoke experiential processing.” a novel **affective component** which integration in dual processing he suggested (Epstein, 1994, p. 714; Frankish & Evans, 2009).

The dual process approach proposed by Evans and Over (1996) focused on the **idea of two rationalities**—**instrumental** rationality, comparable to implicit, automatic reasoning, and **normative** rationality, comparable to the explicit, effortful system—that guides the processes of reasoning and judgment that do not involve each other. In their

conceptualization, they noted that “most of the time our decision making is automatic and habitual, but it does not have to be that way ... consciousness gives us the possibility to deal with novelty and anticipate the future” (Evans & Over, 1996, p. 156). This ability of anticipation and hypothetical thinking, along with the ability of humans to differentiate between these suppositions and actual beliefs, are all attributed to the recently evolved explicit system that is considered one of the greatest contributions of Evans’ and Over’s research (Frankish & Evans, 2009).

Sloman’s research from 1996 proposed two similar systems of reasoning, naming them the **associative** (comparable to implicit) and **rule-based** (explicit) systems. This conceptualization of dual process theories is currently considered one of the crucial moments that inspired the integration of dual process theories using the shared names of systems—that is, paths and routes of processing (Smith & Collins, 2009). An additional major conceptualization of dual process reasoning and decision making appeared in 1999 (Stanovich, 1999). In this approach, the terms “**system 1**” and “**system 2**” were coined. In his research, Stanovich managed to demonstrate the relevance of general intelligence for abstract, effortful thinking and reasoning (system 2), but not for system 1, similar to Reber’s (1993) findings.

While being the most recognized for his work on prospect theory, Kahneman also contributed to the research on dual information processing. Apart from examining two modes of thought and information processing, **instinctive** (emotional) and **extensional** (logical, deliberative), Kahneman also successfully extended knowledge of biases, heuristics, and bounded rationality, all of which are relevant to understanding modes of processing (Tversky & Kahneman, 1974; Tversky & Kahneman, 1979; Kahneman, 2003). This research was mostly conducted in cooperation with his colleague Tversky. In the past decade, he has gained a great deal of popularity from his writing for the general public. His books, including *Thinking, fast and slow*, educate readers about the duality of thought and foster its application across various disciplines.

Several other approaches to dual process theories evolved in the 90s. The two routes (systems) of information processing have been named intuitive and analytical or intuitive and rational (Epstein, Pacini, Denes-Raj, & Heier, 1996), experiential and rational (Pacini & Epstein, 1999), and holistic and analytical (Choi, Koo, & Choi, 2007; Buchtel & Norenzayan, 2009). Other terms describing dual process models, developed in other branches of psychology, are also present, and the next chapter describes the two most influential ones, ELM and HSM.

While the interpretations of dual processing in different theoretical propositions have some differences, the main characteristics of the two processing routes (systems) in all proposed dual process theories are shared. The brief overview of their features is presented in Table 5.

Table 5. Overview of characteristics of dual process routes, as described in the literature.

System 1	System 2
Evolutionarily old	Evolutionarily recent
Unconscious, preconscious	Conscious
Shared with animals	Uniquely (distinctively) human
Implicit knowledge	Explicit knowledge
Automatic	Controlled
Fast	Slow
Parallel	Sequential
High capacity	Low capacity
Intuitive	Reflective
Contextualized	Abstract
Pragmatic	Logical
Associative	Rule-based
Independent of general intelligence	Linked to general intelligence
Effortless	Effortful

Source: Frankish & Evans, 2009

Previously presented dual process theories mainly stem from the cognitive psychology literature. The two most influential dual process theories in social psychology and the research of attitudes and persuasion are the ELM of persuasion and the HSM of information processing.

3.1.1 Elaboration likelihood model (ELM)

Petty and Cacioppo (1986) presented the dual process theory, which aims to understand the information processing that leads to attitude formation, change, and persuasion. Their ELM of persuasion proposed a distinction between the two unique routes: the **central and peripheral routes of information processing**. These routes indicate the likelihood that consumers will actually engage in the elaboration of the information at hand in the process of attitude change (i.e., persuasion).

The **central** route consists of the careful, thoughtful, and conscious assessment of information received and further effortless information processing. Therefore, this route presents a more *analytical and devoted* approach to information processing when elaboration is high, which consumers seldom engage themselves with due to their overly limited cognitive capacities to evaluate all of the available information. However, once they engage in central route elaboration, they form attitudes that are expected to be firm, stable, and predictive of future behavior (Cacioppo & Petty, 1984).

More often, especially for daily and repetitive situations, consumers engage themselves in the **peripheral** route of elaboration. In the peripheral route, the level of elaboration by consumers is low. Using this route to process information (i.e., elaborate upon them)

involves direct attitude change without careful or effortful thinking and consideration—that is, the change happens more or less *automatically* (Petty & Cacioppo, 1986).

In elaboration, consumers often use different cues that help them assess the available information. In case consumers use the central route of elaboration, **cues**, such as information and argument quality, have been proven to impact persuasion (Petty & Cacioppo, 1986). On the other hand, peripheral cues, such as expertise or the attractiveness of an information source, are highly influential when the level of elaboration is low—that is, the process of elaboration is more or less automatic.

According to the ELM theory, people use only one of these routes at a given time—the authors did not allow for their simultaneous occurrence or interchangeable biasing in information processing. The route in which particular information is processed depends on the *motivation* and *ability* of the individual. Increased motivation—consumers’ interest in the topic, the relevance of the topic, or existing knowledge about the topic—and ability—possession of skills (knowledge) or sufficient cognitive capacity to process information—have been shown to positively influence the appearance of high elaboration (i.e., the central route of elaboration) of information (Petty & Cacioppo, 1986; Cacioppo & Petty, 1984).

3.1.2 Heuristic-systematic model (HSM)

The HSM of information processing is one of the two main dual process theories, aimed at explaining the way in which persuasion and attitude formation and change happen. In **systematic processing**, individuals extensively use their cognitive capacities to evaluate the information at hand and its validity. It involves the cognitive *elaboration* of the available information before developing an attitude. On the other hand, **heuristic processing** takes *less effort*, as individuals reach for more accessible information that can make the information processing faster and easier. This information is often **cues** or heuristics. Attitude formation in this case is automatic, without deeper elaboration (Chaiken, 1980; Chaiken, Liberman, & Eagly, 1989).

The model does not presume that either of the two processing modes are dominant or ubiquitous (Maheswaran & Chaiken, 1991). In order to occur, systematic processing requires both **motivation and ability** (cognitive capacity), and heuristic processing depends on the existence of **heuristic cues** (Maheswaran & Chaiken, 1991). While the two modes of information processing most frequently occur alone, the HSM also allows for their simultaneous occurrence (Chaiken & Maheswaran, 1994; Chaiken et al., 1989). Simultaneous processing is likely to happen in circumstances that are conducive to both processing modes—that is, when motivation and ability are followed by the presence of heuristic cues. Alternatively, **simultaneous** information processing might be triggered in situations where judgmental implications of one mode bias the nature of the other (e.g., Chaiken & Maheswaran, 1994; Chen, Duckworth, & Chaiken, 1999).

HSM also aims at drawing the attention of the influence that affect can have on information processing and attitudes resulting from it. As this thesis aims at integrating consumer confusion, a construct related to both cognitive and affective competences of an individual, and evaluating it with respect to the concept of attitude strength in social psychology literature, a theoretical background that acknowledges this **duality of affect and cognition in information processing** and attitude formation was preferable. Further discussion in this thesis will therefore focus on the HSM of information processing.

While dual process theories, including the HSM, generally focus on the cognitive aspect of information processing, affect (emotion) has also been shown to play an important role in the formation and transformation of attitudes (Petty & Briñol, 2015) and can trigger heuristic information processing (Chaiken et al., 1989). Moreover, the route determines whether the formed attitude will be more cognitive or affective in nature. Message framing is a common approach when researching attitudes and their natures (e.g., Ryffel & Wirth, 2016). However, the perception of **information sources and their role** as triggers of information processing routes remains to be examined.

While different dual process theories mainly address the same issue, the difficulty of measuring the level of actual engagement in the information processing or the route used remains a challenge. The most common approach is to ask respondents to write down the thoughts they had during the assignment (e.g., Cacioppo, Petty, Kao, & Rodriguez, 1986). The more thoughts, the more elaboration was put into the process, hence the route taken must be systematic. Another common approach includes the use of biases (e.g., credibility, expertise), later assuming that a certain type of processing appears by default, without overly extensive efforts to actually measure the route taken (e.g., Oeldorf-Hirsch & DeVoss, 2020; Lim, 2013; Jung, Walsh-Childers, & Kim, 2016). Various authors have also attempted to measure the route taken using scales and questions, but the results obtained have not always been the most reliable (Novak & Hoffman, 2008). In modern neuroscience, the application of neurological methods and tools is seen as having the potential to achieve a better understanding of the ways in which routes take place (Vezich, Falk, & Lieberman, 2016; Vila-Henninger, 2015; Wixted, 2007). Nevertheless, measuring the information processing and its routes remains a challenging task.

3.2 HSM research: Bibliometric field analysis

In order to identify the most relevant publications and better understand the field of the HSM and the research done in this area, another bibliometric study was conducted. The aim of this study was to provide answers to several research questions:

- How has the HSM research evolved over time?
- Who are the most influential authors in the HSM literature?
- What topics have been explored in the HSM literature?

- What sources (journals) have published the HSM research?

3.2.1 Data collection

A search in WoS using the keywords “*heuristic-systematic model*” OR “*HSM*” brought up surprising results. Namely, this search did not identify the core article of the field that is usually considered the founding article of this theory and model: “Heuristic versus systematic information processing and the use of source versus message cues in persuasion,” written by Chaiken in 1980. This was the reason for the repeated usage of **Scopus**. In Scopus, this, along with the 13 other articles by the given author, were successfully identified and included in the bibliometric analysis. The database setup consisted of three searches, and subsequent results were later merged and checked for potential duplicates. The searches and resulting articles were the following.

- “*Heuristic-systematic*” OR *HSM*. In total, this search showed 3,655 results. Once the field of research was limited to psychology, management, business, economics, and social sciences, the data set was narrowed to 1,345 publications. This data set was further narrowed to works in English only (1,290) and articles, reviews, books, and book chapters, resulting in 1,180 pieces.
- “*Heuristic-systematic*” OR *HSM* AND “*dual process**.” In this search, 72 hits were achieved, 60 of which were found in the previously mentioned field of research, and 56 of which were either an article, review, book, or book chapter. Only 53 pieces written in English were taken for further analysis.
- “*Heuristic-systematic*” OR *HSM* AND “*information process**.” This search discovered 704 items. Only 295 of these belonged to the targeted fields of research, 282 were indexed as either an article, review, book, or book chapter, and 276 works written in English were considered.

By merging results from these three searches, a base of 1,191 unique articles was obtained. This base was further analyzed manually to exclude the inadequate searches. The main reasons for exclusion were the use of the word *heuristic* for multiple contexts, predominantly in the field of engineering and computer science (e.g., heuristic algorithm, heuristic platform, heuristic framework, heuristic approach, metaheuristic, etc.), and the appearance of our keywords in combinations like systematic literature review without actually dealing with the HSM. Only **338 publications** were selected due to the presence of the HSM and information processing in the descriptive part of their abstracts or article keywords. These articles were included in the further analysis of the field. Data collection and analysis were conducted in October 2020.

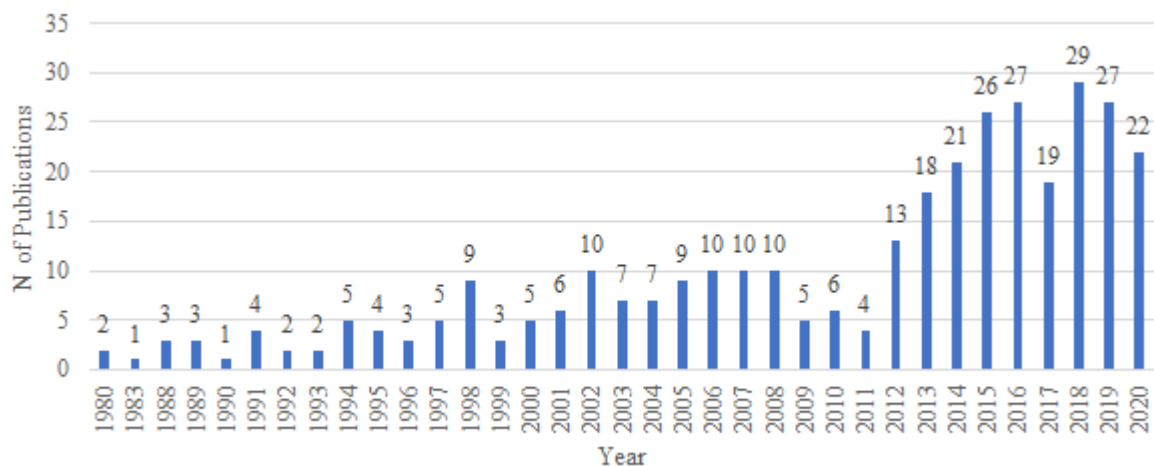
3.2.2 Development of the literature field: Annual publications overview

Over the 40 years of its existence, the **HSM** has experienced a steady increase in the number of publications in the field at an average annual growth rate of 7.3%. Significant growth in

the number of publications dealing with the HSM is evident in the period from 2012 onwards, where the average annual number of publications is 22.4 (the total data set's average annual number of publications is 8.4), as seen in Figure 7. In the first 20 years since the defining article of HSM, the publications mostly aimed at extending the **theoretical** knowledge about the model and the domains of its application. In this period, among other factors, the effects of mood (Bohner, Chaiken & Hunyadi, 1994), argument quality (Friedrich & Smith, 1998), source characteristics (DeBono & Harnish, 1988), the need for cognition (Areni, Ferrell & Wilcox, 2000), and motivation (Maheswaran & Chaiken, 1991; Bohner, Rank, Reinhard, Einwiller, & Erb, 1998) on heuristic and systematic processing routes were examined.

Over the last 20 years, applying the theory to practical examples and examining situations in which heuristic or systematic processing is dominant, or in which both occur, have been the main forms of researching the HSM. In this novel period of HSM knowledge development, the **application** of this theory to various contexts has dominated. Researchers have been intrigued by dual processing in decision making in the abundance of choices (Boyd & Bahn, 2009) or in situations related to health (Walther, Jang, & Hanna Edwards, 2018), travel activities (Kim, Lee, Shin & Yang, 2017), and the digital world, including social media, games, and online reviews (Book, Tanford, & Chang, 2018; Winter, 2020; Koh & Sundar, 2010).

Figure 7. Heuristic-systematic model (HSM) of information processing literature: Annual development of the field.



Source: Own work

3.2.3 Most cited authors in HSM literature

From the authors of the articles in the database, the **15 top authors** (by the number of times their publications are cited in other articles in the database) were selected as the most influential in this field (Table 6). It is not surprising that the author of the grounding article

of the HSM, **Shelly Chaiken**, emerged as the most cited author. Apart from publications dealing with *HSM* and the *cues* and motivations that influence information processing (Maheswaran & Chaiken, 1991; Maheswaran, Mackie, & Chaiken, 1992; Chen et al., 1999; Bohner, Moskowitz, & Chaiken, 1995), Chaiken collaborated with esteemed colleagues in research related to *attitudes* in general and their structure (**Eagly & Chaiken**, 1993; Eagly & Chaiken, 1998; Liberman & Chaiken, 1996; **Liberman & Chaiken**, 1991).

The list of the most influential authors in the HSM literature contains many distinguished names, most of which have studied dual process theories from their beginnings in the 80s. **Petty and Cacioppo** are well-recognized for their research on the need for cognition (Cacioppo & Petty, 1982) and the development of *ELM* (Petty & Cacioppo, 1986), another approach to dual process theory that is frequently applied to studying *persuasion*. They are also known for their research in the field of attitudes and their strength, as presented in the previous chapter.

Apart from providing additional explanations for the dual process in information processing, **Kahneman**, along with his colleague **Tversky**, contributed to a better understanding of *judgment and decision making* under risky, uncertain circumstances in their *prospect theory* (Kahneman & Tversky, 1979). **Schwarz and Clore** drew attention to *affect in judgment* (Schwarz, 1990; Schwarz & Clore, 1983), while **Kruglanski** and **Fiske** made considerable efforts to understand *social cognition* (Kruglanski, 1996; Fiske & Taylor, 1991).

Table 6. Heuristic-systematic model (HSM) of information processing: Top 15 locally cited authors.

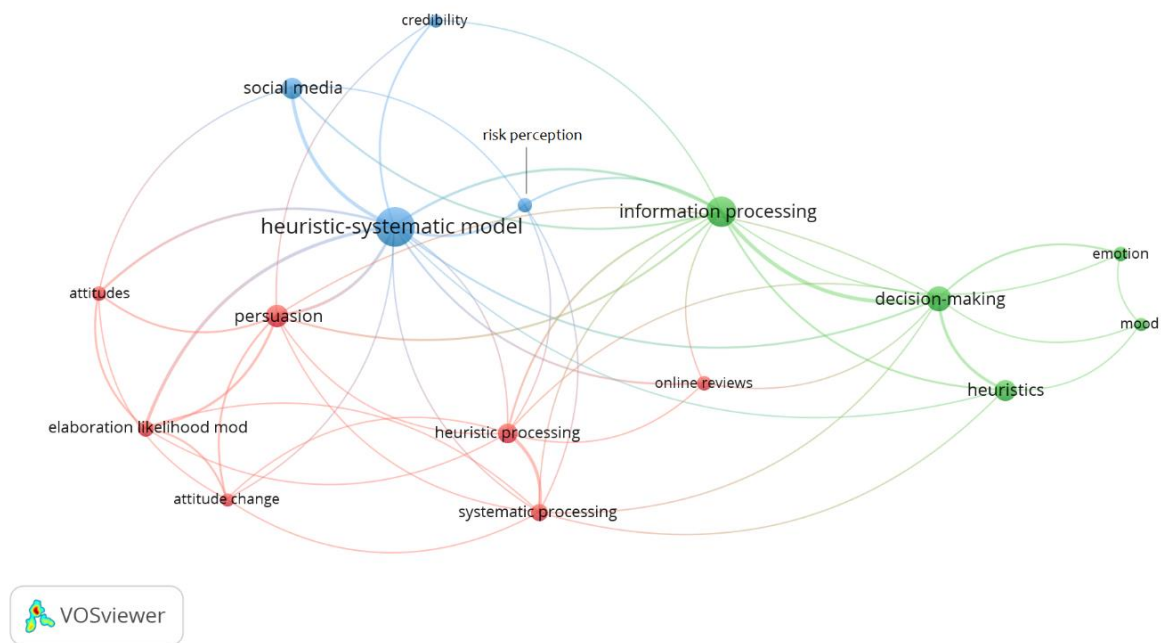
Authors	Citations
Chaiken, S.	1,008
Petty, R.E.	622
Cacioppo, J.T.	406
Eagly, A.H.	305
Kahneman, D.	199
Schwarz, N.	176
Maheswaran, D.	163
Tversky, A.	148
Chen, S.	135
Liberman, A.	135
Bohner, G.	125
Kruglanski, A.W.	124
Clore, G.L.	106
Mackie, D.M.	98
Fiske, S.T.	96

Source: Own work

3.2.4 HSM of information processing: Keyword co-occurrence analysis

Keyword co-occurrence analysis was conducted in VOSviewer. In the database of 338 publications, the program detected 823 keywords used by the authors, **16** of which were used five or more times and selected for further examination in co-occurrence analysis. The resulting map reveals three connected yet distinct clusters of keywords in heuristic-systematic information processing literature (Figure 8).

Figure 8. Heuristic-systematic model (HSM) of information processing literature: Keyword co-occurrence analysis.



Source: Own work

- (1) **Heuristic and systematic processing.** This cluster (**red**) is the biggest in this analysis. Seven keywords, mainly from **research on attitudes**, are nested in this cluster: *persuasion*, *attitudes*, *attitude change*, *elaboration likelihood model*, *heuristic processing*, *systematic processing*, and *online reviews*. They show a strong connection between the HSM literature and attitude literature in general. Heuristic and systematic processing is heavily researched in attitude literature in connection with persuasion, attitudes, and their change (Petty, Wheeler, & Tormala, 2003; Todorov, Chaiken, & Henderson, 2002). While this cluster gathers keywords used in relation to the HSM in different situations and with certain cues, it refers to heuristic and systematic modes of processing from a deeper, psychological perspective of attitude and processing research.
- (2) **HSM.** This is the smallest cluster that appeared in the analysis (**blue**), strongly connecting four keywords: *heuristic-systematic model*, *risk perception*, *credibility*, and *social media*. Most of the keywords describe the contexts and cues in which

consumer information processing has been assessed using the HSM (e.g., Xiao, Wang, & Chan-Olmsted, 2018; Son et al., 2020).

- (3) **Information processing.** Since the HSM aims at explaining information processing, the emergence of this cluster (**green**) among the authors' keywords is not surprising. Authors used the keywords *decision-making*, *mood*, *emotion*, and *heuristics* in relation to information processing, which is also consistent with the research interests presented in articles on information processing. Namely, mood, heuristics, and emotions have been shown to influence information processing and decision making that often results from it (Bless & Schwarz, 1999; Nabi, 1999; Bohner et al., 1994).

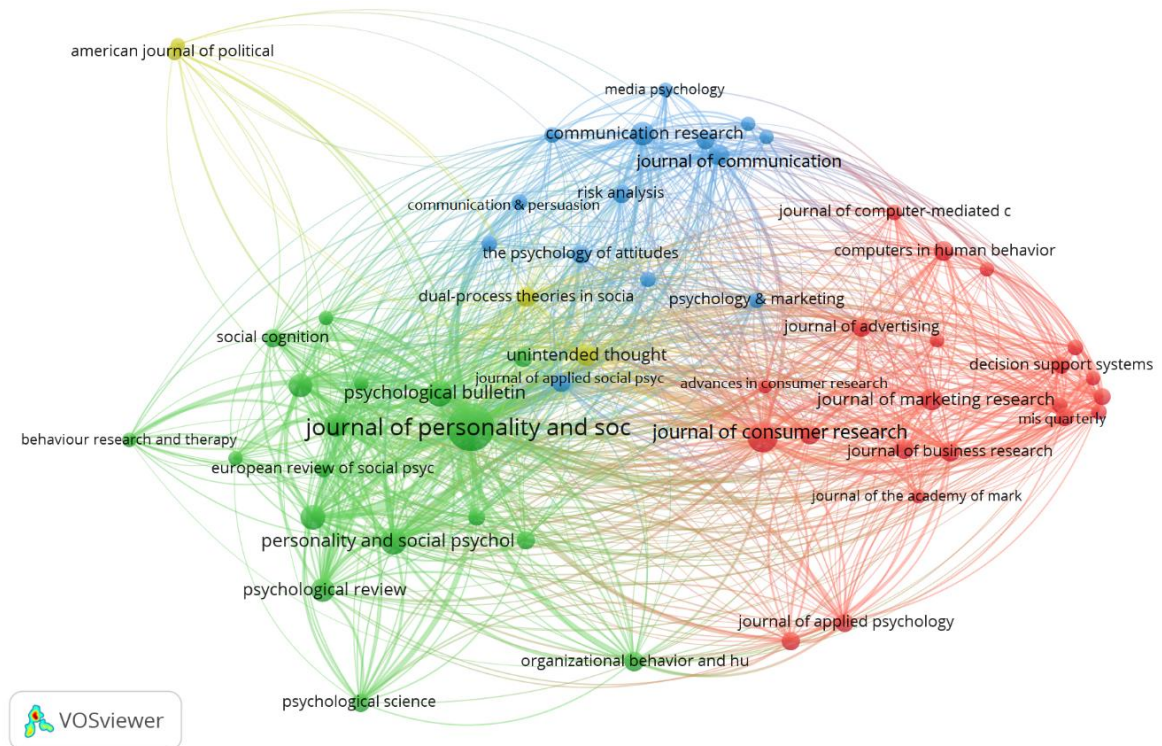
3.2.5 HSM of information processing: Source co-citation analysis

Source co-citation analysis showed several fields in which articles researching the HSM of information processing are published. Analysis in VOSviewer revealed over 5,000 sources, out of which 57 had over 40 citations and were included in further examination. The two largest clusters show great similarity to the results of attitude strength source co-citation analysis (Figure 9).

Namely, sources from *consumer psychology* literature (**red**) and *social psychology* literature (**green**) proved to be the most numerous and to have the strongest connection out of all clusters. The **blue** cluster is also well connected with the two main clusters, and it predominately contains journals from the *communication* literature. Articles from this field mostly examine the effects of different communication strategies on information processing (e.g., Lang, 2000; Fulk, Steinfield, Schmitz & Power, 1987).

Finally, the smallest cluster (**yellow**) consists of sources that are a mix of *social psychology* and *political science*. This mix is not surprising, as social psychologists extensively use political questions in their research on attitudes and information processing, and the results of these studies are suitable and publishable in both social psychology and political science outlets. The overview of all sources is available in Appendix 4.

Figure 9. Heuristic-systematic model (HSM) of information processing literature: Source co-citation analysis.



Source: Own work

3.2.6 Discussion and conclusions

Information processing is not only a complex activity for individuals, but also a complex concept that is difficult to describe and measure. Over the years, various theories of dual information processing have appeared in the literature. These theories, which can co-exist and all be correct at the same time, have contributed to a better understanding of reasoning and information processing.

The heuristic-systematic literature, because it focuses on information processing, also borrows closely from the **attitudes** literature since attitudes are often a result of information processing. Using keyword analysis (Subsection 3.2.4), the relevance of attitude and attitude change research to dual process theories can be seen. While persuasion (ELM) is frequently studied and associated with HSM, **attitude strength** associated with HSM is not one of the most prominent research combinations, which opens a space for new discussion.

A brief overview of the literature on the HSM of information processing shows the strong connection between the various **dual process theories**. Some of the most cited authors in the HSM literature are the creators of similar dual process theories (e.g., Petty, Cacioppo, Kahneman). The HSM literature field has grown considerably in the last decade, while the core of the research seems to remain intact. Namely, the main fields of publishing HSM research remain consumer and social psychology, but there have also been efforts in

communication and political sciences. The HSM has not only been theoretically explored, but has had a wide area of **applications** in different contexts—according to the keyword co-occurrence analysis, risk perception, social media, and online reviews seem to be among the most researched topics.

The last two keywords (i.e., social media and online reviews) indicate the presence of **technology and the online world in HSM research**. The novel conditions created by the exponential increase in the amount of information available and the lack of its unified structure undoubtedly challenge consumers' information processing abilities more than ever. It is therefore not surprising that research on information processing in online contexts is increasing. Current research often includes cues that make information processing easier and more automatic. Cognitively demanding situations are generally considered to trigger systematic information processing, including those presented to consumers by an excessive amount of diverse information. Some **specific cognitively demanding situations** that are common in the online context (e.g., confusion) raise new questions about the flow of information processing and are yet to be thoroughly examined.

4 ONLINE FOOD AND NUTRITION INFORMATION LITERATURE

In the previous chapters, theoretical grounds for this thesis have been set. Brief overviews of the consumer confusion, attitude strength, and heuristic-systematic information processing literature were presented. This chapter lays the foundations of the **research context**. It aims at providing information about the complexity of the online food and nutrition information setting, making it appropriate for examination of the relationship between the given psychological and marketing theoretical concepts. In addition, a bibliometric study of the existing research in this literature is presented.

4.1 Context introduction

Nutrition issues have been important to consumers for decades, ever since they realized the relevance of proper nutrition to ensuring a high quality of life and healthy body functioning. Recently, it has been shown that consumers have been paying increasing amounts of attention to nutrition and its effects on their overall health and well-being. Moreover, current trends show that healthier and better-quality food options are becoming preferred among consumers (Román et al., 2017).

The issue of a healthy diet and recommendations on how to achieve it are becoming relevant in the media and official institutions as well. To ensure adequate nutrition, consumers rely on different advice, which does not necessarily come from the most trained and professional sources (Jacobs, Amuta, & Jeon, 2017; Viviani & Pasi, 2017). Lately, the development of the Internet and digital technologies has expanded, and the convenience of this information source has turned the Internet into one of the most commonly used sources for many issues, including nutrition (Zhang, Sun, & Kim, 2017).

With the technological development, the **accessibility and availability of information** to consumers has been rapidly evolving. The rapid development of web and internet technologies has fostered the emergence of numerous novel information sources, such as online communities, social media websites, social Q&As, and similar digital hotspots where consumers can obtain information, share their knowledge, or collaboratively construct it with other users (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004; Laurent & Vickers, 2009; Oh, Yi, & Worrall, 2012).

Food and nutrition information are no exception. The perception of anonymity that online sources provide to their users is very appreciated for sensitive issues such as health and diet (Moorman, Moorman, Warnick, Acharya, & Janicke, 2020). Moreover, the intentions and behaviors are in fact strongly affected by the **food and nutrition information** that consumers access and read online. A recent study showed that almost half of the users who use the Internet for health- and nutrition-related searches are interested in changing their diets and increasing physical activity (Bujnowska-Fedak & Węgierek, 2020). Still, the research of the use of technology to provide consumers with information about food and nutrition is still in its beginning phase (Lowe, Fraser, & Souza-Monteiro, 2015).

While digital solutions offer instant answers to questions and the possibility for discussion and knowledge creation, the responses received are not as straightforward and helpful as one would hope. **Confusion and inconsistencies** in the information that is accessible to consumers through mass media and online have frequently been noticed and criticized in the existing research (e.g., Nagler, 2014; Keselman, Smith, Murcko, & Kaufman, 2019; Clark, Nagler, & Niederdeppe, 2019). Nevertheless, the wide presence and accessibility of information from the Internet and mass media make these sources very used despite the fact that consumers often notice inconsistent and confusing information coming from it (Johansen, Næs, & Hersleth, 2011; Zhang et al., 2017).

Despite their flaws, online information sources regarding food and nutrition remain the most frequently used among consumers. Individuals use them to download nutrition and health apps, find more information about weight loss or weight monitoring, seek or provide support to others through interventions or experience sharing in communities, read reviews about products, restaurants, and other food providers, find the best food delivery option for them, and inform themselves about food supply chains to choose the best provider for their daily food and nutrition needs (Mhurchu, Eyles, Jiang, & Blakely, 2018).

4.2 The role of information sources in the online food and nutrition information context

In their daily lives, consumers are surrounded by information from all kinds of online **sources**. Sources compete for consumers' attention with their features; some are engaging

and fun in nature, others rely on their credibility and trustworthiness, while some mainly invest in accessibility and ease of use, disregarding the quality of information as a relevant factor. As consumers interact with all of these types of sources constantly, understanding the provided information is of great importance in understanding decisions that consumers make (Jung et al., 2016; Zhang et al., 2015).

In general, **information sources** are “*carriers of information*” and, as such, can be very influential in consumers’ decision-making processes (Kuhlthau, 1999; Zhang, 2014, p. 911). The number of **sources** from which consumers can access information has extensively increased with technological development, and it is still on the rise. Numerous websites, applications, and content creators are constantly trying to get consumers’ attention, provide them with information, and, ideally, develop loyalty. In a constant race to provide more interesting content to consumers, publishers on online platforms sometimes do not devote enough efforts to genuinely checking the **correctness** of the information that they post. Previous studies (Chan, Drake, & Vollmer, 2020; Dickinson, Watson, & Prichard, 2018) have shown that the information available on popular websites and blogs can differ significantly from the recommendations given by official institutions and public health providers.

Changes in communication patterns and information availability have influenced the way in which information, including that pertaining to food and nutrition, is communicated. The shift has happened from the public searching and obtaining information from nutrition experts to taking charge of the information they have (Rowe & Alexander, 2017), resulting in reduced trust in and reliance on official and professional sources when seeking information (Declercq, Tulkens, & Van Leuven, 2019).

Moreover, information from the other users' online commentaries and celebrities or social media “nutrition experts” without credentials are frequently a preferred source of information, as these testimonials can easily be interpreted as fact (Hoffman & Tan, 2015). When the increased chance of sharing the misinformation present in these sources is taken into account (McCartney, 2017), the situation for consumers becomes even more challenging and effortful (Dodds & Chamberlain, 2017).

Nevertheless, the Internet and its platforms are the first source that consumers turn to when seeking health and nutrition information (Prestin, Vieux, & Chou, 2015). The variety of sources and information presentation styles available online is great, and consumers can choose from a plethora of public, commercial, or specialized websites, social engines, forums, social networks, and other online information providers (Fox & Duggan, 2013). Online information sources also differ by their **interactivity**. While some information sources allow user participation in content creation, others only provide access to information. These differences lead to differences in the content available on these sources—some are evidence-based, while others include experience-based information as

well—and in the diversity, quantity, and—ultimately—quality of the information that they provide (Zhang et al., 2017).

Online information sources differ significantly in the ways that consumers perceive them. While some sources engage their users with **fun content** and are therefore used for entertainment, as is the case with social networks, other information sources are perceived as more **useful** when a content-specific search is performed, as is the case with specialized websites and blogs (Luchman, Bergstrom, & Krulikowski, 2014; Hughes, Swaminathan, & Brooks, 2019). Consumers seem to appreciate the internet sources—especially interactive environments, such as online communities and social networks—where they can share their experiences, learn from others, and receive social support for achieving their nutrition and fitness goals. Thus, these sources are used for both creating and consuming information by users and are often very motivating for starting and maintaining healthy lifestyles (Ba & Wang, 2013).

Using the information that online sources provide along with their previous knowledge, consumers make between 10,000 and 40,000 decisions per day (Pozen, 2012), over 200 of which are related to food choices (Wansink & Sobal, 2007). While it may seem that those decisions are easy and automatic, the process of choosing is actually quite complex (Sobal et al., 2006). With this in mind, it is easy to understand that it is impossible for consumers to genuinely devote attention and effortfully engage in making each of these choices. Instead, consumers develop different shortcuts and heuristics that help them make their decisions more efficiently.

Surrounded by information, consumers use **cues to process** most of the information that they encounter and make most decisions (Chaiken, 1980). When processing information fastly (heuristic information processing), consumers rely on hints, such as the source of the information (e.g., Chaiken, 1980), the way in which the information is framed (Meyers-Levy & Maheswaran, 2004), and social consensus (Axsom, Yates, & Chaiken, 1987). On the other hand, processing information in a more effortful and dedicated manner (i.e., systematically) usually requires relying on the argument quality instead of such cues (Chaiken, 1980).

While the technological advancements and tools that consumers use to inform themselves about food and nutrition are seemingly countless, some categorization of these tools can still be made. To better understand the search and obtainment of food and nutrition information online, several tools frequently used by consumers and researched by scientists are observed in this thesis—namely, mobile apps, websites, and social media.

4.2.1 Apps

Mobile devices and the development of programs that enhance the features offered to their users (i.e., mobile apps) provide consumers with wanted features and information in one

place. Apps on mobile devices are becoming an increasingly important part in all aspects of daily life, and their ease of use and convenience are making them a powerful tool for providing consumers the information needed and motivating consumer behavior and behavioral change (DiFilippo, Huang, Andrade, & Chapman-Novakofski, 2015).

Diet and nutrition apps are among the most popular health and fitness apps in the market (Samoggia & Riedel, 2020). According to Krebs and Duncan (2015), many consumers download health and nutrition apps on their mobile devices (over 58% of consumers possess mobile devices in the US), and the app users have the impression that using apps improves their health. These apps also have some of the highest reported usage rates among mobile apps (Krebs & Duncan, 2015). In addition, users of health and nutrition apps show a higher level of trust in the apps and the accuracy of the data that they provide.

Research in the mobile app industry has concluded that there were over 231,000 mobile health apps available in the Apple and Android app stores in 2016, 100,000 of which were added in 2015 (Research2Guidance, 2016). As many of these apps aim to provide the information necessary for healthier nutrition and weight loss (Frie et al., 2017), the estimation of **nearly 3.2 billion health app downloads** (Research2Guidance, 2016) shows their significant presence in consumers' lives and nutrition-related intentions.

For food and nutrition-related matters in particular, individuals use apps for various purposes, including to inform themselves about products, check product labels, and get an overview of a product's healthiness (Mhurchu, et al., 2018). At the same time, apps are used to keep track of food intake and diets and obtain information about appropriate food choices, which is the most frequent motivation for app download and usage (Krebs & Duncan, 2015). Apps that offer the latter option are found to be an **important motivator for behavioral change** and persistence in healthier diets (Villinger, Wahl, Boeing, Schupp, & Renner, 2019; De Cock et al., 2017) and actually make a difference in weight loss attempts (Hu, Nguyen, Langheier, & Shurney, 2020; Mateo, Granado-Font, Ferré-Grau, & Montaña-Carreras, 2015).

Namely, research implies that the effect of food and nutrition apps on consumers' behavior is **real and measurable**. Apart from their effectiveness in the weight loss process (DiFilippo et al., 2015), diet and nutrition apps are reported to have an influence on the frequency and consistency of consumers' healthy eating, as well as on their product selection in the store (Samoggia & Riedel, 2020), motivation, desire, knowledge, and ability to pursue a healthy diet and set their goals (West et al., 2017; Flaherty, McCarthy, Collins, & McAuliffe, 2018; Villinger et al., 2019).

Apart from all of their applicability in the nutrition field, mobile apps are also frequently used by consumers and researched in the settings of food consumption in restaurants and delivery. Research on the application of food delivery mobile apps has increased in recent

years, especially in 2020, when the usage of these apps escalated due to the world health crisis and social distancing (Troise, O'Driscoll, Tani, & Prisco, 2020). The extent to which they are used is strongly influenced by their design and quality, which in turn influence their perceived ease of use and usefulness, both of which reinforce the positive attitude and intention to use these apps (Lee, Lee, & Jeon, 2017). Additionally, mobile apps have been shown to be a reliable way of communicating food information to consumers when eating out to improve the healthiness of their choices (Bray, Hartwell, Appleton, & Price, 2020).

4.2.2 Websites

The accessibility of information, perceived confidentiality, and abundance of choices available in a matter of seconds have made online sources very attractive to consumers. Online health and nutrition information is no exception, as **over 60% of people** use them to get information about food and nutrition (Ramachandran et al., 2018). Moreover, the information on diet, nutrition, and food nutritive values has been reported as one of the most common reasons why consumers use the Internet (Pollard et al., 2015; Wartella, Rideout, Montague, Beaudoin-Ryan, & Lauricella, 2016).

This increasing consumer interest and the intense globalization of the media and pressures from medical stakeholders to use technology to approach patients and provide information have created the increase in the number of websites that provide nutritional and food information. Such an atmosphere has led to **the new trend of food and nutrition information** delivery to consumers: websites specializing in providing food and nutrition information to their readers in the form of short advisory articles (Ostry, Young, & Hughes, 2008).

While the main input to these new media for content generation is expected to come from medical professionals (Ostry et al., 2008), research shows that this is not necessarily always the case (Chen, Cade, & Allman-Farinelli, 2015) and that **websites vary significantly in terms of the quality and reliability** of the information that they provide to their users (Venkatasubramanian, 2020). The proliferation of websites created space for the emergence of some untrustworthy and unreliable sources whose interests stem exclusively from the desire for profit. As such, they do not tend to provide credible information and often contribute to the confusion of readers due to the inconsistencies in information coming from different online sources (Stefanone, Vollmer, & Covert, 2019).

The **inconsistency** of available information is often noticed by consumers (Clark et al., 2019). However, the quality of information seems to be more difficult for non-professionals to assess, as their level of motivation or nutrition literacy may be low (Stvilia, Mon, & Yi, 2009). The way in which food and nutrition information is conveyed to consumers is an additional contributor to confusion. Namely, the context that would aid consumers incorporate the advice received into their daily lives and food routines is frequently absent

(Wills, Dickinson, Short, & Comrie, 2013). The contradiction of and inability to properly assess the available information often results in justificatory behavior and decision making, whereby consumers select the information that they are more inclined to or that justifies their attitudes and previous behavior and act accordingly (Kim, Oh, & Krishna, 2018).

Overall, online information sources are frequently used, but some **variation between generations** must be mentioned. Older users are becoming more accustomed to using online sources for their health and nutrition information searches (Pollard et al., 2015). However, their preferences are still more inclined towards traditional health information sources, such as doctors or friends and family (Heuberger, & Ivanitskaya, 2011). On the other hand, children and young adults are the most frequent users of online health and nutrition information sources. Adolescents are found to be the most prone category to seeking health and nutrition information online, and while doing so, their choice is most likely one of the first nine results on the search engine (Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005). Such behavior might indicate that the amount of information that they face on a daily basis overwhelms them, lowering the criteria and their ability to assess the credibility of the source, thus luring them into selecting the easiest choice, which has consequences on their behavior (Moorman et al., 2020).

4.2.3 Social media

Like any online form of communication, social media provides its users with instant access to information at a very low cost of entry and organizations and companies with an effective way to promote their activities and products very affordably (Gill, Gill, & Young, 2013). The advent of social media has permanently influenced the way in which communication is performed in all life segments. While Web 1.0 enabled one-way communication through websites, a form of information dissemination that was previously known from the existing traditional media, Web 2.0, which includes social media, upgraded this communication to a **two-way interaction** where the voice was also given to users, creating a space for cooperation, sharing, and socialization (Dooley, Jones, & Iverson, 2014).

The communication of nutrition and health information to users via social media is done in several ways. For example, health- and nutrition-promoting **organizations** seem to have maintained a one-sided communication, which substantially limits their reach to their audience. This communication is mostly active through their websites; even when present in social media, they do not seem to stimulate engagement extensively (Klassen et al., 2018; Jenkins, Ilicic, Barklamb, & McCaffrey, 2020). On the other hand, **brands** seem to be more successful at exploiting the possibilities that social media provides for **user engagement**. In their marketing strategies, they incorporate elements that encourage user engagement and enable them to reach a wider audience with their messages and promotions (Lim, Hare, Carrotte, & Dietze, 2016). Due to their interesting, engaging content and creativity, food

brands seem to have some of the most successful marketing and engagement strategies and campaigns on social media (Freeman, Kelly, Vandevijvere, & Baur, 2016).

Consumers use social media to connect with others, create expressions of their identity, and seek information, which is often related to nutrition and health (Raggatt et al., 2018). Consumers use social media for many food- and nutrition-related activities. They often search for recipes and cooking content, as well as nutritional information (Nour, Rouf, & Allman-Farinelli, 2018; Steils & Obaidalaha, 2020). The **food and nutrition information** that consumers receive on social media can also influence their food-related behaviors and choices, as has been shown in the previous research (Vaterlaus, Patten, Roche, & Young, 2015).

The most active generation on social media, young adults, spends more time with technology and media daily than in any other activity (Coyne, Padilla-Walker, & Howard, 2013). Users use social media to **both access and create information** about food and nutrition, and it is their frequent source of food and nutrition information (Vaterlaus et al., 2015). Younger generations also often use social media for inspiration. Recipes and diet styles presented on social media seem attractive to users, and they frequently guide their behavior (Vaterlaus et al., 2015).

The ability to interact among themselves and with companies often results in creative processes in which hypes are created—that is, interactive movements on social media where users participate by creating information and content and mark it with common hashtags (Stevens, Aarts, Termeer, & Dewulf, 2018). It is worth mentioning that at the moment of writing (February 2021), the hashtags *food*, *foodporn*, and *nutrition* on Instagram have over half a billion hits (the same search in March 2022 resulted in over 820 million posts). Tens of thousands of new recipes and nutrition advice videos are uploaded to YouTube daily, and the amount of new nutrition information on Twitter, Facebook, and other social media is not lagging behind.

4.3 Online food and nutrition information research: Bibliometric field analysis

Since the interest in and usage of digital information sources on food and nutrition is growing, in this study, the aim was to gain a better understanding of the state of the academic research in this field. Using bibliometric methods, the goal was to structure the knowledge in the field and provide a clear overview of the existing research of online food and nutrition information while answering three research questions.

- How has online food and nutrition research evolved over time?
- Which sciences most frequently research online food and nutrition information?
- What trends can be observed in online research on food and nutrition information?

4.3.1 Data collection

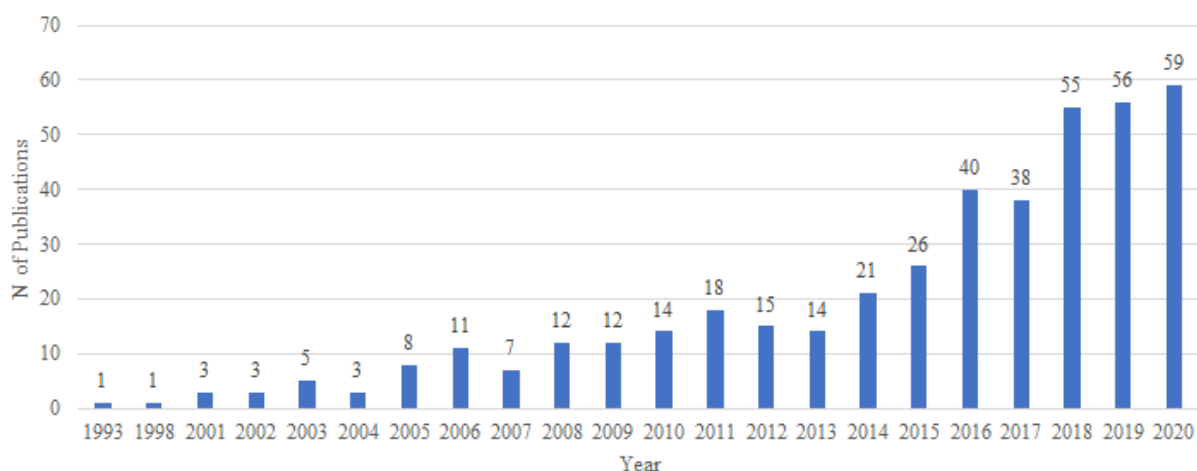
In search of relevant publications in food and nutrition information online research, the following query was used: *food OR nutrition OR diet + information + consum* + online OR internet OR digital*. The search for the relevant publications was conducted in November 2020, and it was not temporally limited—that is, all publications matching the given topics were taken into account—to cover all of the literature in the field available on **Scopus**. The search was, however, constrained to articles and reviews written in English only. The given keyword search was performed on article titles, keywords, and abstracts. In total, **424 items** matched the search requirements and were included in the further steps of the analysis.

4.3.2 Development of the literature field: Annual publications overview

Figure 10 presents an overview of the publication activity in the field of online food and nutrition information research. According to the data from our data set of 424 publications, the first publications dealing with online food and nutrition information appeared in 1993 and 1998, which makes it the youngest literature field examined in this thesis. As the development of the Internet and its abundant availability to consumers was in its early stages at that point, it comes as no surprise that publications before 2000 were not that frequent.

In this literature field, a constant increase in the number of publications can be observed since its creation. The significant increase in publication production can be observed from 2015 to 2020; in this period, 248 publications, or 58.5% of all items from this field, were published. The data set also included two publications from journal issues for 2021. In order to avoid misinterpreting the trend in publication, however, these publications were omitted from the annual scientific production analysis.

Figure 10. Number of publications per year in the field of online food and nutrition information research in Scopus, published from 1993 to 2020.



Source: Own work

4.3.3 Most relevant sources for studies in the area of online food and nutrition information

Table 7 summarizes **15 journals** that have so far published the most articles from the field of online food and nutrition information. Overall, 178 publications from the field were published in the listed 15 sources. From Table 7, it can be concluded that the main journals for publishing online food and nutrition information research can be divided in three categories: (1) **health and nutrition related journals** (e.g., *Journal of Medical Internet Research*, *BMC Public Health*, *Public Health Nutrition*), (2) journals specialized in **food research** (e.g., *British Food Journal*, *Appetite*, *Food Quality and Preference*), and (3) **consumer research and marketing** (e.g., *Journal of Retailing and Consumer Services*, *International Journal of Consumer Studies*).

Table 7. Top 15 publication sources (journals) listed by the number of publications from the online food and nutrition information research field.

Sources	Number of articles
Journal of Medical Internet Research	31
British Food Journal	25
Appetite	16
BMC Public Health	14
Public Health Nutrition	13
Sustainability (Switzerland)	13
Food Quality and Preference	12
Journal of Retailing and Consumer Services	11
International Journal of Environmental Research and Public Health	8
Journal of Food Products Marketing	7
Journal of Nutrition Education and Behavior	7
European Journal of Clinical Nutrition	6
International Journal of Consumer Studies	5
International Journal of Hospitality Management	5
International Journal of Information Management	5

Source: Own work

4.3.4 Most influential publications from this area of research (by the number of citations)

Table 8 provides an overview of the **20 most cited publications** from the data set collected in the field of online food and nutrition information. In total, 19 articles have more than 100 citations, and they are mainly published in the *medical, nutrition, and health literature*. The most common source in this list is the open-access *Journal of Medical Internet Research*, in which six publications from this list were published.

Table 8. Top 20 articles from the online food and nutrition information research field listed by the number of citations.

Authors (journal of publication)	Title	Year	Citations
Zhang, Ye, Law and Li (<i>International Journal of Hospitality Management</i>)	The impact of e-word-of-mouth on the online popularity of restaurants: A comparison of consumer reviews and editor reviews	2010	358
Baranowski et al. (<i>Ethnicity and Disease</i>)	The Fun, Food, and Fitness Project (FFFP): The Baylor GEMS pilot study	2003	206
Harttig, Haubrock, Knüppel and Boeing (<i>European Journal of Clinical Nutrition</i>)	The MSM program: Web-based statistics package for estimating usual dietary intake using the multiple source method	2011	192
Morris and Avorn (<i>Journal of the American Medical Association</i>)	Internet Marketing of Herbal Products	2003	192
Breton, Fuemmeler and Abrams (<i>Translational Behavioral Medicine</i>)	Weight loss-there is an app for that! But does it adhere to evidence-informed practices?	2011	190
Boushey et al. (<i>European Journal of Clinical Nutrition</i>)	Use of technology in children's dietary assessment	2009	178
Womble et al. (<i>Obesity Research</i>)	A randomized controlled trial of a commercial internet weight loss program	2004	168
Moore and Rideout (<i>Journal of Public Policy and Marketing</i>)	The online marketing of food to children: Is it just fun and games?	2007	162
Carroll et al. (<i>Journal of Medical Internet Research</i>)	Who uses mobile phone health apps and does use matter? A secondary data analytics approach	2017	146
Folinas, Manikas and Manos (<i>British Food Journal</i>)	Traceability data management for food chains	2006	140
Dennis et al. (<i>Journal of Human Hypertension</i>)	INTERMAP: The dietary data - Process and quality control	2003	122
Ernsting et al. (<i>Journal of Medical Internet Research</i>)	Using smartphones and health apps to change and manage health behaviors: A population-based survey	2017	118
Celis-Morales et al. (<i>International Journal of Epidemiology</i>)	Effect of personalized nutrition on health-related behaviour change: Evidence from the Food4Me European randomized controlled trial	2017	115
Hebden, Cook, Van Der Ploeg and Allman-Farinelli (<i>Journal of Medical Internet Research</i>)	Development of smartphone applications for nutrition and physical activity behavior change	2012	107
Lee, Choi, Quilliam and Cole (<i>Journal of Consumer Affairs</i>)	Playing with food: Content analysis of food advergames	2009	104

Table continues

Continued

Authors (journal of publication)	Title	Year	Citations
Mackert, Mabry-Flynn, Champlin, Donovan and Pounders (<i>Journal of Medical Internet Research</i>)	Health literacy and health information technology adoption: The potential for a new digital divide	2016	102
Smith Anderson-Bill, Winett and Wojcik (<i>Journal of Medical Internet Research</i>)	Social cognitive determinants of nutrition and physical activity among web-health users enrolling in an online intervention: The influence of social support, self-efficacy, outcome expectations, and self-regulation	2011	101
Yeo, Goh and Rezaei (<i>Journal of Retailing and Consumer Services</i>)	Consumer experiences, attitude and behavioral intention toward online food delivery (OFD) services	2017	101
Couper et al. (<i>Journal of Medical Internet Research</i>)	Engagement and retention: Measuring breadth and depth of participant use of an online intervention	2010	100
Silk et al. (<i>Journal of Nutrition Education and Behavior</i>)	Increasing Nutrition Literacy: Testing the Effectiveness of Print, Web site, and Game Modalities	2008	98

Source: Own work

4.3.5 Online food and nutrition information literature: Keyword co-occurrence

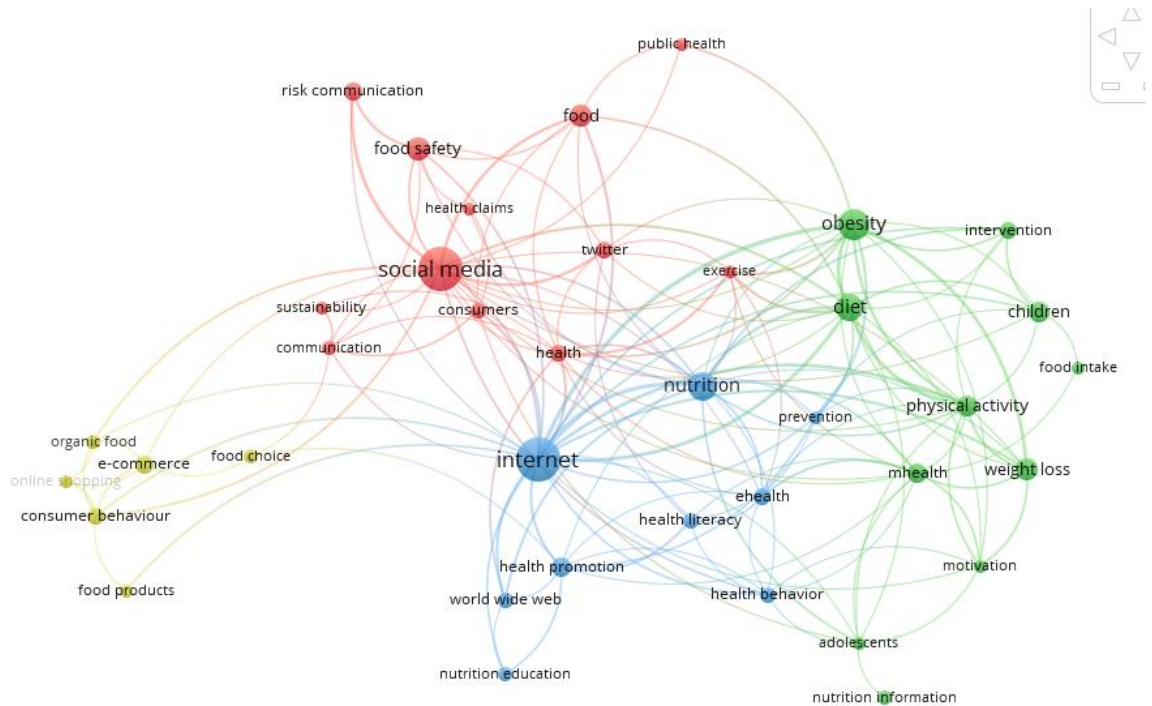
The **analysis of the author’s keywords** and the link between them was conducted in VOSviewer. This analysis included **38 keywords** that appeared at least five times in the author keywords. The results presented in Figure 11 clearly identify **four clusters** in the published research of online food and nutrition information.

- (1) **Social media and food safety.** Social media and its importance for the dissemination of food information are clearly identifiable from this (**red**) cluster. The frequency of researching food and nutrition information on social media makes this cluster the largest in this analysis. Twelve keywords from this cluster (*social media, risk communication, food safety, food, twitter, consumers, exercise, health, etc.*) indicate a strong connection between social media and research on food safety and risk. Social media is also heavily researched in combination with the keywords from the other three clusters (e.g., health and nutrition, diet, and obesity) due to the importance of social media in the lives of all generations (Teerakapibal & Melanthiou, 2019; Steils & Obaidalahe, 2020). Social media and its effectiveness for interventions and behavior change initiatives is another important research topic (Chau, Burgermaster, & Mamykina, 2018). Nevertheless, the connection between social media keywords is the strongest amongst keywords describing research in the food risk and safety literature. In this literature, traditional research methods in which the researchers mainly aim to better understand the influence that social media can have on the dissemination of food risk and safety information (e.g., Mou & Lin, 2014; Rutsaert et al., 2014) are often used. Additionally, research in this field frequently applies techniques of mass data acquisition from the Internet and social media—often

Twitter due to its open policy for data access—and analysis, such as text mining and LDA (Shadroo et al., 2020; Zhou, Liu, & Zhou, 2018).

- (2) **Obesity and diet.** The second largest cluster (**green**) is slightly narrower than the red cluster and shows a strong connection to health studies. This cluster gathered research that can be described by keywords *diet, obesity, intervention, children, physical activity, food intake, mhealth, motivation, adolescents, and weight loss*. Author keywords from this cluster suggest that the research on **obesity and diet** is very relevant to online food and nutrition information research. These keywords have been researched in several settings, including diet issues and challenges of children and young adults (Moorman et al., 2020) and interventions aiming at changing nutrition- and health-related behavior in online formats (e.g., Prusaczyk, Earle, & Hodson, 2021) with a focus on changing physical activity patterns and enabling sustainable weight loss (Shadroo et al., 2020).
- (3) **The Internet, nutrition, and health.** Nine author keywords were identified in this (**blue**) cluster: *internet, nutrition, ehealth, prevention, nutrition education, world wide web, health behavior, health literacy, and health promotion*. They imply a strong connection to **health research**. Due to nutrition's crucial importance to health, research on online food and nutrition information from a health perspective comes as no surprise. Researchers have devoted a significant amount of effort to understanding the preference for online sources of food and nutrition information among different populations and age groups (Moorman et al., 2020; Chiu, Kuo, & Lin, 2017), as well as the quality of information available via digital sources (e.g., Keselman et al., 2019). Behavioral change and the importance of online health information for proper nutritive habit formation and change is another important topic for research (e.g., Bujnowska-Fedak & Węgierek, 2020).
- (4) **Consumer behavior.** The last cluster reflects keywords predominantly from consumer studies. Six author keywords are placed in this (**yellow**) cluster: *online shopping, food products, organic food, food choice, e-commerce, and consumer behavior*. While the other three clusters are rather strongly connected to one another—especially the Internet and obesity clusters—this one has relatively weaker connections to the other three. It reflects **consumer aspects of online food and nutrition information** instead of the patient perspective usually observed in medical health and diet studies and represents the research on consumer attitudes towards food choices, food, and e-commerce (e.g., Santos et al., 2020; Barska & Wojciechowska-Solis, 2020).

Figure 11. Author's keyword co-occurrence network for online food and nutrition information research field.



Source: Own work

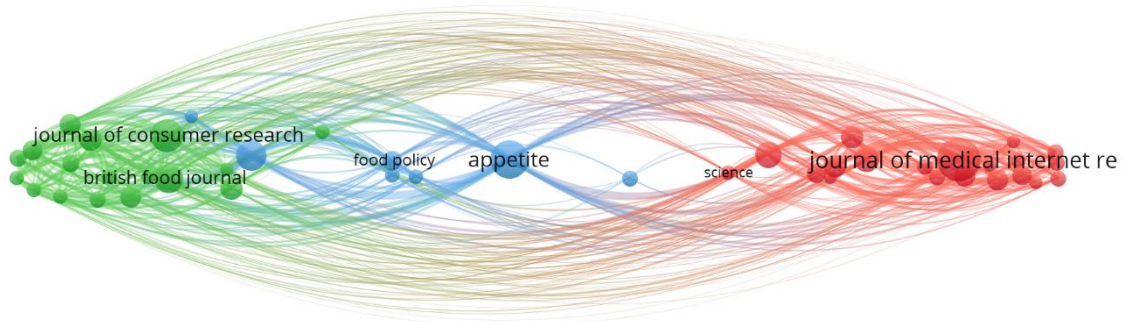
4.3.6 Online food and nutrition information literature: Source co-citation

In order to assess the relevant areas dominating the online food and nutrition information field, a **source co-citation analysis** was carried out. Similar to previous bibliometric studies, **44 sources** that had at least 40 citations were included in the analysis conducted in VOSviewer. Three clusters emerged in the analysis (Figure 12).

The two largest clusters (**red** and **green**) are distant from one another, but their sources exhibit a strong connection to each other. The red cluster is the largest with 19 sources, and it predominantly contains sources from **consumer-oriented journals**. Some of these journals exclusively focus on food-related issues in consumer studies (e.g., *Food Quality and Preference*, *British Food Journal*). The green cluster represents sources from **health research**—mainly medical, public health, and nutrition journals. It is the second largest cluster in this analysis, containing 18 sources.

The third (**blue**) cluster, positioned in the middle, helps bridge the research differences between the other two clusters. The sources represented with blue mainly belong to the **food policy and communication literature**, which often discusses the issues of food risks, environmental impacts, and food information communication strategies. The overview of all of the sources is available in Appendix 5.

Figure 12. Food and nutrition information online literature: Source co-citation analysis.



Source: Own work

4.3.7 Discussion and conclusions

At a time when there are more obese than undernourished people (Popkin, 2007; Ingram, 2020), leading to numerous health, social, and economic problems (Withrow & Alter, 2011), it is essential to empower individuals to make better and **healthier nutritional choices**. Individuals are aware of the adverse effects that an inappropriate or excessive diet can have on their health and well-being, and they are generally interested in making healthier choices and learning more about the foods that they consume and their nutritional values.

For a behavioral shift, proper and unified information is necessary, but in the current digital climate, it is hardly obtainable. Consumers access different information sources online, and for many of them, determining credibility proves to be a challenging task. Using online information sources for food and nutrition is therefore inevitable, and the prospects of such educational communication to consumers are bright (Gill et al., 2013).

From the brief analysis of the existing literature, it appears that the number of publications dealing with online food and nutrition information has increased significantly. Relevant publications in this area come from a variety of fields, though **consumer** research appears to have the largest output in this field, along with **medical and public health** research. Authors' focus on researching online food and nutrition information was broad. In addition to health and consumer research, significant research efforts have been made to understand food safety and risk communication via online sources—in particular, the food and nutrition communication via social media.

From the keyword analysis (Subsection 4.3.5), it appears that this area is strongly associated with health and nutrition publications. However, keywords from consumer studies are also strongly represented, indicating the importance of this field for consumer research and understanding. Source co-citation analysis (Subsection 4.3.6) supports this finding by

showing the presence of online food and nutrition information–related research in outlets prominent in consumer research.

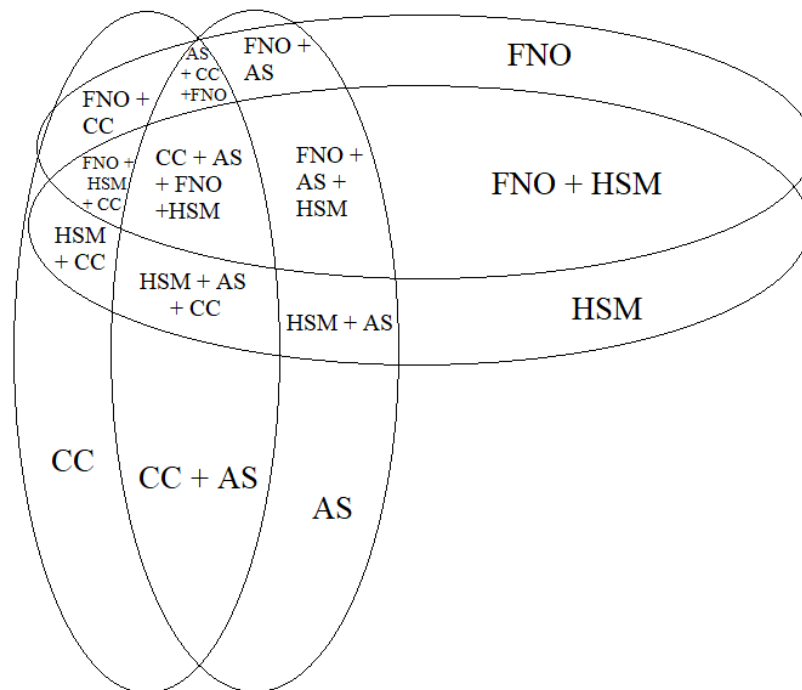
Interestingly, we did not find any keywords related to **information processing** on the keyword visualization map. However, recent studies have shown that online food and nutrition information and its characteristics (e.g., accuracy of information) have the potential to influence how consumers process information (Jung et al., 2016). In addition, an emergence of **confusion** by this information in information processing has also been emphasized (Zou & Liu, 2019).

As the number of information sources and information itself is constantly on the rise, the importance of research on this topic is expected to increase. The increase in the available information limits the capacity of consumers to properly process all of the available information and influences the quality of the decisions made, while inconsistent information makes decision making even harder. Therefore, future research efforts tackling confusion and its triggers and helping individuals choose appropriate information when processing information and making a decision are essential.

5 CONNECTIONS AND SHARED KNOWLEDGE BETWEEN THE FOUR DISCIPLINES AND RESEARCH GAP

In order to better understand the current connections between the four research areas that this thesis is based on, thorough research of both individual literature areas and their mutual points was conducted (Figure 13). After a detailed examination of each of the **four literature fields** of interest to this thesis, a search for the publications in the intersection of these fields was conducted. This search was performed in Scopus using the same keywords as in the individual bibliometric analyses presented in the previous chapters. For the comparisons involving attitude strength, searches for matching articles were conducted in both Scopus and WoS, the latter of which was used for data collection and analysis in this field. Articles belonging to the **intersecting areas of research**—that is, articles that contain at least two keywords of interest to this research—are presented and briefly discussed in the following sections.

Figure 13. Four fields' intersections: Visual representation.



Abbreviations: CC—Consumer confusion, AS—attitude strength, HSM—heuristic-systematic model of information processing, FNO—food and nutrition information online

Source: Own work

5.1 Mutual publications for two scientific fields

5.1.1 The research link between consumer confusion and attitude strength

A manuscript search in Scopus for articles including both consumer confusion and attitude strength discovered two items exploring the conflicting information and, indirectly, consumer confusion in the online hotel review setting with regard to the attitude strength dimension of ambivalence. The search in WoS discovered one article, primarily focusing on moralization and social legitimacy. The article is from the social psychology literature, in which attitude strength is often researched.

Table 9. Publications mutual to consumer confusion and attitude strength literature fields.

Authors	Title	Year	Journal
Effron and Miller	How the Moralization of Issues Grants Social Legitimacy to Act on One's Attitudes	2012	<i>Personality and Social Psychology Bulletin</i>
Siddiqi, Sun and Akhtar	The role of conflicting online reviews in consumers' attitude ambivalence.	2019	<i>The Service Industries Journal</i>
Akhtar, Siddiqi, Akhtar, Usman and Ahmad	Modeling attitude ambivalence and behavioral outcomes from hotel reviews.	2020	<i>International Journal of Contemporary Hospitality Management</i>

Source: Own work

5.1.2 The research link between consumer confusion and the HSM of information processing

The Scopus search on consumer confusion and the HSM keywords search revealed six articles that deal with these two topics jointly. These studies mainly focused on researching information processing and understanding in situations where the likelihood of misunderstanding and information misinterpretation is high (e.g., online information sources, food labels, choice overload, etc.). The manuscripts identified are mostly from the marketing and consumer psychology literature.

Table 10. Publications mutual to consumer confusion and HSM literature fields.

Authors	Title	Year	Journal
Boyd and Bahn	When Do Large Product Assortments Benefit Consumers? An Information-Processing Perspective	2009	<i>Journal of Retailing</i>
Fischer and Glenk	One model fits all? — On the moderating role of emotional engagement and confusion in the elicitation of preferences for climate change adaptation policies	2011	<i>Ecological Economics</i>
Jung et al.	Factors influencing the perceived credibility of diet-nutrition information web sites	2016	<i>Computers in Human Behavior</i>
Siddiqi et al.	The role of conflicting online reviews in consumers' attitude ambivalence.	2019	<i>The Service Industries Journal</i>
Stanton and Cook	Product knowledge and information processing of organic foods	2019	<i>Journal of Consumer Marketing</i>
Akhtar et al.	Modeling attitude ambivalence and behavioral outcomes from hotel reviews.	2020	<i>International Journal of Contemporary Hospitality Management</i>

Source: Own work

5.1.3 The research link between consumer confusion and food and nutrition information online

Information overload, as one of the three main causes of consumer confusion, is very frequently present in food and nutrition information as well. Before the rise in popularity of online information sources, researchers often tried to understand the effect that too much food and nutrition information, mostly via food labels and claims, has on consumers' decision making.

Food labels and claims are found to confuse consumers in multiple directions, as is often the case with fat (Chan, Patch, & Williams, 2005) and whole grain content (Wilde, Pomeranz, Lizewski, & Zhang, 2020). Novel trends such as eco-labels or organic or natural claims on foods are nothing less than confusing to consumers, as the latter are often unable to distinguish between such labels or their meanings (Kuchler et al., 2020; Moon et al., 2017).

When it comes to food and nutrition information in an online setting, 19 articles that deal with consumer confusion were identified in the Scopus search. The dominant topics of interest in this group of articles include food systems and technologies, nutrition, food information available on online sources (i.e., social media, websites, ads, apps, etc.), and nutrition literacy. These articles aim at drawing attention to the issue of the **overwhelming amount of inconsistent**, sometimes even contradictory information that consumers are exposed to on a daily basis.

Table 11. Publications mutual to consumer confusion and online food and nutrition information literature fields.

Authors	Title	Year	Journal
Haven, Burns, Britten and Davis	Developing the Consumer Interface for the MyPyramid Food Guidance System	2006	<i>Journal of Nutrition Education and Behavior</i>
Silk et al.	Increasing Nutrition Literacy: Testing the Effectiveness of Print, Web site, and Game Modalities	2008	<i>Journal of Nutrition Education and Behavior</i>
Wills et al.	What is being conveyed to health professionals and consumers through web and print sources of nutrition information?	2013	<i>Catalan Journal of Communication & Cultural Studies</i>
Chrysochou and Grunert	Health-related ad information and health motivation effects on product evaluations	2014	<i>Journal of Business Research</i>
Lowe et al.	A change for the better? Digital health technologies and changing food consumption behaviors	2015	<i>Psychology and Marketing</i>

Table continues

Continued

Authors	Title	Year	Journal
Hynes and Wilson	I do it, but don't tell anyone! Personal values, personal and social norms: Can social media play a role in changing pro-environmental behaviours?	2016	<i>Technological Forecasting and Social Change</i>
Mackert et al.	Health literacy and health information technology adoption: The potential for a new digital divide	2016	<i>Journal of Medical Internet Research</i>
Mitsutake, Shibata, Ishii and Oka K.	Associations of eHealth literacy with health behavior among adult internet users	2016	<i>Journal of Medical Internet Research</i>
Regan, Raats, Shan, Wall and McConnon	Risk communication and social media during food safety crises: A study of stakeholders opinions in Ireland	2016	<i>Journal of Risk Research</i>
Jung et al.	Factors influencing the perceived credibility of diet-nutrition information web sites	2016	<i>Computers in Human Behavior</i>
Huang	The dining experience of Beijing Roast Duck: A comparative study of the Chinese and English online consumer reviews	2017	<i>International Journal of Hospitality Management</i>
Wellard, Koukoumas, Watson and Hughes	Health and nutrition content claims on Australian fast-food websites	2017	<i>Public Health Nutrition</i>
Gesser-Edelsburg and Shalayeva	Internet as a source of long-term and real-time professional, psychological, and nutritional treatment: A qualitative case study among former Israeli Soviet union immigrants	2017	<i>Journal of Medical Internet Research</i>
Marano-Marcolini and Torres-Ruiz	A consumer-oriented model for analysing the suitability of food classification systems	2017	<i>Food Policy</i>
Kim Dang et al.	Consumer preference and attitude regarding online food products in Hanoi, Vietnam	2018	<i>International Journal of Environmental Research and Public Health</i>
Dumas, Lapointe and Desroches	Users, uses, and effects of social media in dietetic practice: Scoping review of the quantitative and qualitative evidence	2018	<i>Journal of Medical Internet Research</i>
Keselman et al.	Evaluating the quality of health information in a changing digital ecosystem	2019	<i>Journal of Medical Internet Research</i>
Clark et al.	Confusion and nutritional backlash from news media exposure to contradictory information about carbohydrates and dietary fats	2019	<i>Public Health Nutrition</i>
Bradley et al.	Impact of a health marketing campaign on sugars intake by children aged 5-11 years and parental views on reducing children's consumption	2020	<i>BMC Public Health</i>

Source: Own work

5.1.4 The research link between attitude strength and the HSM of information processing

As both are from the fields of attitude and social psychology, attitude strength and the HSM are frequently researched together. The Scopus and WoS searches resulted in 10 articles mentioning both areas in their abstracts or keywords. The articles mostly focus on some of the **attitude strength dimensions** (e.g., ambivalence, certainty, importance) when assessing information processing using the **HSM**.

Table 12. Publications mutual to attitude strength and HSM literature fields.

Authors	Title	Year	Journal
Mackie and Gastardo-Conaco	The impact of importance accorded an issue on attitude inferences.	1988	Journal of Experimental Social Psychology
Roese and Olson	Attitude importance as a function of repeated attitude expression	1994	Journal of Experimental Social Psychology
Jonas, Diehl and Brömer	Effects of Attitudinal Ambivalence on Information Processing and Attitude-Intention Consistency	1997	Journal of Experimental Social Psychology
Griffin, Neuwirth, Giese and Dunwoody	Linking the Heuristic-Systematic Model and Depth of Processing	2002	Communication Research
Barden and Petty	The mere perception of elaboration creates attitude certainty: Exploring the thoughtfulness heuristic	2008	Journal of Personality and Social Psychology
Monroe and Read	A general connectionist model of attitude structure and change: The ACS (attitudes as constraint satisfaction) model	2008	Psychological Review
Yan	Persuading People to Eat Less Junk Food: A Cognitive Resource Match Between Attitudinal Ambivalence and Health Message Framing.	2014	Health Communication
Siddiqi et al.	The role of conflicting online reviews in consumers' attitude ambivalence.	2019	The Service Industries Journal
Akhtar et al.	Modeling attitude ambivalence and behavioral outcomes from hotel reviews.	2020	International Journal of Contemporary Hospitality Management
Brown and Beruvides	The heuristic-based framework for attitude certainty: How technology and the attention economy are systematically eroding systematic thinking.	2020	The Psychologist-Manager Journal

Source: Own work

5.1.5 The research link between attitude strength and online food and nutrition information research fields

While the attitude strength literature extensively publishes articles that deal with relevant social issues and frequently uses them as examples (e.g., political parties and controversial issues, such as slavery, abortion, and health concerns), the issue of food and nutrition is not a frequently researched topic in relation to attitude strength. The searches in Scopus and WoS resulted in **three articles** that refer to these two keywords. These articles assess the attitude strength of individuals exposed to online information about food and nutrition via manipulations created in *social media or website settings*.

Table 13. Publications mutual to attitude strength and online food and nutrition information literature fields.

Authors	Title	Year	Journal
van Strien et al.	How attitude strength biases information processing and evaluation on the web	2016	<i>Computers in Human Behavior</i>
Al-Kwifi, Farha and Ahmed	Dynamics of Muslim consumers' behavior toward Halal products: Exploration study using fMRI technology	2019	<i>International Journal of Emerging Markets</i>
Schäfer	Illusion of knowledge through Facebook news? Effects of snack news in a news feed on perceived knowledge, attitude strength, and willingness for discussions	2020	<i>Computers in Human Behavior</i>

Source: Own work

5.1.6 The research link between the HSM of information processing and online food and nutrition information research fields

Analysis of online food and nutrition information processing using the HSM was detected in three articles available in Scopus. These articles examine the **cues** that influence information processing (e.g., source, expertise, message accuracy) and the **route** of processing (heuristic or systematic) it takes in social media, online review, and website settings.

Table 14. Publications mutual to HSM and online food and nutrition information literature fields.

Authors	Title	Year	Journal
Yang, Chen and Feng	Risk perception of food safety issue on social media	2016	<i>Chinese Journal of Communication</i>
Jung et al.	Factors influencing the perceived credibility of diet-nutrition information web sites	2016	<i>Computers in Human Behavior</i>
Nazlan, Tanford and Montgomery	The effect of availability heuristics in online consumer reviews	2018	<i>Journal of Consumer Behaviour</i>

Source: Own work

5.2 Mutual publications for three scientific fields

5.2.1 The research link between consumer confusion, the HSM of information processing, and online food and nutrition information research fields

The Scopus search for manuscripts that connect consumer confusion, the HSM, and online food and nutrition information yielded one result. This article, written by Jung et al. (2016), discusses factors, such as *source expertise and message accuracy*, as cues in online nutrition information processing.

Table 15. Publications mutual to consumer confusion, HSM, and online food and nutrition information literature fields.

Authors	Title	Year	Journal
Jung et al.	Factors influencing the perceived credibility of diet-nutrition information web sites	2016	<i>Computers in Human Behavior</i>

Source: Own work

5.2.2 The research link between consumer confusion, the HSM of information processing, and attitude strength research fields

Queries in Scopus and WoS for publications that belong to the consumer confusion, attitude strength, and HSM literature resulted in two items. The two publications aim to understand the links between conflicting reviews, cues for information processing, and attitude ambivalence, which is a dimension of attitude strength.

Table 16. Publications mutual to consumer confusion, HSM, and attitude strength literature fields.

Authors	Title	Year	Journal
Siddiqi et al.	The role of conflicting online reviews in consumers' attitude ambivalence.	2019	<i>The Service Industries Journal</i>
Akhtar et al.	Modeling attitude ambivalence and behavioral outcomes from hotel reviews.	2020	<i>International Journal of Contemporary Hospitality Management</i>

Source: Own work

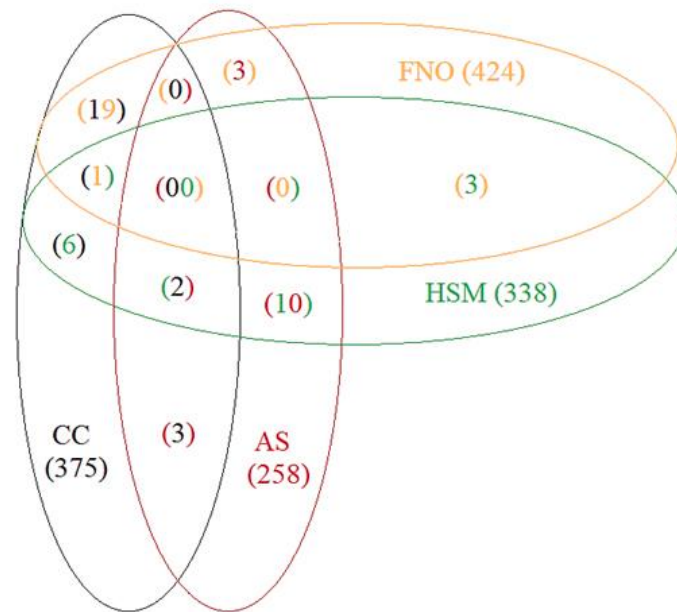
The searches in WoS and Scopus for publications containing attitude strength-, HSM-, and online food and nutrition information-related keywords yielded **zero results**. One publication related to food and attitude ambivalence that used the HSM was detected (Yan, 2015), but due to the lack of an online context, it was not considered for further evaluation.

The searches in WoS and Scopus for publications containing consumer confusion-, attitude strength-, and online food and nutrition information-related keywords brought similar results as the previous search. In other words, queries for keywords relevant to these three fields also yielded **zero results**, bringing the attention to the lack of research that tackles the three areas simultaneously.

5.3 Mutual publications from all four scientific fields

While the research is extensive for each of the four literature fields, thorough research of the fields' **intersections** has shown that research including three or four of these fields at the same time is scarce. To the best of our knowledge and according to the article search conducted in Scopus and WoS, **no publications** have so far included all four areas of interest to this thesis at the same time.

Figure 14. Number of publications per field and intersection: Visual representation.



Abbreviations: CC—Consumer confusion, AS—attitude strength, HSM—heuristic-systematic model of information processing, FNO—food and nutrition information online

Source: Own work

From the bibliometric analysis and the analysis of the articles in overlapping areas, it can be seen that the areas of interest for this PhD are connected. Some overlap in research exists, as is visible in the keyword co-occurrence analysis of attitude strength and the HSM, and researchers are already trying to demystify the connections that can be drawn between these areas. At this point in time however, the scientific search for connections between these four areas has not yet been conducted.

Researching the four areas together aims at strengthening the ties between social psychology and consumer research. These two areas are **strongly intertwined**, and studies incorporating both fields constantly confirm the applicability of psychological constructs to consumer research, mainly due to the fact that humans are the research subject in both fields (Bagozzi, Gurhan-Canli, & Priester, 2002).

While the research that explicitly connects the four areas has not been conducted yet, previous efforts indicate that the interplay of these topics is of interest to researchers. **Attitude strength** and **the HSM**, although primarily studied in social psychology, have been frequently used in studying consumers in marketing literature as well. Attitude strength has also often been evaluated in studies about brands (e.g., Priester, Nayakankuppam, Fleming, & Godek, 2004; Park, MacInnis, Priester, Eisingerich, & Iacobucci, 2010; Moore & Homer, 2008) and online consumer behavior (e.g., Schäfer, 2020; van Strien et al., 2016).

Furthermore, as information processing has attracted a significant amount of attention in consumer research, the HSM is present in marketing studies even more often than attitude strength. Understanding how consumers process the information presented to them has been studied with a focus on numerous aspects of consumer research, including product labels (e.g., Zuckerman & Chaiken, 1998), brands and advertising (Kim, King, & Kim, 2018), travelers' behavior (Hlee, Lee, & Koo, 2018), food and risk messages (e.g., Kahlor, Dunwoody, Griffin, Neuwirth, & Giese, 2003; Kim & Paek, 2009), and purchase intentions (Tan, Geng, Katsumata, & Xiong, 2021).

While **consumer confusion** is primarily found in the marketing and consumer research literature, confusion itself has also sparked research interest in the field of psychology. Confusion has been studied primarily in education, where researchers have worked to develop strategies for its reduction in learning (Lehman et al., 2012) or its usage in favor of learning by triggering interest and engagement (D'Mello, Lehman, Pekrun, & Graesser, 2014). In attitudes research, confusion has been found to be one of the barriers that prevent individuals from expressing their **attitudes** (Effron & Miller, 2012).

The context of this study, **online food and nutrition information**, has been explored in a plethora of fields. Due to its multidisciplinary relevance, online food and nutrition information is not only a frequent context of consumer and marketing studies (e.g., Jung et al., 2016; Aschemann-Witzel & Grunert, 2015), but also of medical studies due to the importance of such information to dietary decisions that directly affect health (e.g., Pollard et al., 2015; Van Veen, Beijer, Adriaans, Vogel-Boezeman, & Kampman, 2015). In addition, this context has often been examined in studies of communication (Lee et al., 2018; Nagler, 2014) and information technology (Ayres & Hogg, 2012; Larsen & Martey, 2011). While social psychology frequently uses relevant social contexts, such as politics, education, and access to health services, the research in the context of this thesis—though relevant as a social topic—has yet to be conducted.

From the examples given in previous paragraphs, it can be seen that the research interests of two fields are connected when it comes to constructs relevant to this study. Research connecting the four areas, therefore, has the potential to contribute to the existing knowledge in several ways. From a theoretical point of view, such research would improve the understanding of the effects of consumer confusion on consumers' attitudes and behavioral intentions. In addition, it would aid the **reinforcement of the existing knowledge** about the connection between the two literatures by introducing new relationships between their prominent constructs.

From a practical point of view, understanding processing in confusing situations can help create better and more **applicable guidelines** to address the specifics of information processing in different source environments. Moreover, raising awareness of the influence that consumer confusion can have on consumers' attitude and its stability (i.e., proneness to

change) and strength can be of value to managers to understand the importance of consistency in the messages and actions that they create.

For all of the reasons stated above (i.e., the proposed contributions), we believe that research of this sort is worth conducting. Therefore, the aim of this dissertation is to unveil the unresearched connections between these literature fields and enrich the existing knowledge with novel insights through several empirical studies.

6 EMPIRICAL EVALUATION OF CONSUMER CONFUSION AND ATTITUDE STRENGTH IN ONLINE FOOD AND NUTRITION INFORMATION

The bibliometric overview of the fields of interest in this PhD research implied a lack of in-depth research that assesses consumer attitude strength when facing consumer confusion in the online food and nutrition context. As decision making and attitude formation require information processing, the theoretical background of the HSM also has a substantial role in this research (Eagly & Chaiken, 1993).

In order to better understand the mutual effects and interplay of the given constructs, theoretical model, and context, an empirical investigation was conducted in three studies. The first step (Study 1) evaluated the relationship between **consumer confusion and attitude strength in the online food and nutrition information context**. The proliferation of online information sources and their content has resulted in an abundance of information that is available to consumers. Nevertheless, much of this information is inconsistent, creating a challenge for consumers to form attitudes that are strong (van Strien et al., 2016). The effects that consumer confusion caused by inconsistencies in information provided to consumers have on the attitudes they create can be of relevant influence on consumer behavior and are, therefore, carefully examined in this step of research.

The second step (pre-study of Study 2) enabled the **distinction of online food and nutrition information sources** by their information quality, helpfulness, and affective (cognitive) and functional (informative) natures. While the existing research found significant differences in online information sources in terms of their content quality, helpfulness, and entertainment properties (Go, You, Jung, & Shim, 2016; Jung et al., 2016), such differentiation did not include a clear distinction of cognitive and affective—as well as hedonic and informative—traits. In addition, this study focuses exclusively on online food and nutrition information sources. This step allowed us to differentiate between the ways that consumers approach different information sources and provided us the grounds for testing the potential differences in processing information coming from these sources, as well as the consequences for the attitudes.

Finally, the third step (Study 2) of this thesis explored the ideas from Study 1 further and in more detail with the help of the results of the pre-study. The focus of this study was the assessment of the consumer **information processing route** for information coming from different sources in the presence of consumer confusion. Different ways of presenting information and message framing are shown to influence information processing (e.g., Ryffel & Wirth, 2016). However, this study wanted to examine potential effects of the source itself on processing routes used. The study aimed at deepening the knowledge of the effects that the nature of information sources can have on the approaches to information processing and attitude formation. Details that ground the relevance of these investigations, developed and assessed hypotheses, and the results are discussed in the following chapters.

6.1 Study 1: The effects of consumer confusion on attitude strength in evaluating food and nutrition information from mobile apps

The search for information and the desire to make the best choice possible are very common characteristics of modern consumers. These goals are especially emphasized in situations where the stakes are high. Health- and diet-related decisions are an example of such situation due to nutrition's relevance to ensuring the quality of life and healthy body functioning. Studies have shown that consumers make the effort to properly choose foods that they consume, while current trends show that healthier and better-quality food options are even becoming preferred among consumers (Román et al., 2017).

In their journey of food decisions, consumers face information and advice from multiple sources. Apart from traditional information sources that are usually consulted (friends, family, television, official institutions, field experts, etc.), recent forms of communication strongly rely on the online world, where creators of the content are not always known but the content might nevertheless be persuasive and play an important part in decision making (Jacobs et al., 2017; Viviani & Pasi, 2017).

While online sources became preferred due to their convenience of use, speed, and accessibility, they are not without limitations. The information offered online is often inconsistent, and as such, it has the potential to confuse consumers (Spiteri Cornish & Moraes, 2015). In addition to this, such inconsistencies can result in doubt in the product's genuine nutritive value and healthiness, as well as lower trust in recommendations and food and nutrition information sources in general (Nagler, 2014; Carpenter et al., 2016; Clark et al., 2019).

The purpose of this study is to examine the effects that inconsistencies in online food information provided to consumers have on consumer confusion, their attitudes towards the perceived healthiness, and the strength of that attitude. This study aims to investigate the relationship between the product healthiness evaluation provided in an app and consumers' attitude towards product healthiness, and the strength of this attitude. In addition, the study

explores the elements of consumer confusion with the inconsistent information available in nutrition mobile apps and its effects on attitude and attitude strength.

6.1.1 Study 1: Literature review and hypotheses

One of the very evident but infrequently examined consequences of inconsistency in available information is **consumer confusion**. In consumer confusion literature, misleading and ambiguous information is considered one of the three main sources of confusion. In the food and nutrition context, confusion has mainly been assessed from the point of view of too much and overly inconsistent information in the media (Nagler, 2014), official recommendations and guidelines (Spiteri Cornish & Moraes, 2015), and product labels (Chan et al., 2004; Henryks & Pearson, 2010; Wilde et al., 2020). All of these studies detected the existence of confusion among consumers, and the proportion of consumers confused by the available food and nutrition information reaches 72% in some studies (Nagler, 2014; Lee et al., 2018).

When it comes to the online world, the situation of inconsistent information becomes especially complicated. Availability and easy access to information attract individuals to the Internet, but the overwhelming volume of information can be very confusing (Goldberg & Sliwa, 2011), especially in the presence of **inconsistent information**, which is quite frequent in this environment (Jung, Walsh-Childers, & Kim, 2016). However, a more in-depth investigation of different contexts in the online world, confounders, and specifics in food and nutrition is still pending (Spiteri Cornish & Moraes, 2015).

The lack of consistency in the online food and nutrition context has been attracting research efforts for the last couple of decades. Researchers have tried to understand the effects that such information has on the inferences that consumers make, as well as the attitudes that they create in these conditions. Moreover, people can and tend to evaluate the elements or **characteristics** of things as well (Briñol & Petty, 2012; Ares, Besio, Giménez, & Deliza, 2010). When it comes to food, consumers usually hold attitudes about the brand, product, or product characteristics (i.e., healthiness, taste, etc.). These attitudes are a result of factors both internal (motivation, knowledge) and external (situations, social factors) to the consumer (Sobal, Bisogni, Devine, & Jastran, 2006).

This study intends to focus on consumers' **attitude towards perceived healthiness**, attitude change, and attitude strength, which are strongly related to consumers' decisions and actions (Ares & Gámbaro, 2007; Johansen et al., 2011), purchase intentions (Shan et al., 2017; Wang, Oostindjer, Amdam, & Egeland, 2016), and food intake (Provencher, Polivy, & Herman, 2009). In general, we approach attitudes according to the definition provided in Chapter 2. Studies in this field have also assessed attitudes and inferences about the healthiness of a certain product or object (e.g., Aschemann-Witzel & Grunert, 2015; Chang,

2013), and they have reported a decrease in positive attitudes after study participants were subjected to inconsistent information.

Further studies examining the **effects of inconsistencies** in food and nutrition information available to consumers showed that they surpass the mere attitude that they form about a certain subject for which the information is received. These inconsistencies are shown to increase general uncertainty about research in health, increase negative assessments and attitudes of health research, and lower the perception of credibility of news in general (Chang, 2015). What is more, the presence of inconsistencies in information might also decrease consumers' intention of following the official recommendations for a proper diet as a consequence of confusion (Lee et al., 2018), proving its ability to have a deeper impact on consumers.

While previous research has proven that consumer attitudes are affected by inconsistent information, the **strength of the attitudes** created in these situations has rarely been evaluated. Conflicting information was usually considered a trigger for attitude ambivalence. If present, conflicting information is found to increase attitude ambivalence (Petty et al., 2007; Siddiqi et al., 2019; Akhtar et al., 2020). From the previous research, however, the relationship between attitudinal ambivalence and attitude strength is not straightforward. While some studies imply that attitudinal ambivalence results in attitudes of lower strength (e.g., Conner et al., 2002), some authors have shown that it can actually reinforce the strength of attitudes (e.g., Sawicki et al., 2013).

However, this study examines the connection between **confusion and attitude strength**. While ambivalence often brings two sides of a story to the consumer, and while creating an impression of being more informed can strengthen their attitudes (Rucker, Petty, & Briñol, 2008), confusion studied in this research does not have this positive characteristic. Namely, the main difference in the conceptualization of attitudinal ambivalence and consumer confusion as proposed here is that while ambivalence provides positive and negative aspects of an object that can all be true at the same time (e.g., eating fast food is delicious but unhealthy), consumer confusion caused by inconsistent information presents consumers with a situation where the information available to them cannot all be true at the same time (e.g., two website evaluations of the same product where one clearly says it is healthy and the other labels it as unhealthy).

Confusion therefore brings rather unpleasant uncertainty and discomfort in decision making and attitude formation due to the inconsistency in the information provided, and it even has the potential to modify existing perceptions and behaviors (Mitchell & Papavassiliou, 1999). In addition, consumer confusion influences levels of annoyance, which likely influences consumer perceptions and attitudes (Sachse, Drengner, & Jahn, 2010; Walsh & Mitchell, 2010). In addition to its effect on attitude shaping, as its deteriorating effect on consumer decisiveness and sureness has been shown (Walsh & Mitchell, 2010), we can expect to find

the influence of feeling confused on consumers' attitude strength. Therefore, the following suggestions are made.

H1a: The presence of information inconsistency leads to lower attitude strength.

H1b: The relationship between information consistency and attitude strength is mediated by consumer confusion.

A decrease in positive assessments of a product and more conservative attitudes in situations where inconsistent information is present have been tested in the existing research (Aschemann-Witzel & Grunert, 2015). Consumers are proven to be prone to attitude adaptation when subjected to inconsistent information from different sources—namely, media, scientific, or popular “soft” information sources. In situations where the inconsistency of information is present, consumers change their attitudes towards products and their characteristics rather than towards a more negative assessment compared to situations where inconsistencies are absent (e.g., Aschemann-Witzel & Grunert, 2015).

However, existing studies have not incorporated consumer confusion and its potential effects on attitudes and their strength. The effects of consumer confusion on consumers' attitudes and intentions have been stated in the existing literature (e.g., Mitchell & Papavassiliou, 1999; Walsh et al., 2007). Under the pressure of confusion, consumers are expected to be more prone to changing their attitudes (Mitchell & Papavassiliou, 1999). This is also applicable to situations where confusion is triggered by ambiguity and inconsistencies in information, as is the case of this study, because the ambiguity and lack of clarity of information are well-known causes of consumer confusion (Mitchell & Papavassiliou, 1999).

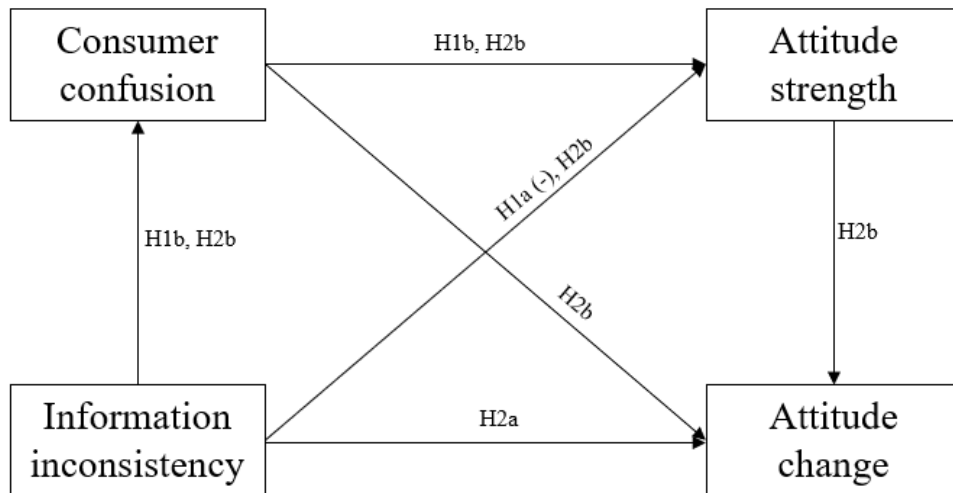
In **consumer confusion** research, confusion and the lack of clarity are often researched along with uncertainty, as the confusion often brings along uncertainty in decision- and attitude-making processes (Mitchell & Papavassiliou, 1999). In the attitude literature, certainty is closely connected with **attitude strength** (e.g., Gross et al., 1995; Tormala & Rucker, 2018), as certainty positively influences the strength of formed attitudes. The effects that uncertainty brings to consumers by confusion are not solely visible on the strength of their attitudes. As an attitude characteristic, the strength of an attitude is strongly related to the ease and frequency with which an attitude can be changed (Krosnick & Petty, 1995). Thus, in situations where attitude strength is affected (i.e., in the presence of inconsistent information that causes consumer confusion), **attitude change** can be expected to occur.

H2a: The presence of information inconsistency leads to attitude change.

H2b: The relationship between information consistency and attitude change is mediated by consumer confusion and attitude strength.

The proposed hypotheses are visually presented in Figure 15. Several anticipated direct and mediating effects and relationships are empirically tested in this study, and they are presented in the following chapters.

Figure 15: Graphical representation of the proposed hypotheses.



Source: Own work

6.1.2 Study 1: Method

6.1.2.1 Study design

Previous studies have mainly used websites in their experimental design (e.g., van Strien et al., 2016; Aschemann-Witzel & Grunert, 2015). This study provides a fresh perspective to consumer confusion, using the mobile apps setting as its context. As a source of food and nutrition information, nutrition mobile apps are frequently used and trusted by their users (Krebs & Duncan, 2015). Their availability, ease of use, likeability, and user-friendly interface are some of their main advantages in the eyes of consumers (Ferrara, Kim, Lin, Hua, & Seto, 2019; Zečević, Mijatović, Kos Koklič, Žabkar, & Gidaković, 2021). The origin of the information that they provide, however, often remains hidden. Furthermore, differences in the methodologies that they use can cause differences in their final product assessments (Maringer, Wisse-Voorwinden, van't Veer, & Geelen, 2018). For instance, a short search for assessments of the same muesli bar in two apps resulted in significantly different product evaluations and grading, as shown in in Appendix 6.

In their assessment of food products and their appropriateness to a certain diet or diet goal, nutrition applications often use visual displays (colors, icons) and gradings (in letters or numbers) to present product evaluations to their users. Similar **healthiness grades** have been used on food labels for decades and have been shown to influence consumers' attitudes about food healthiness, overall product assessment (i.e., product attitude), purchase intentions, and

even their purchase behavior (Neal et al., 2017; De Temmerman, Heeremans, Slabbinck, & Vermeir, 2021; Hailu, Boecker, Henson, & Cranfield, 2009).

To test the proposed hypotheses, a between-subjects research design was used. Authentic screenshots from **two existing nutrition apps** (Environmental Working Group, 2014; Fooducate, 2010) were employed to manipulate the healthiness score of the selected product, a branded muesli bar with limited presence in the respondents' market (Carman's in the US), and are available in Appendix 6. Adjustments were only made to the product picture to ensure that the product presented to both groups, treatment and control, was the same.

The **single-factor experiment** consisted of a control group and a treatment group. In both conditions, respondents saw two app screenshots. The control group respondents saw two screenshots that showed consistent results about the Carman's muesli bar's healthiness, both grading the product as relatively healthy. In the treatment group, app healthiness scores were not unanimous—one app implied that the muesli bar was healthy, while the other indicated that the product was unhealthy and gave it a low healthiness score. The order in which screenshots were shown to participants was randomized to avoid potential biases. The apps were not differentiated based on credibility, and the experiment instruction stated that “Both apps are from non-profit, non-partisan organizations that provide food scores for more than 80.000 products.”

At the beginning of the experiment, the respondents were shown an image of the Carman's muesli bar and asked to assess its healthiness. Afterward, they saw one of the two conditions—a consistent or inconsistent muesli bar healthiness assessment by two apps—to which they were randomly assigned and asked to again evaluate the healthiness of this product (healthiness attitude was collected before and after manipulation). At this stage, other evaluations were assessed as well, including confusion, attitude certainty (used to measure attitude strength, as explained in Subsection 6.2.2.2), controls, and demographics. Participants were shortly debriefed, thanked for their participation, and dismissed.

6.1.2.2 Measurement scales and sample characteristics

Data for this study was collected online in March 2019 using the Prolific online platform, and participants were paid \$6.00 per hour for their cooperation. In total, 248 respondents from the US completed the study, out of which 11 were excluded as outliers (Aguinis, Gottfredson & Joo, 2013). Of the participants, 47% were male, and the average age was 32.8 (ranging from 18 to 69). Out of the 237 respondents included in the final sample, 48% (114 respondents) were randomly presented with two screenshots with similar healthiness levels shown in the nutrition app score muesli bar condition (control group). The remaining 52% (123 respondents) saw two screenshots showing inconsistent nutrition app scores.

Well-established scales from consumer and social psychology were adapted to capture responses. An overview of the scales, their reliability, obtained means, and standard deviations is presented in Table 17.

Table 17. Measurement scales used in Study 1.

Scale/ Item	Cronbach's alpha (α)	Mean (total)	Mean (per condition)	St. deviation (total)	St. deviation (per condition)
Attitude towards product healthiness (Provencher et al., 2009) <i>(post manipulation metrics)</i>	.954	4.62	Mc = 5.25 Mt = 4.03	1.42	SDc = 0.89 SDt = 1.56
How healthy is Carman's muesli bar?		4.68	Mc = 5.33 Mt = 4.07	1.42	SDc = 0.94 SDt = 1.53
How appropriate is Carman's muesli bar for a healthy menu?		4.65	Mc = 5.28 Mt = 4.06	1.52	SDc = 1.01 SDt = 1.67
How appropriate is Carman's muesli bar in a healthy diet?		4.53	Mc = 5.15 Mt = 3.96	1.51	SDc = 1.02 SDt = 1.65
Attitude certainty (Tormala, Clarkson, & Petty, 2006)	.912	4.88	Mc = 5.15 Mt = 4.62	1.27	SDc = 1.12 SDt = 1.36
How certain are you of your attitude about this product's healthiness?		4.86	Mc = 5.17 Mt = 4.58	1.38	SDc = 1.17 SDt = 1.49
How convinced are you of your opinion about this product's healthiness?		4.84	Mc = 5.10 Mt = 4.60	1.40	SDc = 1.28 SDt = 1.47
How much confidence do you have in your attitude toward this product's healthiness?		4.94	Mc = 5.20 Mt = 4.69	1.36	SDc = 1.18 SDt = 1.48
Consumer confusion (Lehman et al., 2012)	.834	2.66	Mc = 2.32 Mt = 2.96	1.40	SDc = 1.30 SDt = 1.42
<i>When evaluating information in two app screenshots, please rate how ... did you feel?</i>					
Anxious		2.50	Mc = 2.22 Mt = 2.76	1.58	SDc = 1.51 SDt = 1.61
Confused		3.05	Mc = 2.52 Mt = 3.54	1.85	SDc = 1.64 SDt = 1.89
Frustrated		2.57	Mc = 2.15 Mt = 2.97	1.77	SDc = 1.56 SDt = 1.85
Overwhelmed		2.50	Mc = 2.40 Mt = 2.59	1.65	SDc = 1.60 SDt = 1.70

Notes: Constructs were measured on a 7-point scale; Mc—mean control group, Mt—mean treatment group, SDc—standard deviation control group, SDt—standard deviation treatment group

Source: Own work

Attitude strength and attitude change are two constructs that were measured indirectly due to their complexity. In the existing literature, attitude strength is usually measured using a combination of some of its dimensions (e.g., Schäfer, 2020; van Strien et al., 2016). This was the approach applied in this study as well—attitude strength was captured using the *extremity* of the attitude towards product healthiness and *attitude certainty* (attitude strength dimensions explained in Chapter 2) of this thesis. Attitude extremity was measured by giving values from 1 to 4 to respondents' answers to items measuring attitude towards product healthiness. While 1 represented a neutral answer (4 on the Likert scale), 2 was assigned to answers 3 and 5 on the Likert scale, 3 accounted for 2 and 6, and 4 was assigned to the most

extreme answers 1 and 7. This 4-point scale was transformed to a 7-point scale by expanding its range and recoding and averaged with attitude certainty answers to obtain a measure for attitude strength; $Mc = 4.06$ (1.01), $Mt = 3.78$ (1.08).

As mentioned in Subsection 6.2.2.1, respondents stated their attitude towards product healthiness before seeing the manipulation and after assessing manipulation information. By using this information collected at two times, we assessed attitude change. **Attitude change** was therefore calculated as the difference between the attitude towards product healthiness before respondents were shown manipulation and the answers that they gave to the same questions post-manipulation; $Mc = 0.29$ (0.73), $Mt = 1.47$ (1.38).

Convergent and discriminant validity of our interval variables (consumer confusion and attitude strength) was also evaluated. As shown in Table 18, this analysis showed no concerns.

Table 18. Convergent and discriminant validity: Study 1.

	CR	AVE	MSV	MaxR (H)	CC	AS
CC	0.833	0.557	0.114	0.847	0.746	
AS	0.915	0.782	0.114	0.939	-0.338***	0.884

Note: Square root of AVE in bold on the diagonal, construct correlations below the diagonal.

Source: Own work

6.1.3 Study 1: Results

In order to account for the **manipulation check**, respondents were asked to indicate their agreement with two statements: “After reading the information provided in the two app screenshots, I felt puzzled”— $Mt = 3.70$ (1.92), $Mc = 2.79$ (1.66)—and “The information provided in the two app screenshots gave contradictory information about muesli bar’s healthiness”— $Mt = 4.41$ (1.64), $Mc = 3.11$ (1.66). The difference in means was statistically significant (at $p < .001$ for both claims), suggesting that the respondents perceived the manipulation as expected—that is, that the participants in the treatment group reported a higher level of inconsistent information in the screenshots.

In the statistical analysis of the hypotheses, SPSS software (version 25.0) was used (IBM Corp. Released, 2017). A one-way ANOVA was used to test whether the presence of information inconsistency leads to lower attitude strength (H1a). In support of this hypothesis, the **main negative effect** of inconsistencies in information on attitude strength was confirmed ($p < .05$, $F = 4.10$). Therefore, we were able to prove that inconsistent information about the product’s healthiness presented to respondents in the form of nutrition apps’ scores did have a negative influence on respondents’ attitude strength, as proposed in H1a.

The second part of the first hypothesis—that is, that consumer confusion mediates the relationship between information inconsistency and attitude strength (H1b)—was tested using PROCESS (Hayes, 2017; model 4) to estimate a mediation model. Supporting this hypothesis, an indirect negative effect ($\beta_M = -.10$) of information consistency on attitude strength was significant (LLCI = $-.21$; ULCI = $-.03$), while the direct effect no longer remained significant ($p = .21$), implying the existence of the **indirect-only mediation** of the relationship between information consistency and attitude strength by consumer confusion (Zhao, Lynch, & Chen, 2010). An overview of the results is provided in Tables 19 and 20.

Table 19. Direct effect of information inconsistency on attitude strength.

Effect	se	T	P	LLCI	ULCI
-.17	.14	-1.25	.21	-.44	.10

Source: Own work

Table 20. Indirect effect of information inconsistency on attitude strength through consumer confusion.

	Effect	BootSE	BootLLCI	BootULCI
Consumer confusion	-.10	.04	-.21	-.03

Note: Confidence level interval (LLCI—lower confidence level interval, ULCI—upper confidence level interval)

Source: Own work

An ANOVA test of the first part of the second hypothesis—that is, that the presence of information inconsistency leads to attitude change (H2a)—demonstrated the highly significant effect of information consistency on attitude change ($p < .00$, $F = 66.40$). The change in attitude towards product healthiness was significantly higher in the group that saw inconsistent nutrition app screenshots ($Mt = 1.47$) than in the control group where both screenshots implied the product’s healthiness ($Mc = 0.29$).

The second part of the second hypothesis, which posits that consumer confusion and attitude strength mediate the relationship between information consistency and attitude change (H2b), was again conducted using PROCESS (Hayes, 2017; model 6). Supporting H2a, an indirect positive effect ($\beta_M = .14$) of information consistency on attitude change as serially mediated by consumer confusion and attitude strength was significant—LLCI = $.00(3)$; ULCI = $.05$. Individual mediation of consumer confusion was also significant (LLCI = $.03$; ULCI = $.21$), while attitude strength was not a significant mediator without consumer confusion (LLCI = $-.02$; ULCI = $.11$). The direct effect of information consistency on attitude change remained significant ($p = .00$), implying the existence of **partial mediation** of the relationship between information consistency and attitude change by consumer confusion (Zhao et al., 2010). An overview of the results is provided in Tables 21 and 22.

Table 21. Direct effect of information inconsistency on attitude change.

Effect	se	T	p	LLCI	ULCI
1.04	.14	7.21	.00	.76	1.33

Source: Own work

Table 22. Indirect effect of information inconsistency on attitude change through consumer confusion.

	Effect	BootSE	BootLLCI	BootULCI
Total	.14	.05	.05	.25
Consumer confusion	.10	.05	.03	.21
Attitude strength	.03	.03	-.02	.11
Consumer confusion– Attitude strength	.02	.01	.00(3)	.05

Note: Confidence level interval (LLCI—lower confidence level interval, ULCI—upper confidence level interval)

Source: Own work

6.1.4 Study 1: Discussion and conclusions

The findings of this study aim to draw attention to the effect that inconsistent information can have on attitudes, as well as their strength and change. An overview of the hypotheses and their confirmation status in this study is presented in Table 23.

Table 23. Overview of the hypotheses and their confirmation status in Study 1.

Hypothesis	Results
H1a: The presence of information inconsistency leads to lower attitude strength	Confirmed
H1b: The relationship between information consistency and attitude strength is mediated by consumer confusion	Confirmed
H2a: The presence of information inconsistency leads to attitude change	Confirmed
H2b: The relationship between information consistency and attitude change is mediated by consumer confusion and attitude strength	Partially confirmed

Source: Own work

The results imply that when confronted with inconsistent information, consumers tend to be less positive about product healthiness (i.e., the muesli bar was perceived as less healthy in this condition) and **change their attitude** about product healthiness. Respondents who saw app screenshots with inconsistent scores for product healthiness in the experiment showed **higher levels of confusion** and **lower levels of attitude strength**. While the effect of inconsistent media health and nutrition information on confusion's emergence has already been mentioned in the literature (Nagler, 2014; Ward et al., 2011), this study managed to identify its presence in the case of inconsistent information provided by nutrition apps.

To the best of our knowledge, the unique point of view incorporated in this study was the **assessment of attitude strength in the presence of consumer confusion**. In this way, an

assessment of the relationships between well-established constructs from two fields aiming to understand human behavior was conducted. While consumer confusion is mostly researched in marketing, attitude strength is an important construct from social psychology literature. The previous literature has conceptually connected consumers' general state of confusion with choice uncertainty and frustration (Mitchell & Papavassiliou, 1999), while this research extends the knowledge about the relationship between experiencing confusion, the strength with which consumers hold their attitudes, and the occurrence of attitude change.

While the presence of **inconsistencies** in food and nutrition information is expected to a certain extent due to the constant research efforts and ongoing novel conclusions and findings, the amount of unclear information still seems overwhelming. A simple search on some of the most popular search engines brings dozens of results, offering both positive and negative assessments of the same characteristic (e.g., low-fat products, saturated fats). Previous research has unanimously detected inconsistencies in information provided to consumers by popular sources, such as blogs and social media (e.g., Ramachandran et al., 2018; Dickinson et al., 2018; Chan et al., 2020). These studies identified both contradictions in the advice that individual sources provide and contradictions when the information provided by the source is compared with the official public recommendations for healthy eating.

Additional problems emerge when we try to identify the **origin of the information** that these sources appealingly present in their posts. For example, a study concerned with mobile apps has emphasized that most health apps, including those focused on food and nutrition, are not necessarily designed with input from professionals in healthcare and behavioral change (Krebs & Duncan, 2015). This has also been the case for websites and blogs (Allen, Dickinson, & Prichard, 2018; Keogh & Chadwick, 2019), as well as social media (Lynn, Rosati, Leoni Santos, & Endo, 2020). This lack of professional advice and input, along with the lack of uniform standards for healthiness evaluation, are currently allowing online information sources to use different methodologies to evaluate food healthiness and nutritive value and provide such information to the public. This can trigger the state of confusion when online sources show inconsistent information about the same product or product category.

The confusion therefore starts with the **confrontation with such information**, even before the attitudes are created. Consumer confusion can also influence the ways in which consumers approach information processing (Sachse et al., 2010). Difficulties in information processing due to confusion can emerge independently from the information's source, as even information from the same source on the same issue is not always unanimous (Spiteri Cornish, & Moraes, 2015; Nagler, 2014). Nevertheless, differences in perception between sources are relevant, and their characteristics have the potential to influence consumers' approaches to information processing (Hughes et al., 2019). Additional research is necessary

to understand the relevance of information sources and information processing conditions, such as confusion, to better understand how consumers approach the abundance of diverse—and often inconsistent—information that they receive on a daily basis.

The results of this study show an unambiguous negative effect of consumer confusion on attitudes (i.e., their change and strength). However, the effect on information processing in which the attitude was created is missing at this point, and further research is necessary to better understand the back-end mechanisms that lead to such effects.

6.2 Study 2: Examining the effects of inconsistent information and consumer confusion on information processing and behavioral intentions

Research from the previous chapter of this thesis provided grounds for a better understanding of the adverse effect that consumer confusion can have on attitude strength and the consequent change of attitudes. This chapter takes a step back and investigates the information processing that occurs as a result of the information presented to the consumer before the formation of the attitude.

In order to understand consumers, the attitudes that they create about food and nutrition from the information that they receive, and the ways in which they process information, it is necessary to first examine the relationships and perceptions that they create about the information itself. In the online world, credibility can be blurred since the concept of free publishing of information sometimes makes distinguishing truth from clickbait hard. In such a complex environment, however, people are still held accountable for their choices, and they still must obtain information to make those choices.

From the information processing literature, we know that consumers use one of two ways when evaluating information available—they either engage in more **cognitive** and effortful thinking, or they do not engage with the information extensively, and process them **affectively** and automatically. Apart from consumers' motivation and ability, the setting of provided information is also found to influence the chosen processing route. Information characteristics, such as whether they are framed cognitively or affectively (e.g., Ryffel & Wirth, 2016), as well as cognitive and affective textual and visual messages used, are shown to influence the manner in which consumers approach information (e.g., Conner, Rhodes, Morris, McEachan, & Lawton, 2011; Jeong, 2008).

As carriers of information through which consumers access information, **information sources** are of importance for information processing (e.g., Chaiken, 1980). The existing literature, however, does not offer a deeper investigation of information sources with regard to their potential to influence information processing that occurs when accessing information on different types of sources. To make this differentiation in our research, we first explored the characteristics of information sources.

During our literature review, we did not encounter studies that consider the traits of online food and nutrition information sources (i.e., their affective and cognitive or hedonic and informative value) targeted in our study. Aiming at contributing to the existing research in this field, this chapter poses and answers several questions related to consumer perceptions of online information sources.

6.2.1 Pre-study: Understanding the consumer assessment of the nature, value, and helpfulness of online food and nutrition information sources

As this study is expected to classify sources by their characteristics, it is envisioned as exploratory and aims at contributing to the existing knowledge about online information sources. The context of the study is set to online food and nutrition information. Previous studies have indicated that selected source traits might be of importance for studying attitudes and information processing—for instance, mood and emotions can influence information processing and consequently attitudes (e.g., Bless & Schwarz, 1999; Kim, Lim, & Bhargava, 1998). Both attitudes and information processing are connected to online content (entertaining vs. educational), which leads to the above given selection of traits.

In our study, the cognitive and affective nature of information sources was first examined. Previous research implies that information can be divided into **cognitive and affective** (e.g., Aikman, Crites Jr, & Fabrigar, 2006). As information sources differ in form and content, similar to information, this research goes a step back and questions to what extent the presence of a source can trigger the perception of cognitive and affective values.

Similarly, in the previous research, online content has been assessed in relation to its hedonic and informative values (Hughes et al., 2019). This study suggests that consumers tend to differentiate content from online sources based on their **hedonic and informative** value. Once again, we decided to take a step back and evaluate consumers' perceptions of hedonic and informative values at the source level instead of the information level because we believe that the source in which consumers approach information itself influences how they process the information and form attitudes (Chaiken, 1980).

Finally, **information's quality, helpfulness, and ease of use** are often researched and compared among information sources (e.g., Zhang et al., 2015; Jung et al., 2016). This study widens the scope of previous research by introducing a greater variety of online information sources and conducting a comparison between them.

By combining the evaluations of these source characteristics, we aim for a better understanding of the consumer point of view when accessing online food and nutrition information. In addition, we aim to understand the relevance of these factors for sources' usage frequency to evaluate whether the quality of information has the primacy, or whether some other characteristic prevails, and to be able to provide recommendations.

6.2.1.1 *Pre-study: Literature review and research questions*

Due to its convenience, the Internet is dominating the world of information sources. Consumers have different motives and needs that trigger their internet usage, including the search for information, information surveillance, entertainment, and social utility (You, Lee, Lee, & Kang, 2013). However, a deeper investigation of the differences between sources and their understanding by consumers is lacking in the literature (Go et al., 2016).

In general, the existing research on online information mainly focuses on one type of information source and tries to assess it in terms of credibility, motivation, usefulness, and similarity (Go et al., 2016). This has led to the increase in knowledge about specific sources. The research that provides a direct comparison between multiple online sources and assesses differences in perception between them is somewhat scarce. In the existing literature, Go et al. (2016) managed to show a distinction in the motivation of consumers to access information on search engines, social networks, and news portals.

With the Internet's rise in popularity, the number of different sources available online has continued to grow exponentially. These sources are so diverse that each consumer can find the content they desire; the information available online varies in terms of visuals, styles of writing, designs, and methods of access. Thus, consumers have the **ability** to seek information through various sources, including commercial websites, search engines, blogs, online forums, and government websites (Jung et al., 2016). Diversity among sources (i.e., their visual and content properties) also influences **motivations** to use them. Consumers have various reasons for visiting online information sources—namely, the search for information, social utility, and entertainment are found to be some of the most frequent motivations for online information source usage (Go et al., 2016).

The **information and its adequacy on different sources** also varies. While media platforms on which consumers are also content creators frequently offer users entertaining elements, other sources can offer stability in the quality of the information that they provide and be the preferred choice for intentional information searching (Jung et al., 2016; No & Kim, 2015). Sources that contain user-generated content are usually found to be especially useful in situations where consumers are looking for first-hand experience or social support from peers (Zhang, 2017; Mazzoni & Cicognani, 2014).

Due to these differences, a relevant question as to how the information sources themselves are perceived arises. This study therefore goes a step back and questions whether the nature of online information sources is differently perceived by consumers, depending on the source itself and consumers' experience with it. Fun components of sources such as social media or online forums are enhanced by communication between members and their mutual support. Because of their pleasurable and experiential nature, such sources, which heavily rely upon user-generated content in the form of blogs, social networks, or forums, might

have the potential to have higher **hedonic** value to consumers. Their ability to entertain and awaken emotions and excitement in their users could further lead to their evaluation as more **affective** (Palazon & Delgado-Ballester, 2013).

More structured information providers that disseminate information from relevant official institutions are, due to their relatively rigid and one-sided nature (i.e., consumers do not participate in information creation; as they are only information users), not expected to arouse such feelings of fun and enjoyment in consumers. Detailed information about the subject and relevant credentials are considered to be highly relevant qualities for consumers' **cognitive** evaluation of information (Moon et al., 2017). In addition, their focus on information's value, usefulness, and efficiency might contribute to their positive evaluation of **functional (informative)** value (Hughes et al., 2019; Palazon & Delgado-Ballester, 2013).

The information about online sources presented in this chapter was obtained from previous publications from various fields—predominantly health information online research. Some of the traits of interest for this study have been previously researched, including perceived helpfulness and information quality (Zhang et al., 2015), entertainment, and information orientation of the source (Rains, 2007). However, these studies were conducted at the level of motivators for source usage (e.g., fun and entertainment as a motive for social network usage). To the best of our knowledge, the existing studies have not examined **how information sources are perceived** as affective and cognitive (or hedonic and informative). Therefore, this study should be seen as **exploratory**, and the following research questions are proposed.

RQ1: How do consumers differentiate between online information sources by their cognitive and affective nature?

RQ2: How do consumers differentiate between online information sources based on their hedonic (vs. functional, informative) value?

Apart from an information source's nature, several other source characteristics are worth researching. **Credibility** is one of the most frequently researched traits of online information sources due to the difficulties in assigning it to those sources. While the Internet and information sources available online are becoming the most preferred source among consumers for health and nutrition issues (McMullan, 2006; Pollard et al., 2015), its filters for quality or information accuracy are nonexistent. This helps spread myths, pseudoscience, and the appearance of self-proclaimed experts who lack formal training, credentials, and knowledge of professional codes of conduct (Adamski, Truby, Klassen, Cowan, & Gibson, 2020). Therefore, consumer attitudes and behavior can be influenced by professional websites, blogs, and social network posts that can essentially be written by anyone, independent of their expertise in the field (Ramachandran et al., 2018). The challenges for

the public to assess the credibility of information and for experts to enable the dissemination of such information are increasing in such an environment (Adamski et al., 2020).

According to the existing literature, consumers in such an environment help themselves with multiple **cues** when assessing a source's credibility. Namely, the ownership (sponsorship) of a website (e.g., governmental or commercial), content authors (e.g., anonymous author, expert author, or lay person), or channel of communication and technology used to convey a message (e.g., mobile devices, computers) can influence the credibility assessment of the source, as well as the level of trustworthiness and expertise attributed to that source. Cues such as the presence of ads on the website pages, website URLs (e.g., ending with ".edu" or ".com"), references, links to the content on the website, and authors' credentials are often used to assess the source's appropriateness for information sharing (Choi & Stvilia, 2015; Fogg et al., 2001).

Credibility perception is affected by several other source characteristics, including information quality (Chang, Zhang, & Gwizdka, 2021). **Information quality** can be defined as "the quality of outputs source produces, concerning completeness, accuracy and currency" (Zha, Yang, Yan, Liu, & Huang, 2018, p. 230). Information quality can vary significantly across different sources, and the current stream of encouraging consumers to participate in health and nutrition information search and creation online can contribute to this distortion of information quality (Seçkin, 2010; Madathil, Rivera-Rodriguez, Greenstein, & Gramopadhye, 2015; Zhang et al., 2015). Quality can be especially problematic in the current proliferation of open web sources (e.g., social networks or forums) where the quality assurance mechanisms are missing, and the information available to consumers is in its unfiltered form, varying in quality (Kim & Sin, 2011; You et al., 2013). The lack of quality assurance mechanisms can easily lead to information overload since consumers are unable to differentiate among pieces of information or evaluate it (Zha et al., 2018).

Apart from assessing information quality, consumers often evaluate the helpfulness of the information provided. Current research is mainly focused on evaluating the **perceived helpfulness** of online reviews (e.g., Ruiz-Mafe, Chatzipanagiotou, & Curras-Perez, 2018; Wu, 2013; Yin, Bond, & Zhang, 2014). Perceived helpfulness can be described as "the extent to which potential consumers perceive source's evaluation as useful and valuable in their decision-making process" (Ruiz-Mafe et al., 2018, p. 337). Arguments and information of higher quality are generally considered to be more helpful and have a stronger impact on consumers' purchase intentions (Ruiz-Mafe et al., 2018).

The differentiation of information quality and the perceived helpfulness of online information sources by which consumers can access food and nutrition information has not been established in the existing literature. As these source qualities influence consumers'

attitudes, intentions, and behavior, understanding how consumers perceive different sources with regard to them is of importance.

RQ3: How do consumers differentiate between online information sources in terms of their perceived helpfulness?

RQ4: How do consumers assess the differences in the quality of information provided by online information sources?

While online information sources are widely available and may seem equally accessible, users might still be able to differentiate between the barriers of their use, such as their **accessibility** and **ease of use**. A source's accessibility is usually judged by "whether the source is easily available and accessible" (Zhang, 2014, p. 916). Source characteristics, such as interactivity and user engagement, have been shown to aid the accessibility of nutrition information (Adams, 2010). Sources that possess these characteristics (e.g., social networks and forums) are increasingly being used for obtaining food and nutrition information, as consumers want to quickly access information and share their stories and personal experiences (Adamski et al., 2020).

When discussing a source's ease of use, it usually refers to "a degree to which a person believes that using a particular source would be effortless" (Karahanna & Straub, 1999, p. 238). As a construct, it has mostly been examined in the management systems literature, where its close relationship with perceived usefulness has been demonstrated (e.g., Davis, 1989; Adams, Nelson, & Todd, 1992). In the existing literature, ease of use has also been shown to influence consumer attitudes and behavioral intentions (Hansen, Saridakis, & Benson, 2018; Elkaseh, Wong, & Fung, 2016).

A study that has assessed the accessibility and ease of use of information sources has shown that online information sources are considered more accessible and easier to use than traditional, offline information sources and are, as such, more popular and used more frequently (Kim & Sin, 2011). The difference between various online information sources were not examined in detail.

RQ5: How do consumers differentiate between online information sources in terms of perceived barriers to use (e.g., ease of use, accessibility)?

Finally, the differences that consumers identify between information sources also influence the purpose for which they decide to use the sources. Some sources that are perceived as more credible and accurate (e.g., official websites) are usually employed for an extensive search for information, while consumers also consume information in situations where they do not intentionally seek information. The situations where consumers are exposed to an extensive amount of information without searching for it are often present in some of the sources known for their interactivity and entertainment effects, which makes their usage—

and, consequently, the usage of the information that they provide—pleasant and effortless (Chang et al., 2021). Therefore, the question of the relevance of additional source characteristics, considered in this study, to the actual frequency of source usage for accessing food and nutrition information should be asked.

RQ6: How do these constructs (i.e., source traits from RQ1–4: cognitive and affective nature, hedonic and informative value, perceived helpfulness, and information quality) relate to a source’s frequency of usage for obtaining food and nutrition information?

6.2.1.2 Pre-study: Method

6.2.1.2.1 Study design

The proposed research questions (RQ1–RQ6) were addressed using a questionnaire, which is available in Appendix 6. Each of the respondents answered questions related to one of **six popular online information sources**—three are rich in user-generated content (i.e., social networks, forums, and blogs), and three convey website sponsor content (i.e., public scientific websites, mobile apps, and commercial websites). When accessing the survey, respondents were randomly assigned to one of the six categories. The first question asked participants to think of the source from that category that they use the most often to obtain food and nutrition information and to keep this particular source in mind when answering the questions in the survey.

On the following page, participants rated the frequency of usage of the source for obtaining food and nutrition information. Respondents who marked “never” as their answer were thanked for their participation, rewarded, and dismissed. All other respondents evaluated sources by their cognitive and affective nature, hedonic and informative value, perceived helpfulness, information quality, accessibility, and ease of use on the following pages of the survey. After providing their answers, the participants were asked for their demographic data, thanked for their participation, and rewarded.

6.2.1.2.2 Measurement scales and sample characteristics

Data collection was conducted online in March 2021 with the online platform Prolific. Participants were paid an hourly rate of \$9.20 for their participation—the average time needed to fill in the questionnaire was around 10 minutes. Overall, 258 complete responses were collected and used in the analysis. In addition, 40.7% of the participants were male, and the average age of the respondent was 33.14 (ranging from 18 to 71). The obtained responses were fairly evenly distributed across the six categories that we aimed at capturing; 48 participants assessed social networks, 41 gave their opinion about public scientific websites and blogs, 42 evaluated mobile apps and forums, and 44 were asked to think of commercial websites for their assessment.

The study employed previously **established scales** from the consumer psychology literature. Measuring perceptions of the *cognitive and affective nature* of online information sources was performed with the scale from Crites, Fabrigar, and Petty (1994). Furthermore, the *hedonic and informative* value of sources was assessed on a scale by Hughes et al. (2019), while the *perceived helpfulness* was captured on a scale from Ruiz-Mafe et al. (2017). A *source's information quality, ease of use, and accessibility* were evaluated on the scale from Jeong and Lambert (2001). The scales were adapted by adjusting the wording of the questions and scale items to match the context (i.e., items reflect online food and nutrition information source context), while the essence of the scales—namely, the content of items (attributes) used by scale authors—remained the same as in the original scales. A *source's usage frequency* (SUF) was measured using a single question: “How often do you read food and nutrition information on [source]?” The responses were collected on a 7-point scale from rarely to multiple times a day. A general overview of the scales and items used is presented in Table 24, while scale means and standard deviations per source are available in Table 25.

Table 24. Measurement scales used in pre-study.

Scale/ Item	Cronbach's alpha (α)	Mean	St. deviation
Source's cognitive nature (adapted from Crites, Fabrigar, & Petty, 1994)	.924	5.62	1.21
<i>I believe that, as a source of information on food and nutrition, (source) is overall</i>			
Useless (useful)		5.83	1.35
Foolish (wise)		5.32	1.41
Unsafe (safe)		5.67	1.46
Harmful (beneficial)		5.69	1.46
Imperfect (perfect)		4.65	1.46
Unhealthy (wholesome)		5.50	1.34
Worthless (valuable)		5.70	1.41
Source's affective nature (adapted from Crites et al., 1994)	.942	5.49	1.30
<i>I feel that, as a source of information on food and nutrition, (source) is overall</i>			
Angering (relaxing)		5.11	1.50
Inappropriate (likeable)		5.69	1.45
Saddening (delightful)		5.28	1.44
Disgusting (acceptable)		5.89	1.40
Sorrowing (enjoyable)	5.50	1.39	
Source's hedonic value (adapted from Hughes et al., 2019)	.902	4.38	1.29
<i>How would you evaluate (source) as a source of information on food and nutrition?</i>			
Attention-getting		4.68	1.59
Creative		4.88	1.59
Emotional		3.56	1.76
Energetic		4.59	1.53

Table continues

Continued

Scale/ Item	Cronbach's alpha (α)	Mean	St. deviation	
Humorous	.902	3.76	1.85	
Unique		4.58	1.62	
Warmhearted		4.59	1.44	
Source's informative value (adapted from Hughes et al., 2019)	.884	5.65	0.90	
<i>How would you evaluate (source) as a source of information on food and nutrition?</i>				
Genuine/sincere		5.43	1.19	
Honest		5.53	1.14	
Informative		5.90	1.10	
Understandable		5.87	1.02	
Consider using		5.77	1.09	
Post believable		5.41	1.22	
Source's perceived helpfulness (adapted from Ruiz-Mafe et al., 2018)		.888	5.52	0.97
<i>The source...</i>				
...provides valuable tips about food and nutrition.	5.59		1.16	
...is helpful for me to evaluate the food and nutrition information.	5.53		1.10	
...is helpful to familiarize myself with food and nutrition.	5.51		1.16	
...is helpful for me to understand the information about food and nutrition.	5.45		1.08	
Source's information quality (adapted from Jeong & Lambert, 2001)	.862	5.36	1.07	
<i>How would you evaluate (source) as a source of information on food and nutrition?</i>				
Factual		5.46	1.26	
Accurate		5.48	1.20	
Timely		5.27	1.24	
Objective		5.26	1.39	
Source's ease of use (adapted from Jeong & Lambert, 2001)	.852	5.72	0.93	
<i>How would you evaluate (source) as a source of information on food and nutrition?</i>				
Easy to use		6.01	1.07	
Clear		5.79	1.15	
Understandable		5.98	1.03	
Source's accessibility (adapted from Jeong & Lambert, 2001)	.851	6.09	0.95	
<i>How would you evaluate (source) as a source of information on food and nutrition?</i>				
Easily accessible		6.16	1.01	
Easily available		6.14	1.07	
Convenient to use		5.96	1.18	

Note: All constructs were measured on 7-point scales (from not at all to completely)

Source: Own work

Table 25. Scale means and standard deviations by source category.

Scale/Source	Cognitive	Affective	Hedonic	Informative	Helpfulness	Information Quality	Ease of use	Accessibility
Social networks	5.02 (1.35)	5.31 (1.46)	4.79 (1.15)	4.98 (1.08)	5.00 (1.12)	4.64 (1.21)	5.42 (1.04)	5.85 (1.16)
Public scientific websites	6.03 (1.26)	5.45 (1.44)	3.99 (1.35)	6.11 (0.62)	6.01 (0.61)	5.99 (0.72)	5.96 (0.66)	6.32 (0.67)
Blogs	5.60 (1.29)	5.46 (1.48)	4.65 (1.20)	5.66 (0.96)	5.46 (1.03)	5.50 (0.99)	5.56 (1.07)	5.88 (1.03)
Mobile apps	5.75 (1.10)	5.43 (1.20)	3.40 (1.37)	5.67 (0.81)	5.53 (1.08)	5.52 (0.97)	5.84 (0.87)	6.09 (0.85)
Forums	5.39 (1.09)	5.50 (1.16)	4.75 (0.91)	5.80 (0.66)	5.51 (0.86)	5.17 (0.97)	5.76 (0.84)	6.28 (0.85)
Commercial websites	5.99 (1.21)	5.80 (0.98)	4.33 (1.29)	5.79 (0.78)	5.68 (0.76)	5.49 (1.00)	5.81 (0.94)	6.13 (0.99)

Source: Own work

6.2.2 Pre-study: Results

In order to answer the study's research questions, a comparison between different online information sources was conducted in version 25.0 of the SPSS software (IBM Corp. Released, 2017). **MANOVA** was used to assess the differences between sources, as well as the significance of those differences. Answers to the research questions in the form of results of statistical analysis are presented below.

RQ1: How do consumers differentiate between online information sources by their cognitive and affective nature?

The results of this analysis indicate that individuals perceive a difference among sources by their cognitive traits ($F = 4.86, p = 0.00$), while the affective traits were not evaluated as significantly different ($F = 0.73, p = .60$). A post hoc test (Tukey) revealed that the statistically significant differences were present between the following groups (Table 26).

Table 26. Statistically significant differences between sources (pairs) by their cognitive value.

Source pair	Mean difference (1-2)	p-value
Social networks – public scientific websites	-1.01	0.00
Social networks – mobile apps	-0.72	0.04
Social networks – commercial websites	-0.97	0.00

Source: Own work

According to the results, we can confirm that consumers differentiate between online information sources based on their cognitive value, but not based on their affective nature (analysis indicated non-significant differences). Results for sources' **cognitive nature** reveal significant differences between social networks and public scientific websites, mobile apps, and commercial websites. All three of the latter sources were evaluated by consumers as more cognitive than social networks.

RQ2: How do consumers differentiate between online information sources based on their hedonic (vs. functional, informative) value?

Highly significant differentiation between sources' hedonic ($F = 5.58, p = 0.00$) and informative ($F = 9.11, p = 0.00$) value to consumers was demonstrated using the MANOVA analysis. The post hoc test (Tukey) revealed that the statistically significant differences were present between the following source groups (Tables 27 and 28).

Table 27. Statistically significant differences between sources (pairs) by their hedonic value.

Source pair	Mean difference (1-2)	p-value
Social networks – public scientific websites	0.76	0.04(9)
Social networks – mobile apps	1.05	0.00
Public scientific websites – forums	-0.80	0.04
Blogs – mobile apps	0.95	0.01
Mobile apps – forums	-1.10	0.00

Source: Own work

Table 28. Statistically significant differences between sources (pairs) by their informative value.

Source pair	Mean difference (1-2)	p-value
Social networks – public scientific websites	-1.13	0.00
Social networks – blogs	-0.68	0.00
Social networks – mobile apps	-0.69	0.00
Social networks – forums	-0.82	0.00
Social networks – commercial websites	-0.81	0.00

Source: Own work

Thus, this analysis supports the idea elaborated in RQ2, as significant differences were found between consumers' perceptions of online information sources for their hedonic and informative value. When it comes to the perception of **hedonic value** of sources, based on the results of this study, it can be seen that consumers differentiate between social networks and public scientific websites and mobile apps. Both public scientific websites and mobile apps are considered less hedonic than social networks. Additionally, forums are perceived as significantly more hedonic than public scientific websites and mobile apps, and mobile apps are found to be less hedonic than blogs.

By their **informative value**, social networks significantly differ from public scientific websites, blogs, mobile apps, forums, and commercial websites. Differences in the perceptions of informative value did not differ significantly among other online information sources.

RQ3: How do consumers differentiate between online information sources in terms of their perceived helpfulness?

MANOVA performed on the perceived helpfulness scale indicated the existence of significant differences across the tested groups ($F = 5.49, p = 0.00$). After the post hoc test (Tukey) was completed, two pairs of sources were shown to have statistically significant differences (Table 29).

Table 29. Statistically significant differences between sources (pairs) by their helpfulness.

Source pair	Mean difference (1-2)	p-value
Social networks – public scientific websites	-1.01	0.00
Social networks – commercial websites	-0.68	0.00

Source: Own work

The evaluation of RQ3 included a pairwise comparison, from which we conclude that the six information sources are considered as relatively equally helpful. Two pairs were identified to have significant differences in perceived helpfulness; social networks are considered less helpful than public scientific websites and commercial websites.

RQ4: How do consumers assess the differences in the quality of information provided by online information sources?

The results of the analysis of sources' information quality indicate highly significant differences ($F = 9.19, p = 0.00$). The post hoc test (Tukey) enabled the identification of the specific groups in which statistically significant differences are present (Table 30).

Table 30. Statistically significant differences between sources (pairs) by their information quality.

Source pair	Mean difference (1-2)	p-value
Social networks – public scientific websites	-1.35	0.00
Social networks – blogs	-0.86	0.00
Social networks – mobile apps	-0.88	0.00
Social networks – commercial websites	-0.84	0.00
Public scientific websites – forums	0.83	0.00

Source: Own work

The analysis conducted to answer RQ4 shows that differences between online information sources regarding consumers' perception of information quality exist. Interestingly, social networks were once again the category with the most differences from other online information sources. They were perceived as having significantly less information quality than public scientific websites, blogs, mobile apps, and commercial websites. In addition, public scientific websites were evaluated as having a significantly higher information value than forums.

RQ5: How do consumers differentiate between online information sources in terms of perceived barriers to use (e.g., ease of use, accessibility)?

No statistically significant difference in the perception of barriers between online information sources included in this study were obtained in the analysis. Consumer perceptions of a **source's ease of use** ($F = 1.800, p = 0.11$) and **accessibility** ($F = 1.455, p = 0.21$) are, therefore, generally considered **equal** across different online information sources. Therefore, as an answer to RQ5, we conclude that consumers do not differentiate between online information sources in terms of their ease of use and accessibility.

RQ6: How do these constructs relate to the source's frequency of usage for obtaining food and nutrition information?

The relationship between SUF and a source's characteristics examined in RQ1–5 was tested using **linear regression** analysis in SPSS. Testing the relationship between a source's **cognitive and affective nature and SUF** showed a statistically insignificant influence of a source's cognitive traits on its usage frequency ($t = -1.03, p = .30$). Regression was significant ($p < .00, R^2 = .06$), as was the positive influence of a source's affective nature on SUF ($t = 3.75, p < .00$).

Testing the **hedonic and informative** perceptions of sources and their effect on SUF achieved similar results. Regression was significant ($p < .00, R^2 = .18$), and while informative characteristics of information sources do not influence usage frequency ($t = -.78, p = .44$), perceiving a source as hedonic proved to positively affect SUF ($t = 7.32, p < .00$).

The effect of **perceived helpfulness and information quality** of a source was examined next. Regression was again significant ($p < .00, R^2 = .05$). The effect of perceived helpfulness on SUF was positive and significant ($t = 3.54, p < .00$), while the negative effect of information quality on a source's usage frequency was not significant ($t = -1.38, p = .17$).

To answer RQ6, we should mention that online information a source's traits, such as its cognitive nature or informative value to consumers or information quality, do not influence the frequency with which consumers use that source to obtain food and nutrition information. On the other hand, a source's characteristics, such as its affective nature, hedonic value, or perceived helpfulness, were proven to have a significant positive influence on SUF.

6.2.3 Pre-study: Discussion and conclusions

In order to inform themselves, consumers apply different strategies while searching for and accessing online information. Still, it seems that consumers aim to obtain the information while sparing the cost of overly high cognitive effort. For example, studies have shown that when it comes to health and nutrition information, consumers rely on search engine query results to inform themselves about more serious conditions or seek specific information (Chang et al., 2021). Sources such as social networks are usually used for everyday, spontaneous (i.e., unsearched for) information acquisition, as privacy problems frequently prevent consumers from sharing their needs or conditions openly (De Choudhury, Morris, & White, 2014). However, forums and online blog communities are perceived differently, as their anonymous yet personalized approach to giving advice and close connections with other members (i.e., social support) make them a trustworthy source for any type of health and nutrition information (Eysenbach et al., 2004; Chang et al., 2021).

In order to grasp these differences among online information sources as perceived by consumers, we conducted this study (pre-study in the context of this thesis). The pre-study findings indicate several interesting insights about consumers' perceptions of the traits of online food and nutrition information sources. An overview of the results obtained from empirical study is presented in Table 31.

Table 31. Pre-study research questions: Findings' overview.

Research question	Findings
RQ1: How do consumers differentiate between online information sources by their cognitive and affective nature?	<ul style="list-style-type: none"> - Cognitive: Social networks were perceived as less cognitive than public scientific websites, mobile apps, and commercial websites. - Affective: No statistically significant differences were observed.
RQ2: How do consumers differentiate between online information sources based on their hedonic (vs. functional, informative) value?	<ul style="list-style-type: none"> - Hedonic: Social networks and forums were seen as more hedonic than public scientific websites and mobile apps, while blogs were perceived as more hedonic than mobile apps. - Informative: Social networks were perceived as less informative than all other information sources (i.e., public scientific websites, blogs, forums, commercial websites, and mobile apps)
RQ3: How do consumers differentiate between online information sources in terms of their perceived helpfulness?	The differences in perceived helpfulness were mostly not significant; they were observed only between social networks and public scientific and commercial websites (social networks were perceived as less helpful).
RQ4: How do consumers assess the differences in the quality of information provided by online information sources?	The information quality of social networks was evaluated as significantly lower than public scientific websites, blogs, mobile apps, and commercial websites. Forums were assessed to have lower information quality than public scientific websites.
RQ5: How do consumers differentiate between online information sources in terms of perceived barriers to use (e.g., ease of use, accessibility)?	No differences were found regarding consumers' perceptions of barriers for online information sources in terms of their ease of use and accessibility .
RQ6: How do these constructs (assessed in RQ1–4) relate to the source's frequency of usage for obtaining food and nutrition information?	<ul style="list-style-type: none"> - Cognitive: Not significant. - Affective: Significant positive influence on source's usage frequency. - Hedonic: Significant positive influence on source's usage frequency. - Informative: Not significant. - Perceived helpfulness: Significant positive influence on source's usage frequency. <p>Information quality: Not significant.</p>

Source: Own work

This difference between the perception of social networks and other user-generated content pages can be helpful in explaining the difference between sources' informative value and information quality to consumers in this study. Namely, the results of this study imply that the **informative value and perceived information quality** of social networks are significantly lower than those of all other types of sources. As the information provided via sources that do not include user-generated content is **easier to control** and can guarantee the information quality level (Chang et al., 2021), it may be perceived as more informative. On the other hand, **support and closeness** in online blog and forum communities (Eysenbach et al., 2004), as well as the perceived **expertise** of advice providers (Buis & Carpenter, 2009) in these sources, can be of importance to the difference in informativeness perceptions between these sources and social networks.

Additional findings of this study support the proofs of differences between sources by identifying the existence of several differences in the perceptions of online food and nutrition information sources. Overall, the main significant differences emerged between **social networks and the other tested source types**. Social networks were perceived as significantly less **cognitive** than public scientific websites, mobile apps, and commercial

websites. As these three sources are mostly created by a website or app sponsor rather than other users (specific for platforms conveying user-generated content, such as forums or blogs), and as their style of writing tends to be more formal (Chang et al., 2021; Luchman et al., 2014), consumers may perceive these sources to be more cognitive in nature.

When it comes to the **hedonic value of sources**, sources rich in user-generated content (i.e., blogs, social networks, and forums) were generally evaluated as significantly more hedonic than others. As these sources provide higher levels of **interactive content and create entertaining environments** for their users (Hughes et al., 2019), their usage is often highly enjoyable and—according to our results—even hedonic to modern consumers and internet users.

Perceived helpfulness did not differ significantly across all types of sources, indicating that consumers mostly perceive information sources as equally helpful. The assessment of **accessibility and ease of use** showed no statistically significant difference between sources, which is similar to previous studies (e.g., Kim & Sin, 2011). This implies that consumers do not perceive some online information sources to be of greater accessibility and convenience than others. The lack of this difference shows that accessibility and ease of use **do not represent barriers** to using sources of high-quality information, such as public scientific websites. While scientific (i.e., credible) information sources were previously marked as often hard to use for regular consumers (e.g., Benotsch, Kalichman, & Weinhardt, 2004), our results imply that consumers might be getting more acquainted with the public and scientific information when using online health information (Pulido, Villarejo-Carballido, Redondo-Sama, & Gómez, 2020).

Finally, while consumers successfully differentiate between online food and nutrition information sources, the **frequency of usage** of these sources for obtaining food and nutrition information does not depend on all of these qualities. Surprisingly, perceptions of information quality and informative value do not have a statistically significant effect on consumers' frequency of getting food and nutrition information from the source. Such results support previous warnings from the literature that state that consumers frequently aim for quick and easy-to-get information, even if it is just “good enough” in terms of quality (Warwick, Rimmer, Blandford, Gow, & Buchanan, 2009; Kim & Sin, 2011). The perception of a source as helpful for obtaining food and nutrition information did, however, influence the frequency of the source's usage for this purpose.

The results of our pre-study provide us with a clearer understanding of online food and nutrition information sources and the differences in how consumers perceive them. Sources of information can be of great importance when it comes to information processing; previous research has established the strong influence of information's source on formed attitudes during information processing, as the credibility of a source can be a strong heuristic that biases processing towards a less effortful route (e.g., Chaiken, 1980; Hughes et al., 2019).

However, to our knowledge, the possibility of having an information source type as a trigger of an information processing route has not yet been tested. The differentiation of information sources obtained with the results of this pre-study is used in Study 2 to evaluate the potential influence of information source type on the information processing route.

This study was conducted with the aim of providing a differentiation between information sources to be able to later evaluate their effects on information processing. While providing several answers and stable ground for the continuation of research on online food and nutrition information, our pre-study neglects a few topics of importance to this thesis. For example, the content of the information provided through different information source types was not checked for its consistency or similar traits. In addition, to better understand the influence of the information provided by online information sources on attitudes and their strength, additional research is needed (offered in Section 6.2), as our pre-study does not address this issue.

Furthermore, we established the empirical basis for differentiating between online information sources that provide food and nutrition information to consumers. In the last empirical study, we aim to evaluate the information processing on different information sources with and without the presence of consumer confusion and the consequences for the formed attitudes.

As online information is increasing daily at an unimaginable pace, apart from the amount of information, its quality and consistency are questionable as well. Taking into account the circumstances discussed in the previous paragraphs, this study aims at further exploring the **information processing** that emerges as a result of accessing information on **different sources** online. The context of the study is set to online food and nutrition information to complement the rest of the work performed in the scope of this thesis. The main idea of the study is that information processing differs depending on the information itself, whether or not it is consistent, and on the nature of the source that it comes from.

6.2.4 Study 2: Literature review and hypotheses

The abundance of information, while often desired, brings multiple challenges for consumers. Processing the available information and forming attitudes and decisions based on it is one of these challenges. According to **the HSM** (Chaiken, 1980), consumers engage in one of the two processing modes in order to evaluate and make sense of the information. The first mode, heuristic information processing, is the *default* option of information processing in consumers' daily lives, as it is automatic, fast, and efficient. Instead of focusing on the information itself and carefully interpreting it, when processing information heuristically, consumers usually focus on different cues to make a conclusion (Chaiken & Ledgerwood, 2011). Since information is abundant and since making an informed decision

requires a significant amount of effort, most of the information available to consumers is processed using this mode.

When processing information in the second, systematic mode, consumers actively attempt to thoroughly understand the information available. This processing mode is described as *effortful*, slow, and intentional (Chaiken, 1980). When engaging in systematic information processing, consumers carefully pay attention to all of the available information and engage in deep thinking and intensive reasoning (Chaiken & Ledgerwood, 2011). The information obtained in this process is combined with previously obtained information and knowledge, and it helps shape subsequent attitudes and behaviors (Chaiken & Ledgerwood, 2011).

Unlike previous dual process theories (e.g., ELM), the HSM does not exclude the possibility of the **simultaneous occurrence of the two processing modes**. In fact, it explicitly states the possibility of the simultaneous appearance of both heuristic and systematic processing in certain situations (Chaiken, 1987; Chaiken & Maheswaran, 1994). Chaiken and Maheswaran (1994) suggested that due to its cognitive superiority, systematic information processing has the power to bias heuristic information processing in situations when involvement is high. In situations when respondents are not as involved, heuristic information processing can be independent and equally influential.

Apart from being able to influence and bias each other, processing modes are also affected by circumstances and various factors. For instance, systematic information processing is influenced by several consumer characteristics. As this form of processing entails significant mental effort and attention, the consumer should be able to devote a certain amount of attention to the information and the process itself. Apart from *ability*, consumers should also possess the *motivation* to devote attention to information processing in order to engage in the systematic mode of processing (Chaiken & Ledgerwood, 2011).

Heuristic information processing is much less dependent on the **motivation and ability** to process information due to the decreased mental effort and attention required when using this mode (Chaiken & Ledgerwood, 2011). Instead, when processing information heuristically, consumers tend to use different cues that help speed up the processing of information. These cues include source characteristics (e.g., credibility), the number of arguments, and the social consensus on the matter (Chaiken, 1980; Darke et al., 1998).

Based on the literature provided in the previous two paragraphs about systematic and heuristic information processing, first, we proposed two hypotheses. The hypotheses suggest the evaluation of relevant constructs as antecedents of systematic and heuristic information processing.

In this thesis, **motivation, knowledge**, and the **level of distraction** are proposed as antecedents of systematic information processing. As such processing requires effort and

conscious intention to devote attention to the available information and its assessment, the motivation, opportunity, and ability to process information are considered to be of crucial importance to systematic information processing (Chaiken, 1980; MacInnis, Moorman, & Jaworski, 1991). Our operationalization of motivation is straightforward, while ability is measured through the perceived knowledge of consumers, and the level of distraction that they face when evaluating online information represents opportunity. Knowledge is considered to be of crucial importance for processing ability (MacInnis, Moorman, & Jaworski, 1991), while distraction also influences (i.e., inhibits) information processing (Hughes et al., 2019).

When it comes to the antecedents of heuristic information processing, we propose source **credibility** and **amusement**. Source credibility has been found to drive heuristic information processing in many studies (e.g., Ryu & Kim, 2015; Lim, 2013). Even the HSM theory-grounding article proposes source credibility as a cue that aids heuristic processing (Chaiken, 1980). On the other hand, amusement has not been studied in direct relation to heuristic information processing. Previous studies have shown that positive feelings contribute to the emergence of heuristic information processing, as they provide a sense of subjective certainty (Tiedens & Linton, 2001). In addition, studies have suggested that amusement is a relevant factor that can be of importance for triggering heuristic information processing (e.g., Isbell, Lair, & Rovenpor, 2013). This research evaluates this proposition empirically.

H1: Amusement and credibility influence heuristic information processing.

H2: Motivation, knowledge, and distraction influence systematic information processing.

The abundance of information sources creates an additional challenge for information processing. In their best intention to inform readers, online sources often use pieces of information that are not necessarily consistent with each other (e.g., Chan et al., 2020). By quoting scientific studies, sources aim at increasing the **credibility** of their writing, while the problem in consistency usually emerges when cited sources convey inconsistent findings. An example used in this study is coconut oil, a product that has been praised for its beneficial effects on health in the past decade. The consensus on its genuine effects on health has, however, not been reached, and some of the studies actually suggest that coconut oil can have harmful effects on health (e.g., Lima & Block, 2019).

Given such an environment, information processing can be a challenge for consumers. Over 70% of consumers in the US state that they have noticed contradictory nutrition advice in popular media (Clark et al., 2019). Inconsistencies in the information available are especially problematic when they come from sources considered to be credible, as consumers may end up being confused about the trustworthiness of any of the information (Nagler, 2014; Chan et al., 2019; Ramachandran et al., 2018).

When it comes to information processing, an investigation of environments rich in inconsistencies is available. For example, ambiguity and uncertainty have been shown to influence information processing and trigger the systematic mode (Chaiken & Maheswaran, 1994; Akhtar et al., 2020; Tiedens & Linton, 2001). However, confusion itself has not been investigated in this context. In other words, the **consumer confusion** literature does not tackle the differences between heuristic and systematic information processing, though it has been noted that confused consumers are more prone to further effort engagement and thorough option evaluation (Mitchell & Papavassiliou, 1999). We, therefore, believe that the situations in which consumers are subjected to inconsistent information increase their intentions and efforts invested in information processing independently from the source of information. Existing studies imply that due to the complexity of inconsistent information for information processing and its detrimental effects on consumers' judgmental confidence, systematic information processing occurs when consumers are faced with such information (Kim et al., 2018). Research also suggests that inconsistencies in evidence provided to consumers can result in the appearance of both systematic and heuristic information simultaneously (Chaiken & Maheswaran, 1994). While trying to assess inconsistent information, consumers use all of the resources available, including the dedicated information processing of the current information and elaboration (Smith, Fabrigar, Macdougall, & Wiesensthal, 2008), as well as cues—both past and present—eliciting heuristic information processing. Therefore, our assessment of information processing in the presence of consumer confusion also allows for heuristic information processing.

Apart from the information available and its consistency, it is also important to understand the potential **effect of online information sources** themselves on **information processing**. The initial idea of this thesis was to provide an assessment of the information processing modes triggered by sources considered to be more affective and cognitive in their nature. However, the empirical assessment of the sources by these two characteristics did not yield statistically significant results—cognitive traits were significantly greater in sources, such as scientific and official food and nutrition information providers, while the difference in affective nature was not significant.

Further investigation of existing studies implied that the similar effect on information processing and attitudes can be expected among objects that possess hedonic and functional (i.e., informative) traits (e.g., López & Ruiz, 2011; Wu, Ke, & Nguyen, 2018; Pang, 2021), traits that were also measured in our pre-study, and where the results showed significant differences between the online information sources. Previous research on different online information sources implies that the **source's nature** can influence the information processing mode (Hughes et al., 2019). Research on consumer involvement implies that platforms rich in distractions and on which information is dispersed (e.g., social networks) usually lead to lower involvement, and, consequently, effortful engagement in information processing is not expected in such situations. Such sources are expected to rely on their **hedonic characteristics** to facilitate their usage, while information processing is performed

with the help of cues, such as the number of followers, comments, and posts, that are used as an aid to assign credibility to the source and information (Hughes et al., 2019; Westerman, Spence, & Van Der Heide, 2012; Hlee, Lee, Yang, & Koo, 2018).

On the other hand, platforms that provide high-quality and more directive information to their readers usually foster higher involvement and are able to trigger effortful information processing of the content that they carry (Hughes et al., 2019). Such sources pay greater attention to the content that they provide than to heuristic cues, as consumers mostly visit them for the information (informative role of the source). As a consequence, consumers use more diverse information processes and are actually effortfully engaging with the available content. Heuristic information processing, however, can still play a role when processing information from **informative sources**, as consumers also take simplistic cues into account (Hlee et al., 2018).

This study aims at discovering the effect that different combinations of information consistency and online information sources' traits—hedonic and informative—have on information processing. Taking into account the previous research presented in previous paragraphs, we propose several hypotheses with the aim of explaining information processing modes in various scenarios.

H3a: When faced with consistent information from an informative source, consumers employ both the heuristic and systematic information processes in the formation of their attitude towards product healthiness.

H3b: When faced with consistent information from an informative source, consumers employ both the heuristic and systematic information processes in the formation of their attitude towards a product.

H4a: When faced with inconsistent information from an informative source, consumers employ both the heuristic and systematic information processes in the formation of their attitude towards product healthiness.

H4b: When faced with inconsistent information from an informative source, consumers employ both the heuristic and systematic information processes in the formation of their attitude towards a product.

H5a: When faced with consistent information from a hedonic source, consumers employ the heuristic information process in the formation of their attitude towards product healthiness.

H5b: When faced with consistent information from a hedonic source, consumers employ the heuristic information process in the formation of their attitude towards a product.

H6a: When faced with inconsistent information from a hedonic source, consumers employ both the heuristic and systematic information processes in the formation of their attitude towards product healthiness.

H6b: When faced with inconsistent information from a hedonic source, consumers employ both the heuristic and systematic information processes in the formation of their attitude towards a product.

After processing the information at their disposal, consumers make decisions and form attitudes about the given topic. The formed **attitudes** can be an overall assessment of the object, but also evaluations of its certain characteristics. In our case, we expect that, depending on the source through which information was presented to consumers, they use the heuristic or systematic process (or both) to form their **attitudes towards product healthiness** (as the information presented specifically deals with product healthiness) and product attitude in general.

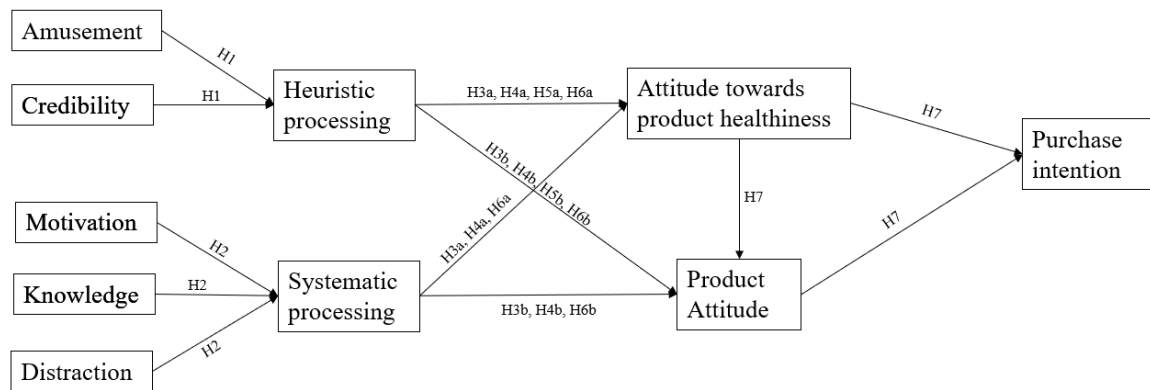
The relationship between attitudes, behavioral intentions, and behavior, while questioned in the literature in terms of the consistency of the relationship between these constructs and the actual effect of attitudes and intentions on behavior (Sheeran & Webb, 2016), remains one of the most frequently researched and empirically proved connections in the marketing literature (e.g., Huang & Lu, 2016; Islam, & Daud, 2011). **Purchase intention**—as one of the most often used behavioral intention indicators in relation to attitudes—is usually understood as the strength of consumers’ willingness to purchase a certain product or commodity (Schiffman & Kanuk, 2005).

As important characteristics, such as healthiness in the case of food, can influence general product evaluations (Aschemann-Witzel & Grunert, 2015; Rana & Paul, 2020) and purchase intention (Huang & Lu, 2016), we expect that the relationship between attitude towards product healthiness and purchase intention is mediated by product attitude.

H7: Attitude towards product healthiness influences purchase intention through product attitude.

The proposed relationships in this study were designed and later tested in the form of a model. A visual representation of the proposed model for Study 2 is presented in Figure 16.

Figure 16. Proposed model for Study 2.



Source: Own work

6.2.5 Study 2: Method

6.2.5.1 Manipulation development and testing

To test the proposed hypotheses, an experimental study was designed. Prior to developing the final study questionnaire, we tested the manipulation envisioned for the study to check for its ability to trigger the desired response in participants. Since the main focus of the study was the interaction between the **source** of information and information **consistency**, those two characteristics were checked for in the manipulation pre-test.

As this research also investigates the influence of a source’s nature on information processing (apart from the consistency of information), the text of the manipulation was placed on two different sources, which were selected based on the results of this project’s pre-study. Rated as the most **hedonic** (social networks) and the most **informative** (public scientific websites), respectively, Facebook and the American Heart Association’s (AHA) website (heart.org) were chosen as the carriers of information (i.e., sources) presented to respondents. The same text was placed on screenshots of the two websites (available in Appendix 8 as part of the final questionnaire used for Study 2), while the scenario introduction did not contain additional information about the source.

For the topic of research and, thus, the manipulation text, **coconut oil** was selected. While often praised in popular media for its miraculous effects on body and hair care, diet, and health in general, scientific research is not as unanimous when it comes to coconut oil in diet. The beneficial effects of coconut oil have been promoted for years, and the majority of consumers believe in its healthiness. For example, in the US, 72% of consumers would rate coconut oil as healthy (Quealy & Sanger-Katz, 2016). However, the science is inconsistent, especially regarding the effects of coconut oil on “bad” cholesterol levels (LDL). While some of the research implies that coconut oil lowers LDL more than other fats (Jayawardena, Swarnamali, Lanerolle, & Ranasinghe, 2020), other studies have shown that it fosters an

increase in “bad” cholesterol levels (e.g., Neelakantan, Seah, & van Dam, 2020; Teng et al., 2020).

Being a product with real-life controversy and scientific open discussion, coconut oil was a great choice for this study. The manipulation was developed by creating an approximately 150-word-long text describing the health effects of coconut oil on “good” and “bad” cholesterol levels. The experiment design was 2 x 4—that is, it included two **source variations** (hedonic vs informative source; Facebook vs AHA) and 4 **information consistency variations** (positive, negative, inconsistent 1, and inconsistent 2), the order of which were changed to avoid bias. The manipulation text consisted of two paragraphs. In the consistent condition, both paragraphs suggest that coconut oil has a positive (negative) influence on cholesterol levels. In the inconsistent condition, one paragraph suggested positive effects of coconut oil usage on cholesterol levels, while the other paragraph warned about the negative effects.

After being shown the mock-up page, the respondents were asked to evaluate their level of cognitive confusion (Fitzgerald et al., 2019). In addition, they were asked to rate the extent to which they felt confused. Finally, respondents marked the source of the information they read, answered several demographic questions, were thanked for their participation, and were dismissed. In total, 59 complete responses were collected from the U.S. respondents. The responses were collected on the Prolific platform, and participants were paid \$1.00 for completing a 5-minute-long survey. Overall, 52.5% of respondents were male, and the average age of participants was 31.82 years.

Out of the 59 completed questionnaires, 34 contained the manipulation carried on Facebook (14 of which were inconsistent), while 25 (14 inconsistent) presented information placed on the AHA website. As for the source recognition, 85% of respondents in the Facebook condition correctly selected Facebook as the source of information, while 83.33% correctly identified AHA as the source in the AHA condition.

When it comes to the assessment of confusion, both cognitive ($F = 3.854$, $p = 0.005$) and emotional confusion ($F = 2.772$, $p = 0.027$) were shown to be statistically significant between groups using ANOVA. While the sample was very small, post hoc tests did reveal significant tendencies of difference between pairs that included manipulations with inconsistent information on one side and consistent information manipulations on the other. Cognitive confusion was nearly significant for consistent positive and inconsistent information shown on the AHA webpage ($M_{AHAc} = 1.833$, $M_{AHAi} = 4.954$, $p = 0.005$), consistent positive information shown on the AHA website and inconsistent information shown on Facebook ($M_{AHAc} = 1.833$, $M_{FBi} = 3.929$, $p = 0.088$), and consistent positive information shown on Facebook and inconsistent information shown on the AHA website ($M_{FBc} = 3.036$, $M_{AHAi} = 4.954$, $p = 0.051$). Emotional confusion difference was found to be marginally significant for consistent positive and inconsistent information shown on the

AHA webpage ($M_{\text{AHAc}} = 1.667$, $M_{\text{AHAi}} = 2.818$, $p = 0.063$) and consistent positive information shown on Facebook and inconsistent information shown on AHA ($M_{\text{FBc}} = 3.036$, $M_{\text{AHAi}} = 4.954$, $p = 0.066$).

6.2.5.2 *Study design and sample characteristics*

Due to the satisfactory results of the manipulation testing, we decided to use the same manipulations for the actual study as well. The format of the study was kept (source x consistency: 2x4), and it was designed as an online experiment. Study 2 was designed in Qualtrics. Upon entry to the survey platform, the respondents were randomly assigned to one of the eight conditions. They first answered an array of questions (i.e., the pre-manipulation measurement) regarding their attitudes towards product and product healthiness. Next, they were shown the manipulation (i.e., the text on one of two sources) and asked to carefully read it before advancing to the following part of questionnaire. This part was followed by items and scales (i.e., the post-manipulation measurement) measuring consumer confusion, attitude strength, credibility, motivation, knowledge, amusement, distraction, attitudes towards product and product healthiness, and purchase intentions. All measurements used 7-point scales. In the last stage, demographic information was collected, and participants were thanked, rewarded, and dismissed.

Data collection was conducted online June–September 2021 using the online platform Prolific. Responding to all questions took an average of 12 minutes, and participants were rewarded at the rate of \$11.00 per hour for their participation. In total, 531 complete answers marking the correct source were collected and used in further analysis. Overall, 48.4% of the respondents were female, while the average age of the respondents was 33.12 (ranging from 18 to 88).

In the collection of responses and measurement of constructs, Study 2 used established scales from consumer psychology and marketing literature. Product attitude and purchase intention were measured using scales developed by Spears and Singh (2004) and Putrevu and Lord (1994), respectively. Attitude towards product healthiness used assessment questions proposed by Provencher et al. (2009). Information processing, both heuristic and systematic, was measured with a combination of statements adapted (to the context of the study) from Ryu and Kim (2014), Griffin et al. (2002), and Kim and Paek (2009), while sources' hedonic and informative value measurements came from the study by Hughes et al. (2019). A general overview of the scales and their reliability are available in Table 32.

Table 32. Measurement scales used in Study 2.

Scale/ Item	Cronbach's alpha (α)
Product attitude (Spears & Singh, 2004)	.968
<i>How do you evaluate coconut oil?</i>	
Bad – Good	
Unappealing – Appealing	
Unpleasant – Pleasant	
Unfavorable – Favorable	
Unlikeable – Likeable	
Attitude towards product healthiness (Provencher et al., 2009)	.959
How healthy is coconut oil?	
How appropriate is coconut oil for a healthy menu?	
Credibility (Zha et al. (2018)	.932
Persons generating information on Facebook-AHA are trustworthy.	
Persons generating information on Facebook-AHA are knowledgeable.	
Heuristic information processing (adapted from Ryu & Kim, 2014; Griffin et al., 2002)	.719
I accepted given information without hesitation.	
I was given more than enough information to evaluate the product.	
Systematic information processing (adapted from Ryu & Kim, 2014; Kim & Paek, 2009)	.762
I have made a strong effort to evaluate the information presented in the post.	
I carefully thought about the information I have read.	
Source's hedonic value (adapted from Hughes et al., 2019)	.921
<i>How would you evaluate (source) as a source of information on food and nutrition?</i>	
Attention-getting	
Creative	
Emotional	
Energetic	
Humorous	
Source's informative value (adapted from Hughes et al., 2019)	.910
<i>How would you evaluate (source) as a source of information on food and nutrition?</i>	
Genuine/sincere	
Honest	
Informative	
Understandable	
Purchase intention (Putrevu & Lord, 1994)	.942
It is very likely that I would buy coconut oil in the future.	
I would purchase coconut oil the next time I need such a product.	
I would definitely try coconut oil in the future.	

Source: Own work

Most antecedents of heuristic and systematic information processing were measured using single-item scales. Respondents were asked to evaluate **amusement** (“Please rate how amused you felt when evaluating coconut oil information on [source]”), **distraction** (“Please rate how distracted you felt when evaluating coconut oil information on [source]”), **motivation** (“How motivated are you to read food and nutrition information online?”) and **knowledge** (“How knowledgeable are you about food and nutrition?”) on 7-item scales (from not at all to very much).

In line with this study’s hypotheses, the collected answers were divided into four data sets. Since we were primarily interested in differences in information processing that emerge when consumers are subjected to **consistent (vs. inconsistent)** information on predominantly **hedonic (vs. informative)** information sources, the collected data from groups was joined to create four final data sets: the Facebook consistent information data set (125 complete responses), the Facebook inconsistent information data set (123 complete responses), the AHA consistent information data set (135 complete responses), and the AHA inconsistent information data set (148 complete responses).

6.2.5.3 Sample characteristics verification

Prior to model evaluation, we conducted several simple assessments of the sample characteristics’ compatibility with the envisioned criteria. First, we checked for the validity of consumer confusion assumptions in the treatment group (i.e., respondents seeing inconsistent information) versus the control group (i.e., respondents seeing consistent information). In the second step, we evaluated whether the source nature (i.e., hedonic or informative) matched our claims in the Study 2 literature review. Finally, we determined the existence of differences between the two online information sources when it comes to consumers’ amusement, distraction, and information-seeking behavior (i.e., factors of relevance to the selection of involvement and processing mode).

Prior to the formation of the final data set, a check for the desired differentiation between sources and consumer confusion was conducted on the data collected from the manipulation check. While it is a relevant construct for this thesis, consumer confusion was measured and tested at the level of the manipulation check exclusively in Study 2 to decrease the complexity of the model used. In the set of questions that they responded to in the consumer confusion assessment, participants were also asked to evaluate two statements measuring the effect of manipulation. The assessment of both statements was significantly different for consistent and inconsistent information. On a scale from 1 to 7 (completely disagree to completely agree), respondents assessed the following statements: “After reading information in the post, I felt confused” ($M_c = 3.246$, $M_i = 3.904$, $p = 0.000$) and “The information provided in the post gave contradictory information about coconut oil’s healthiness” ($M_c = 3.454$, $M_i = 4.590$, $p = 0.000$). Such a result encouraged the further implementation and evaluation of both conditions—consistent and inconsistent

information—because it implied the significant existence of consumer confusion when respondents saw inconsistent information.

Source nature (i.e., hedonic or informative) was checked using the scales from the pre-study for the assessment of these characteristics (i.e., Hughes et al., 2019). The results indicate that there is a difference between respondents' perceptions of Facebook and AHA, confirming the results of the pre-study. Facebook was, on average, rated as more hedonic ($M_{AHA} = 3.869$, $M_{FB} = 4.140$, $p = 0.046$), while AHA was seen as more informative ($M_{AHA} = 5.188$, $M_{FB} = 4.552$, $p = 0.000$). This finding supports our division of sources into hedonic and informative that is included in further detailed analysis.

In addition, the levels of information seeking on specific information sources, as well as the level of **amusement and distraction**, were assessed. The three factors were assessed using single-statement measures. Information seeking was evaluated by asking respondents to state the extent to which they search for specific food and nutrition content when they use the specific online information source (i.e., Facebook and the AHA website). The statements used to measure amusement and distraction are available in the previous Subsection (6.3.2.2). ANOVA analysis showed significant differences between two information sources for all three measured factors. Information seeking was significantly greater when using AHA than when using Facebook ($M_{AHA} = 3.868$, $M_{FB} = 3.139$, $p = 0.000$), while distraction ($M_{AHA} = 2.504$, $M_{FB} = 3.964$, $p = 0.000$) and amusement ($M_{AHA} = 3.071$, $M_{FB} = 3.976$, $p = 0.000$) were significantly greater when using Facebook than when using AHA. These results support the differentiation of **involvement** that was used as an assumption when conducting this research, as described in the Study 2 literature review and discussion sections. By using information seeking as a proxy for involvement on an online platform (Hughes et al., 2019), we showed that the involvement is significantly higher on the AHA website than on Facebook.

6.2.5.4 *Data analysis method*

The data collected in Study 2 was analyzed using structural equation modelling (SEM) multi-group analysis in AMOS (Arbuckle, 2021). SEM has been regarded as “a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables” (Hoyle, 1995, p. 1). It provides a thorough combination of standard statistical approaches in behavioral and social sciences—including correlation, multiple regression, path analysis, and confirmatory factor analysis (CFA)—in the data analysis (Steenkamp & Baumgartner, 2000).

SEM analysis starts with model specification, in which relationships between variables are specified and presented in the form of a model. Parameter values are estimated in the next step (i.e., estimation), where iterative methods, involving series of attempts to obtain estimates, are preferred. After specifying the model and estimating parameters, the

evaluation of the model's fit is performed. The fit evaluation observes the equivalence and fit between the data, the model, and the estimation method (Hoyle, 1995).

Multi-group analysis in SEM performs a between-group analysis among predefined data groups to estimate whether there are significant differences in the estimates of parameters (e.g., path coefficients) specific to groups (Hair, Hult, Ringle, & Sarstedt, 2014; Matthews, 2017). Therefore, multi-group analysis tests for differences between identical models for different groups—in this case, different combinations of sources and information consistency. Its ability to identify the presence or absence of multi-group differences substantially helps researchers when analyzing and comparing multiple relationships across group-specific results (Matthews, 2017; Sarstedt, Ringle, & Hair, 2014).

6.2.6 Study 2: Results

The empirical findings of this study are presented in five subsections. As multi-group assessment was performed in AMOS (version 26), the first step focused on CFA, the evaluation of the measurement model, composite reliability (CR), and the average variance extracted (AVE). This step was followed by a presentation of the results of the SEM analysis. As model comparison analysis showed statistically significant differences between the four groups (CMIN = 64.776, $p = 0.002$), models were examined for each individual group. The division between groups was performed to capture and assess the differences that appear in information processing in each of the given situations.

6.2.6.1 Study 2: Measurement model

The measurement model evaluation included performing a CFA and assessing the validity of our measures. The measurement model converged with a fair fit ($\chi^2 = 374.929$; degrees of freedom [df] = 134; comparative fit index [CFI] = .977; Tucker-Lewis index [TLI] = .971; root mean square error of approximation [RMSEA] = .058; standardized root mean squared residual [SRMR] = .038). In addition, the analysis of CR and AVE showed no concerns for the convergent or discriminant validity of the model (Table 33).

Table 33. Convergent and discriminant validity matrix.

	CR	AVE	MSV	MaxR (H)	1	2	3	4	5	6
Credibility (1)	0.932	0.821	0.522	0.935	0.906					
Systematic processing (2)	0.771	0.538	0.146	0.816	0.281 ***	0.734				
Heuristic processing (3)	0.723	0.566	0.522	0.723	0.723 ***	0.382 ***	0.752			
Product attitude (4)	0.969	0.861	0.691	0.971	0.182 ***	0.176 ***	0.252 ***	0.928		
Product healthiness attitude (5)	0.959	0.887	0.636	0.961	0.191 ***	0.146 **	0.192 ***	0.797 ***	0.942	
Purchase intention (6)	0.943	0.846	0.691	0.944	0.205 ***	0.179 ***	0.261 ***	0.831 ***	0.737 ***	0.920

Note: Square root of average variance extracted (AVE) in bold on the diagonal, construct correlations below the diagonal.

Source: Own work

The structural model fit for the multi-group model was also appropriate: $\chi^2 = 202.371$; $df = 88$; CFI = .963; TLI = .924; RMSEA = .050; PCLOSE = .510. The specifics of each group model are presented in the following four subsections.

6.2.6.2 Study 2: Group 1—Informative source and consistent information

As the first group, we evaluated participant responses that saw posts with consistent information on the AHA website. A brief overview of SEM analysis on hypotheses testing of this group is available in Table 34.

Table 34. Hypotheses overview: Informative source & consistent information.

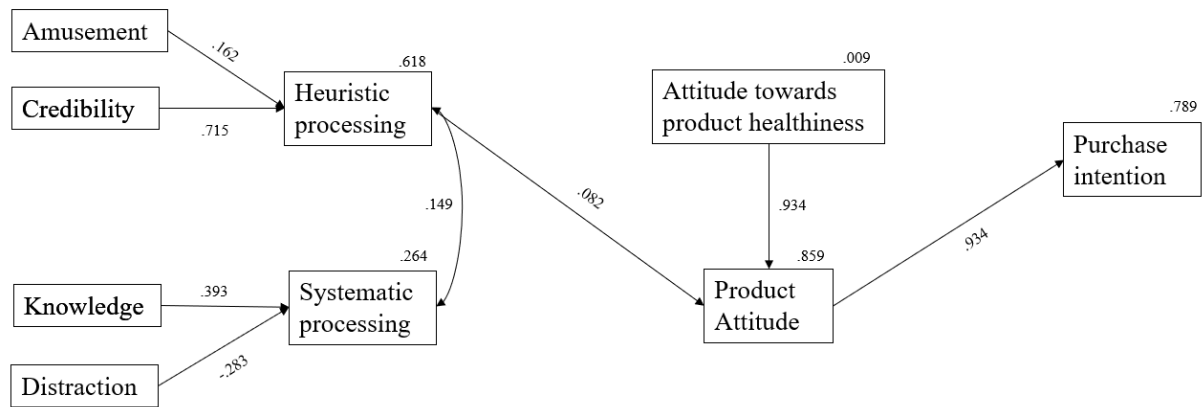
Hypothesis	Relationship	St. loading	p-value	H status
H1	Amusement → Heuristic information processing	.162	.003	Confirmed
	Credibility → Heuristic information processing	.715	.000	Confirmed
H2	Motivation → Systematic information processing	.059	.545	Not confirmed
	Knowledge → Systematic information processing	.393	.000	Confirmed
	Distraction → Systematic information processing	-.283	.000	Confirmed
H3a	Heuristic information processing → Attitude towards product healthiness	.036	.698	Not confirmed
	Systematic information processing → Attitude towards product healthiness	.078	.402	Not confirmed
H3b	Heuristic information processing → Product attitude	.082	.019	Confirmed
	Systematic information processing → Product attitude	-.020	.566	Not confirmed
H7	Attitude towards product healthiness → Product attitude → Purchase intention	.934	.001	Confirmed

Source: Own work

Results imply that **amusement and credibility** have positive effect on heuristic information processing, while systematic information processing is influenced by **knowledge and distraction** (negative effect), but not by motivation when the consistent information is accessed on informative source (AHA website in this study). Therefore, H1 was confirmed, while H2 was only partially shown to be valid. When it comes to information processing and attitude formation, results show a positive influence of **heuristic information processing** on product attitude while other examined effects showed insignificant connection, refuting H3a, and the effect of systematic information processing on product attitude when consistent information is shown on informative source. The direct effect of attitude towards product healthiness on purchase intention is not significant (H7 not confirmed), while indirect effect analysis showed a strong influence of product healthiness on purchase intention through product attitude as mediator (0.934, $p = .001$).

While systematic information processing did not have influence on attitudes formed (according to our results), an interaction between information processing routes was observed. Covariance analysis shows that heuristic and systematic information processing were statistically related (.149, $p = .000$), implying the possibility of their simultaneous appearance when processing consistent information from informative sources. Graphical representation of the model (significant relationships only) is shown in Figure 17.

Figure 17. Processing of consistent information from informative source.



Source: Own work

6.2.6.3 Study 2: Group 2—Informative source and inconsistent information

After conducting an analysis on our first group, we continued with an examination of informative online food and nutrition information sources. The second group focused on the situations where inconsistent information is present. This analysis was therefore done using responses from participants who saw posts with inconsistent information on the AHA website. A brief overview of SEM analysis on hypothesis testing of this group are available in Table 35.

Table 35. Hypotheses overview: Informative source & inconsistent information.

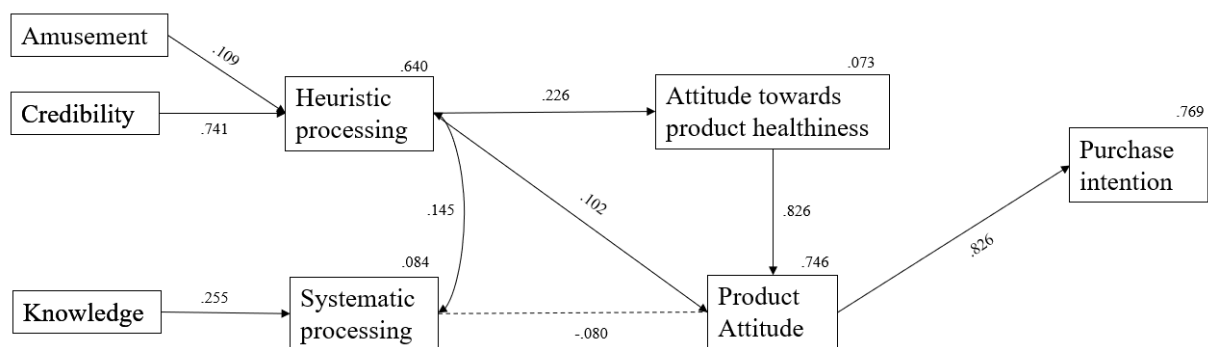
Hypothesis	Relationship	St. loading	p-value	H status
H1	Amusement → Heuristic information processing	.109	.047	Confirmed
	Credibility → Heuristic information processing	.741	.000	Confirmed
H2	Motivation → Systematic information processing	.002	.981	Not confirmed
	Knowledge → Systematic information processing	.255	.008	Confirmed
	Distraction → Systematic information processing	-.101	.188	Not confirmed
H4a	Heuristic information processing → Attitude towards product healthiness	.226	.006	Confirmed
	Systematic information processing → Attitude towards product healthiness	.104	.205	Not confirmed
H4b	Heuristic information processing → Product attitude	.102	.020	Confirmed
	Systematic information processing → Product attitude	-.080	.092	Marginally confirmed
H7	Attitude towards product healthiness → Product attitude → Purchase intention	.826	.001	Confirmed

Source: Own work

Structural equation modelling showed a positive effect of **amusement and credibility** on heuristic information processing, while only **knowledge** was shown to influence systematic information processing when the inconsistent information was shown on informative source. Such results confirmed H1 for this group, while H2 was only partially confirmed. The information processing analysis showed interesting results. Namely, **heuristic information processing** was shown to significantly influence both attitude towards product healthiness and product attitude positively. In addition, **systematic information processing** marginally influences product attitude negatively. Therefore, H4a and H4b were both partially confirmed. The direct influence of product healthiness on purchase intention was not significant (i.e., H7 not confirmed), while its indirect effect through product attitude was positive and highly significant (0.826, $p = .001$). Heuristic information processing was also found to influence purchase intention via product healthiness and product attitude (0.190, $p = 0.013$).

The interaction between the heuristic and systematic information processing routes was observed. The two processing routes were significantly co-varied ($.145, p = .000$), suggesting the presence of their interconnectedness. A visual representation of the model (significant relationships only) is shown in Figure 18.

Figure 18. Processing of inconsistent information from informative source.



Source: Own work

6.2.6.4 Study 2: Group 3—Hedonic source and consistent information

The third group included the responses from participants who saw consistent information on a Facebook post. The results obtained from the SEM multi-group analysis are briefly presented in Table 36.

Table 36. Hypotheses overview: Hedonic source & consistent information.

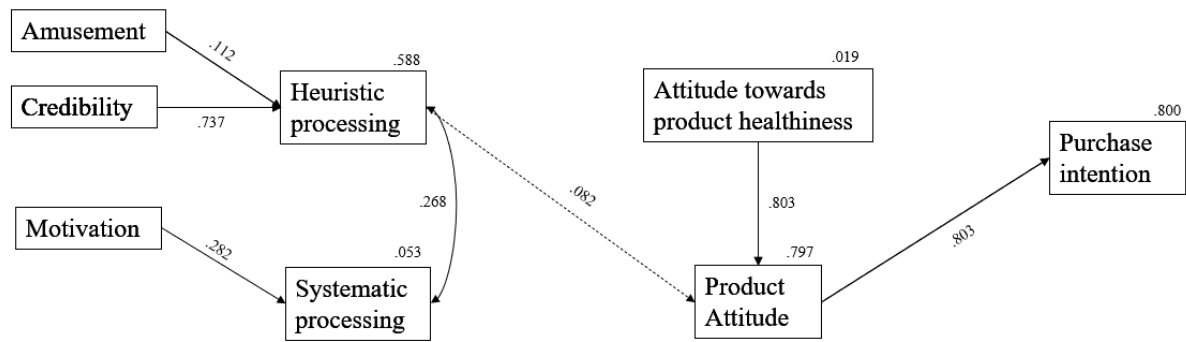
Hypothesis	Relationship	St. loading	p-value	H status
H1	Amusement → Heuristic information processing	.112	.034	Confirmed
	Credibility → Heuristic information processing	.737	.000	Confirmed
H2	Motivation → Systematic information processing	.282	.010	Confirmed
	Knowledge → Systematic information processing	-.159	.142	Not confirmed
	Distraction → Systematic information processing	-.092	.242	Not confirmed
H5a	Heuristic information processing → Attitude towards product healthiness	.111	.242	Not confirmed
H5b	Heuristic information processing → Product attitude	.082	.058	Marginally confirmed
H7	Attitude towards product healthiness → Product attitude → Purchase intention	.803	.001	Confirmed

Source: Own work

The analysis confirmed H1, which regards the effect of **amusement and credibility** on heuristic information processing, as the observed effect was positive for both of the antecedents. H2 was only partially confirmed, as the positive influence on systematic information processing was shown only for **motivation** and not for knowledge or distraction. The information processing–related results implied low processing engagement, as the only relationship between the **heuristic** information processing and product attitude was only marginally significant. Therefore, H5a was rejected, while H5b was marginally confirmed. A direct relationship between attitude towards product healthiness and purchase intention (H7) was not confirmed, while the indirect effect of product healthiness on purchase intention through product attitude was significant, positive, and strong (0.803, $p = 0.001$).

In addition, the interaction between the two information processing routes was detected. The two processing routes co-varied ($.268, p = .000$), implying their connectedness. A graphical representation of this group’s model (significant relationships only) is in Figure 19.

Figure 19. Processing of consistent information from hedonic source.



Source: Own work

6.2.6.5 Study 2: Group 4—Hedonic source and inconsistent information

Finally, our research included an evaluation of the situation in which inconsistencies in information are available from hedonic online information sources. The results presented in this subsection were, therefore, obtained in the analysis of the responses from participants who were shown inconsistent information on a Facebook post. A brief overview of the findings is presented in Table 37.

Table 37. Hypotheses overview: Hedonic source & inconsistent information.

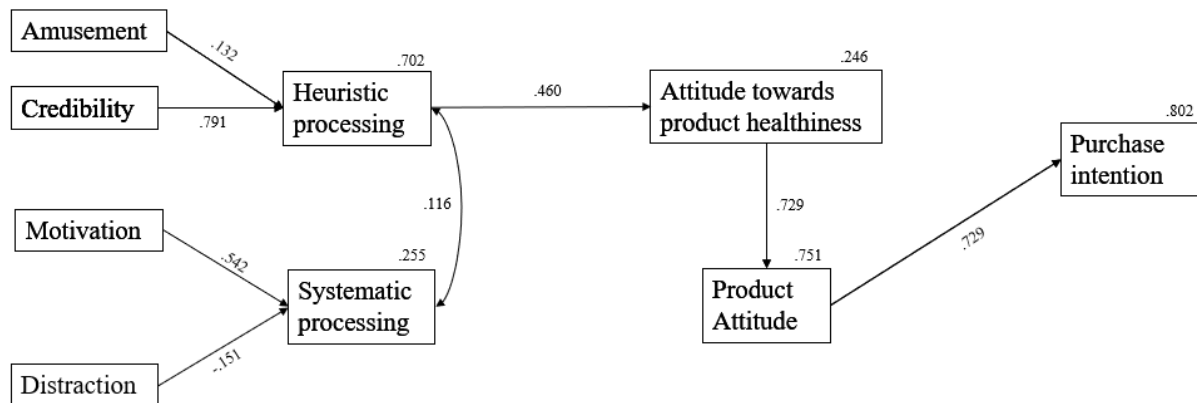
Hypothesis	Relationship	St. loading	p-value	H status
H1	Amusement → Heuristic information processing	.132	.009	Confirmed
	Credibility → Heuristic information processing	.791	.000	Confirmed
H2	Motivation → Systematic information processing	.542	.000	Confirmed
	Knowledge → Systematic information processing	-.131	.205	Not confirmed
	Distraction → Systematic information processing	-.151	.054	Marginally confirmed
H6a	Heuristic information processing → Attitude towards product healthiness	.460	.000	Confirmed
	Systematic information processing → Attitude towards product healthiness	.113	.162	Not confirmed
H6b	Heuristic information processing → Product attitude	.020	.698	Not confirmed
	Systematic information processing → Product attitude	.063	.176	Not confirmed
H7	Attitude towards product healthiness → Product attitude → Purchase intention	.729	.001	Confirmed

Source: Own work

Based on the analysis results, we can confirm H1, as the positive effect on **amusement and credibility** was significant. H2 was partially confirmed, as the influence of **motivation** was significant and positive, distraction was shown to marginally influence heuristic information processing negatively, and knowledge did not show any significant effect on heuristic information processing. The information processing hypotheses were mostly rejected—the only one that was confirmed was H8a, depicting the relationship between **heuristic information processing** and attitude towards PH. While a direct relationship between heuristic information processing and product attitude was not confirmed, the indirect effect analysis showed that the former does influence product attitude through product healthiness (0.387, $p = .001$). The indirect effect of heuristic information processing can also be seen on purchase intention through product healthiness and product attitude (0.387, $p = .001$). Systematic information processing was not significantly related to either of the attitudes examined.

Nevertheless, the interaction between the two information processing routes was observed. Furthermore, the two processing routes were co-varied (.116, $p = .008$), suggesting their connectedness in information processing that appears when consumers are faced with inconsistent information on a hedonic source. A graphical representation of this group’s model (significant relationships only) can be seen in Figure 20.

Figure 20. Processing of inconsistent information from hedonic source.



Source: Own work

6.2.7 Study 2: Discussion and conclusions (Group comparison: Information processing overview)

The comparative approach to studying information processing on different sources and in the presence or absence of consumer confusion applied in Study 2 brought extensive results. Our findings first reveal the importance of the given antecedents for heuristic and systematic information processing. Differences between information sources regarding the antecedents proved to be present during systematic information processing.

In addition, relevant conclusions are offered regarding differences in information processing depending on information source and consistency. In order to better understand the approach that consumers take to process information in these different situations, we tested a series of hypotheses, as presented in the previous chapters. The analysis and results obtained indicate that the differences between information processing routes do exist when consumers are subjected to information that varies in consistency and source. Our results are visually presented in Table 38.

Table 38. Overview of models and significant relationships in Study 2.

Relationship	Group 1 (Consistent Informative)	Group 2 (Inconsistent Informative)	Group 3 (Consistent Hedonic)	Group 4 (Inconsistent Hedonic)
Amusement → Heuristic information processing	H1	H1	H1	H1
Credibility → Heuristic information processing	H1	H1	H1	H1
Motivation → Systematic information processing	H2	H2	H2	H2
Knowledge → Systematic information processing	H2	H2	H2	H2
Distraction → Systematic information processing	H2	H2	H2	H2
Heuristic information processing → Attitude towards product healthiness	H3a	H4a	H5a	H6a
Systematic information processing → Attitude towards product healthiness	H3a	H4a		H6a
Heuristic information processing → Product attitude	H3b	H4b	H5b	H6b
Systematic information processing → Product attitude	H3b	H4b		H6b
Attitude towards product healthiness → Product attitude → Purchase intention	H7	H7	H7	H7

Notes: Green—confirmed hypothesis, yellow—marginally confirmed hypothesis, blank (white)—hypothesis not confirmed

Source: Own work

Analysis of the four groups in our model confirmed the relevance of **amusement and credibility** as antecedents of heuristic information processing. The relationships of these antecedents with heuristic information processing were positive and significant in all four observed scenarios. While credibility is a well-known proxy variable for heuristic information processing (e.g., Chaiken, 1980), amusement was a novel factor that we examined in relation to this type of processing. Therefore, we successfully demonstrated the importance of amusement as an antecedent of heuristic information processing.

Antecedent variables for systematic information processing were not as uniformly confirmed across our four scenarios. While both motivation and knowledge are relevant to systematic information processing according to the literature, their significance seems to

change depending on the source that provides the information. The findings imply that when using **hedonic** sources, consumers heavily rely on **motivation** to process information, while the effort of evaluation and usage of existing knowledge is not present. **Knowledge** does significantly influence the tendency to systematically process information, but only if it comes from **informative** information sources.

Contrary to our expectations stated in H3, the results imply that consumers do not put effort into **processing consistent information on an informative source**. Instead, our findings indicate that heuristic information processing develops a relationship with the attitude created. The lack of a systematic approach to information processing on an informative source can be seen as one of the problems for the adoption of novel information and findings from nutrition science. As consumers show low interest in processing information in an effortful way, their ability to adjust their attitudes and behavior according to novel research findings can be hindered. In addition, attitude change can be affected, as consumers do not devote enough attention to information processing and do not necessarily take all of the available information into account. A lower willingness to engage in intentional information processing can also facilitate confirmation bias, as people might not be ready to look into or consider opposing evidence (Evans, 1989).

In addition, the results imply that information processing heavily relies on general product assessment in product attitude, while the evaluation of product healthiness is not a result of information processing. This additionally confirms the superficiality of the effort put into information processing in this case. Instead of evaluating all of the provided data and using it to form or tweak their attitude, consumers seem to select an easy way and not process information about the product's characteristics thoroughly enough to trigger the systematic information processing mode.

Inconsistencies in information from an **informative information source** did trigger the information elaboration using both heuristic and systematic processing modes, confirming our fourth hypothesis. When faced with inconsistent information, consumers seem to reevaluate their attitude towards product healthiness through heuristic information processing. The usage of the heuristic processing mode positively influences this attitude. In addition to this, overall product attitude is affected by both heuristic (positive impact) and systematic (negative impact) information processing. Such results imply that putting more effort into information processing and elaboration leads to more conservative and critical product assessment, which is consistent with the theoretically proposed consequences of consumer confusion (e.g., Mitchel, & Papavassiliou, 1999).

In the case of **hedonic sources and information processing**, the differences between the situations when consumers see consistent or inconsistent information are minimal in terms of the amount of effort invested in elaboration on information. When faced with consistent information, consumers processed it heuristically, which significantly influenced only the

overall product attitude. The approach to information processing is thus without extensive effort, as was hypothesized in H5.

While consumers' processing of **inconsistent information** from an informative source included influence on product attitude using both systematic and heuristic modes of processing, this was not the case when the information came from a **hedonic source**. Contrary to our expectations stated in H6, inconsistent information on Facebook did not evoke a perceived need for effortful information processing amongst respondents. The significant processing route used when evaluating the provided information turned out to be only heuristic. This implies that while the expectation is that consumers will pay more attention and devote more time and effort to processing information when it is inconsistent, such a turnout is not to be expected when consumers are subjected to information on hedonic information sources. Information from hedonic sources is, therefore, processed effortlessly and automatically, independent from the level of its complexity in terms of consistency.

While not necessarily the result of devoted information processing, attitude towards product healthiness did prove to be relevant to determining product attitude and, indirectly, to purchase intention; the direct relationship between attitude towards product healthiness and purchase intention was not confirmed for any of the four scenarios.

7 GENERAL DISCUSSION AND CONCLUSIONS

Recent health developments on a global scale have popularized the term **infodemics**. As a term, infodemics emerged as a combination of information and epidemic. It stands for the abundance of information, both accurate and inaccurate, about a certain issue (e.g., disease) that spreads rapidly and reaches masses of people (World Health Organization, 2020). Its negative consequences include the fast dissemination of misleading information that can foster the emergence of consumer confusion and difficulties in identifying reliable sources of information (World Health Organization, 2020).

When it comes to the infodemic of food and nutrition information, however, consumers have managed to inform themselves and make decisions for decades already. Ever since the information became freely created and accessible on the Internet, the amount of information only grew, while its consistency only deteriorated. Over the last few years, researchers have constantly been able to confirm the existence of **confusion** among consumers when it comes to food and nutrition information online (e.g., Ramachandran et al., 2018; Vijaykumar, et al., 2021).

This thesis aimed at integrating and examining three research fields from social psychology and marketing—**consumer confusion, attitude strength, and the HSM of information processing**—by applying them on a contextual example of **online food and nutrition information** across eight chapters. The research conducted spreads over four theoretical and

bibliometric knowledge field analyses and three empirical studies testing constructs of relevance and their relationships. The context contributed to widening the importance of this thesis's findings to public health and communication policies.

The analysis of the theoretical constructs and their relationships conducted in the theoretical part of this thesis provided the grounds for the empirical assessment of the relevant effects. **Bibliometric studies of four fields** (i.e., consumer confusion, attitude strength, the HSM, and the online food and nutrition information study context) showed connections between some of these fields. Quantitative analysis of the existing research and its visual mapping indicated that some of the concepts of importance to this research (i.e., attitude strength and heuristic and systematic information processing) have already established strong connections. Two fields of literature share multiple contributing authors (e.g., Chaiken and Petty), as well as keywords used to describe the research performed (e.g., attitudes, information processing). The importance of information processing in consumer confusion studies was reinforced with the results obtained in our keyword analysis of the consumer confusion literature field. Analysis of the study context—that is, online food and nutrition information—implied that the existing research often includes studies from the fields of marketing and psychology.

The evaluation of the intersection of the four fields showed no existing studies, which encouraged the present research. The existing body of literature has consistently suggested that additional research would improve our understanding of consumer confusion and its influence on information processing, consumer attitudes, intention, and behavior (e.g., Fitzgerald et al., 2019; Spiteri Cornish, & Moraes, 2015). Thus, this research offers a **unique evaluation** of consumer confusion and its influence on information processing and attitude strength in the online food and nutrition. Three empirical studies—one exploratory and two causal—were conducted with the aim of extending the existing knowledge about these constructs and their relationships to one another.

In our first empirical study, we delved into a deeper investigation of the theoretical constructs of importance to this thesis. Using an experimental setting, we analyzed the **influence of consumer confusion on attitude strength**. Our literature review before conducting this study implied the existence of the interest in better understanding attitude strength in situations where inconsistent information is present (e.g., van Strien et al., 2016; Aschemann-Witzel & Grunert, 2015). In the studies we identified, however, we did not encounter manuscripts that include these two constructs and evaluate their relationship to one another. By proposing and empirically evaluating the relationship between consumer confusion and attitude strength, we **contribute to the understanding** of consumer attitude formation and its influencers.

Consistent with our expectations, the **detrimental effect** of consumer confusion, caused by inconsistencies in the information provided, on attitude strength was detected in the data

collected and analysis conducted in Study 1. Attitude strength among respondents who were shown inconsistent information was significantly lower than in case when consumers assessed consistent app screenshot. In addition, these respondents were more likely to change their attitude towards the product at hand due to being confused and holding a weak attitude, which is not known for its stability.

Such results were in line with research already present in the literature that included inconsistencies in information and separate dimensions of attitude strength. Negative effects of inconsistencies in the available information were shown to affect several attitude strength dimensions, such as attitude certainty (Smith et al., 2008) and attitude ambivalence (e.g., Siddiqi et al., 2019). Our findings show that the applicability of the effects of inconsistent information—tested in the form of a novel construct to the existing research on the attitude strength field, **consumer confusion**—**surpasses the level of a single dimension** of attitude strength and influences attitude strength as a construct.

In addition to its demonstrated effects on attitude strength, consumer confusion, as a result of inconsistent information, was shown to influence **attitude change**. As found in our study, when consumers are confused by inconsistencies in information, they are often prone to changing their attitudes and often give lower assessments of products (i.e., they form less positive attitudes). Such conclusions are consistent with propositions made in the consumer confusion literature, which states that consumer confusion causes consumers to change their attitudes and choices (Mitchell & Papavassiliou, 1999).

The pre-study of the second experiment we conducted examined the **sources from which consumers access food and nutrition information** on the Internet. Six of the most frequently used source types were selected, and consumers were asked to assess them in light of the food and nutrition information that they provide. Since our thorough literature review did not identify previous studies that approach online food and nutrition sources from this perspective (i.e., studies that evaluate consumer differentiation of these sources based on proposed characteristics), we consider the proposed classification of online information sources to be one of the **novelties** that this research has to offer.

The results obtained in the pre-study indicate that **consumers indeed differentiate between the sources** according to most of the examined characteristics. For example, a clear distinction was observed between the perceived helpfulness of sources, information quality, and the sources' informative and hedonic value. As expected, official sources and sources backed up by evidence (i.e., public and scientific websites) were evaluated as the most helpful, the highest in information quality, and informative. On the other hand, sources such as social networks and forums, due to their high value of community and entertaining content, scored the highest in terms of hedonic value.

While the **cognitive nature of information sources** seems to be strongly distinguished by consumers (following the path of informative sources, where public scientific sources were perceived highest and social networks the lowest), the differentiation of the **affective nature of information sources** was not statistically significant. This implies that the consumers did not differentiate online information sources according to the emotions that we used to capture the affective nature of sources. The lack of this differentiation can indicate the lack of evaluation of information sources from an affective perspective by consumers. While hedonic and fun emotions are significantly different between sources, as shown by the evaluation of the hedonic value of sources, consumers seem not to attribute other emotions to the information sources that they use.

Information worth mentioning is **usage frequency and its comparability** depending on source characteristics. The results implied that the usage of less informative but highly hedonic sources (e.g., social networks) for obtaining food and nutrition information was more frequent than more informative but less hedonic sources (e.g., public or scientific websites). Further findings showed that the quality of information provided on the source, as well as the source's informative value, did not have a statistically significant influence on the usage frequency of an information source to obtain online food and nutrition information.

Such results powerfully show the importance of **convenience, hedonic value, and habit** to consumers while searching for and accessing information, which is consistent with previous findings (Venkatesh, Thong, & Xu, 2012). While consumers distinguish between online information sources according to their **helpfulness, information quality, and informativeness**, the majority of information accessing still happens outside of the sources that score highly regarding these three traits. Their **accessibility and ease of use** does not seem to be a problem either, as it is rated as statistically similar to that of the most popular and convenient information sources (e.g., social networks).

However, hedonic sources bring along certain difficulties, especially when it comes to the **quality and truthfulness of information**. Due to the relevance of the Internet to informing the general population, researchers have already called for raising awareness of misinformation disseminated through popular hedonic platforms, such as social media (Pagoto, Waring, & Xu, 2019). Some efforts should be made to educate online opinion leaders and equip them with scientific and evidence-based knowledge worth sharing. Since consumers often resort to word of mouth to ease their confusion (Hall-Phillips & Shah, 2017) and since opinion leaders are often considered both consciously and unconsciously as a credible information source, public institutions might consider engaging them in their campaigns to reach a wider population and spread information faster.

After gaining a broad overview of the online food and nutrition information sources and consumer perceptions of them, attention was paid in Study 2 to how consumers approach information from different sources (processing-wise) in the presence or absence of consumer

confusion triggered by the inconsistency of the information. To the best of our knowledge, this was the **first study to observe information sources as hedonic and informative** and compare the influence of such sources on the information processing that occurs once consumers read the provided information. As such, it **opened the discussion of the influence that the nature of information sources can have on information processing** that occurs without having to assess its other characteristics, such as source credibility, expertise, and similar cues that have been used in similar studies.

In the analysis conducted in Study 2, we found and confirmed a positive influence of amusement and credibility on heuristic information processing. While credibility is a well-established construct, often used to examine heuristic information processing, the relationship with **amusement** was a **novelty** provided by this research. Such a finding confirms the existence of research indicating that positive feelings can contribute to the occurrence of heuristic information processing (Tiedens & Linton, 2001). This positive feeling was introduced and tested in the form of the level of amusement.

When it comes to systematic information processing, studying antecedents was not as unanimous across different scenarios. **Motivation** was shown to influence systematic information processing when the information came from hedonic information sources. Since hedonic sources such as social networks are usually low-involvement sources, the motivation to process information becomes a key component for information processing (Hughes et al., 2019; MacInnis et al., 1991). When it comes to informative information sources, however, **knowledge** seems to dominate among antecedent factors to systematic information processing. As systematic information processing usually requires using effort and all of the relevant information and knowledge, the relevance of knowledge from informative sources where the involvement is high and therefore systematic processing is understandable (Hughes et al., 2019).

Overall, our results showed a **much smaller tendency to systematically approach** information processing than expected. For example, no systematic information processing was detected when processing information from hedonic information sources, regardless of the information's consistency. This may signalize a certain level of acclimatization by consumers to confusing and inconsistent information on social networks. As levels of **distraction** on social networks are significantly higher than on the informative media used in this study, adjusting to this might be one of the mechanisms that consumers introduce to cope with confusion and distraction, thereby diminishing its effects on information processing.

When faced with confusing information on social networks, instead of trying to make sense of them by putting an effort into reading, evaluating, and elaborating upon information, consumers may instead resort to effortless, automatic information processing just because of the source of the information, regardless of its complexity. The prevailing nature of

hedonic information sources (entertainment and relaxation) might additionally explain the low efforts put into information processing (Hughes et al., 2019). As amusement was shown to be important for heuristic information processing and is frequently sought after, users coming to these platforms intend to relax and seek fun, and, therefore, they may be less prone to seriously weighing the information.

Consistent information, on the other hand, showed no effect of processing—whether heuristic or systematic—on product healthiness evaluations, regardless of the source type. Instead, information processing interacted directly with product attitude, and only the fast heuristic mode proved to be statistically relevant, regardless of the source type (**informative or hedonic**). As consistent information is not as complex for information processing as inconsistent information (Ackerman, 1988), this may partly explain why the evaluation of product healthiness was lacking from the equation. Instead of using the available information and elaborating upon it, consumers relied on heuristic cues, sped up the process by skipping the evaluation of product characteristics (i.e., healthiness), and heuristically processed and created attitudes about the product in general. This implies the **minimal involvement in information processing** of consistent information provided by **hedonic and informative** information sources.

As the existing literature suggests that inconsistencies in information increase the complexity of information processing, undermine consumers' judgmental confidence, and increase critical and more systematic evaluations (Maheswaran & Chaiken, 1991; Kim et al., 2018), our results were able to **support the emergence of systematic information processing** only in the case of product attitude in the **informative source** scenario. The level to which consumers indeed systematically process inconsistent information therefore seems to depend on the information source type, not only on the complexity of information.

When the **inconsistent information** was available on an **informative source** (e.g., a public scientific website), consumers engaged in both systematic and heuristic information processing during attitude formation. The complexity of inconsistent information and the high-involvement nature of the source (as shown in Subsection 6.3.2.3) are shown to trigger **systematic** information processing (Ackerman, 1988; Hughes et al., 2019) and were both present in this scenario. In addition, previous research has implied that the trustworthiness of a source can increase the level of elaboration, which is a part of systematic information processing (Priester & Petty, 1995). Moreover, inconsistency in information is known to induce negative feelings (e.g., confusion, uncertainty), which often lead consumers to analytically approach information processing (Schwarz & Clore, 1983; Tiedens & Linton, 2001). The emergence of the systematic route in processing inconsistent information from an informative source is, therefore, not surprising.

As in situations rich in complexity, confusion, and, inconsistencies where consumers tend to use all of the available information (Kim et al., 2018), the presence of **heuristic**

information processing when consumers are faced with inconsistent information from informative sources is expected. Making sense of conflicting information is a cognitively demanding task, and cues and heuristics may help in the process (e.g., Ackerman, 1988).

Inconsistent information on hedonic information sources led to heuristic evaluation of the product characteristics (i.e., healthiness), which influenced the product attitude and purchase intention. The low-involvement nature of Facebook as an information source (Hughes et al., 2019) is of importance when it comes to the selection of the heuristic information processing route over the systematic one. In addition, the lack of a systematic approach to processing and forming attitudes about information from hedonic sources can be a result of long-term exposure to inconsistent information and misinformation on such sources (e.g., Ramachandran et al., 2018; Pagoto et al., 2019). Not engaging in systematic information processing when encountering information from hedonic sources might therefore be a mechanism for coping with the abundance and inconsistency of the information provided by these sources. As the complexity of information strongly influences the need for and engagement in systematic information processing, its absence in the case of hedonic information sources is peculiar. The factors given above (i.e., low-involvement source, the lack of processing engagement as a coping mechanism) might lead to the absence of systematic processing, although further research is necessary to confirm this.

Consistent with the existing literature, our findings imply the **influence of attitude towards product healthiness on purchase intention** through the overall product attitude across all four tested groups. As the healthiness of a product has already been shown as a positive influential factor on product attitude and purchase intention (e.g., Rana & Paul, 2020), our study provides additional confirmation of this conclusion.

Due to the level of engagement required, consumers are often more critical when assessing information systematically. As a great amount of information today is received and consumed through social networks, this might give the false impression that stakeholders (i.e., companies) do not have to worry about the quality of the information that they disseminate, even though their information might be inconsistent. A combination of consumers' limited processing capacity and decreased willingness to put an effort into information processing paves a fast route to effortlessly approaching information evaluation—if any information elaboration is used at all (Vogrincic-Haselbacher et al., 2021). While it should create a serious concern and instant action, this lack of willingness to put an effort into information processing and companies' awareness of it might be a reason why this problem has still not been tackled on a large scale and why it does not reach headlines and top priorities in policies around the world.

Useful practices for informing consumers about possible misinformation were used in force during the pandemic, when popular social media tried to warn their users that the available information could be checked on trusted sources, such as the World Health Organization or

public health institutes. As the information available on these platforms become more abundant and inconsistent, information providers might think of providing such warnings for other categories of information, including food and nutrition.

8 CONTRIBUTIONS, IMPLICATIONS, LIMITATIONS, AND FURTHER RESEARCH DIRECTIONS

This PhD consists of bibliometric overviews of four literature concepts and three empirical studies that were conducted with the aim of revealing connections between these fields of literature (i.e., consumer confusion, attitude strength, the HSM and online food and nutrition information). The discussion of this research's contributions, implications, and limitations is presented in this chapter.

8.1 Theoretical contributions

The thesis attempted to contribute to the recognition of the relevance of the theoretically and practically exposed issue of **consumer confusion** about online food and nutrition information by showing its detrimental effects on theoretically relevant constructs in social psychology. While the manipulations used in our studies may be somewhat “fabricated” and tweaked according to methodological and research requirements, contradiction in information is not a rare phenomenon in online information sources, especially the most used ones (Pagoto et al., 2019).

In our theoretical overview, we applied a renowned bibliometric methodology of quantitatively analyzing literature to four novel fields that have thus far not been investigated using this methodology. As the **first bibliometric studies** conducted to systematize the knowledge about the given constructs, we visually mapped the existing literature, providing summaries of the fields' development, relevant topics (keywords), and research directions (i.e., prominent outlets of publication).

The findings of the four bibliometric studies identified a gap in the existing literature that was filled with the studies conducted in this thesis. Namely, the investigation of articles published in Scopus and WoS showed no existing article that includes all four areas of the research explored in this thesis (i.e., **consumer confusion, attitude strength, the HSM of information processing, and online food and nutrition information**). By **proposing and testing linkages** between three theoretical concepts (i.e., consumer confusion, attitude strength, and the HSM of information processing), we contribute to a better understanding of these concepts and their relationships and to the fields of marketing and social psychology, as well as research that aims at connecting the two fields to interchangeably apply knowledge.

To make such contributions, we conducted **three empirical studies**, each representing **unique research** in connection with the main topic of the research, connecting the four core

ideas and literature fields of interest. The first study managed to establish and empirically show a clear connection between consumer confusion, attitude strength, and attitude change. This study was motivated by the real-life detection of the existence of inconsistent information provided by the sources of the same level of credibility—in this case, mobile apps. Our findings helped us confirm the **existence of a relationship** between consumer confusion and attitude strength. By showing that confused consumers experience attitude change and a decrease in attitude strength, we showed the direct of this connection between these two constructs. Drawing attention to this relevant matter should motivate researchers to further explore and identify such examples.

An additional contribution of our research was achieved in the second empirical study (i.e., the pre-study). While previous studies in the literature have implied that such differentiation of sources is possible, this study provided a comprehensive overview of consumers' classification of online food and nutrition information sources' traits. Thus, the study improves the understanding of the differences in consumer perceptions regarding sources' traits, such as hedonic and informative value, information quality, perceived ease of use, and accessibility. Traits such as hedonic and informative value are often researched in consumer studies. The focus of these studies is mainly on attitudes (Voss, Spangenberg, & Grohmann, 2003; Batra & Ahtola, 1991), products (Okada, 2005), and motivation (O'Brien, 2010). Only recently has the application of these traits been shown in the online content world (e.g., Hughes et al., 2019). Our pre-study also extended the **understanding**, generalizability, and applicability of these traits to online information sources, suggesting that sources themselves can be differentiated by their hedonic and informative value to consumers.

In the third study (Study 2), we offered a unique comparison of information processing routes taken depending on information source traits and the consistency of information. The results of this experiment showed a scarcity in systematic information processing of online information. This study casts a novel light to the **understanding** of information processing and questions the crucial relevance of information source informativeness for determining consumer willingness to invest additional effort into carefully processing the information at hand. The study offers a novel application of the HSM to **compare the approaches** that consumers make to the information available on different online information sources. In addition, the study shows the potential of sources to influence information processing in general, including the selection of the information processing route.

This study reveals several novel relationships and draws attention to the **information source nature as a relevant factor in the information processing** route that consumers take. The results contribute to the existing knowledge about information processing by showing an overall lack of the systematic approach to information. Contrary to theoretical propositions that claim the common use of systematic processing in complex situations, our results imply that other conditions are necessary (i.e., informative information source) to convince consumers to actually use this type of information processing. In addition, the relationship

between information processing and attitude formation can become especially weak when confusion is absent and when the source is hedonic—indeed, almost no information processing occurs. This finding offers an **addition to the current approach** to information sources while studying the HSM, where source’s main role is seen as heuristics that can bias heuristic information processing (e.g., Chaiken, 1980).

Across our three empirical studies, we assessed and used—for manipulation purposes—multiple different online food and nutrition information sources (e.g., mobile apps, social media, official information sources). This contributed to addressing the generalizability of our results across online information sources and improved the understanding of whether consumer confusion can be specifically attributed to certain sources, or whether it can emerge in any source available.

8.2 Implications

The analysis conducted in the three empirical studies of this thesis brought several interesting findings. Understanding the applicability and influence of these findings in real-life situations can be of relevance to multiple stakeholders. Therefore, the implications of the results are presented in this chapter. We first discuss the implications for the stakeholders that create and disseminate information in most cases—namely, managers and official institutions (policy makers). Later, we introduce several important implications for consumers. Emphasizing these relevant matters should motivate researchers to further explore the given issues, and it should motivate relevant institutions to aim at diminishing the magnitude of such occurrences in the online environment of consumer decision-making.

8.2.1 Implications for managers and policy makers

The findings of the empirical studies in this thesis have several practical implications for stakeholders that are worth discussing. In the digital world, both managers and policy makers are information creators. Due to the differences in financing and usage proficiency, however, the word of brands and managers is often spreading at a greater pace and with a wider reach (Bhattacharya, Sinha, Chaudhuri, & Sheorey, 2015; Klasen et al., 2018). The implications of our research conducted for the purposes of this thesis can be of use to both managers and policy makers and are, therefore, proposed simultaneously. Ideally, further cooperation between the two bodies would lead to an understanding of the importance of providing proper information and diminishing confusion, despite initial differences in the two parties’ goals and interests.

The first study's findings offer useful implications for marketing managers as well as official health institutions. As inconsistent information might result in reduced attitude towards product healthiness and reduced attitude strength, food brands should be very motivated to diminish such a state and dispatch unified information about their product across all media and channels where they are present. It is, therefore, of high importance for companies to

undertake activities that **educate consumers**, help them make informed decisions about the purchase, and lower their susceptibility to confusion due to the inability to differentiate truthfulness and credibility of different sources of information that they are surrounded by on a daily basis.

Awareness of confused consumers' tendencies should be of primary concern for many stakeholders involved in the consumer food and nutrition decision-making process. For example, marketers and brands significantly depend on consumer attitudes and behavioral intentions towards their products and services. As consumers with **weaker attitudes are more prone to changing** their attitudes and intentions (Davidson, 1995), developing loyalty and consequent purchases can be a challenge. Therefore, constant communication is needed to remind consumers of the brand's existence and to convince new individuals to purchase the products.

While these efforts are constant, in the current situation where consumers are bombarded with information on a daily basis, much of which is inconsistent, it is not necessarily always influential, and its long-term effect is especially questionable. A similar amount of effort would likely be necessary to tackle the information environment of consumers and to disseminate a consistent image and message of the brand to the world. Nevertheless, such undertakings would be of the utmost importance to the formation and maintenance of consumers' strong attitudes towards brands and their products. Constant questioning of product characteristics, including those that brands brag most about, due to the inconsistent stimuli is detrimental to a product's success. Therefore, more attention should be paid to the **information** that both brands and other stakeholders share about the product to create a somewhat friendlier environment for consumers to evaluate information and make their decisions in.

Being a question of special relevance to society and health, the context of this study also calls for the greater involvement of policy makers and institutions. Constant exposure to inconsistencies in information and misinformation that dominate the most frequently used information sources online (i.e., social media and health communities on forums) may strengthen beliefs and attitudes in the direction of misinformation (Pagoto et al., 2019). In order to make people confident enough to critically evaluate the information served to them online and hold it accountable for the food choices that they make, it is necessary to first hold the institutions and policy makers accountable for the emergence and maintenance of such a hostile decision-making environment in the first place. Instead of aiming to provide additional information, which is not always beneficial to users because they are already unable to use all of the existing information (Vogrincic-Haselbacher et al., 2021), an approach aimed at **helping consumers make sense of information** would have the potential to improve the decisions that consumers make.

A reform and greater efforts to increase consumers' **digital and nutrition literacy** are necessary. Education is of the utmost importance to fighting misinformation's virality, as consumers are often willing to share the information that they find useful to inform others, without actually knowing whether the information is true (Chen, Sin, Theng, & Lee, 2015). As information provided by official sources contained several ambiguities in the past and were all but actionable (Spiteri Cornish & Moraes, 2015), it is not a surprise that consumers need an additional push to take institutional advice seriously and apply it.

Since consumers often spend their free time on social media, this channel for educating consumers about nutrition and properly extracting food information can be an effective way to **increase nutrition literacy and reduce confusion** (Gill et al., 2013). Practices such as **gamification** and more intuitive information source design have also been shown to be effective in reducing confusion and motivating healthier food choices (Ögel Aydın & Argan, 2021; Haven et al., 2006).

When it comes to apps in particular (i.e., the context of this study), brand managers might find it beneficial to collaborate with app developers to ensure that the information about their products and brand that is available to consumers in the apps is valid and consistent. Mobile apps, which are now a very popular marketing communication channel for many companies, must also be developed very carefully and expertly. Managers and marketers should increase their **efforts to reduce confusion** to ensure that their products and services are well understood and not affected by the inconsistent information that every consumer is confronted with. Therefore, a clear strategy is needed at the product launch stage, followed by the choice of an appropriate and unambiguous way to promote and position the product from the outset. Developers of globally available nutrition apps could benefit from closer cooperation with official institutions (e.g., health authorities, official media channels) to create unique standards or mutually agree on using existing ones (European guidelines, American USDA regulations, etc.) for product healthiness evaluation and, therefore, to avoid giving opposing information to users.

As electronic information sources, including apps, become a very common way of searching for health and nutrition information (Krebs & Duncan, 2015), official institutions could achieve the best results for their campaigns by incorporating such means of delivering messages to educate and motivate citizens. In doing so, institutions should keep in mind that it is crucial to **convey the right amount of information**. An abundance of information does not necessarily lead to a correct understanding of nutrition on the part of consumers (Spiteri Cornish & Moraes, 2015).

The pre-study enabled sorting online sources by their traits. Such differentiation of sources can be useful for multiple stakeholders that create and disseminate food and nutrition information. Depending on the way that they prefer their information to be perceived, stakeholders can decide on a primary **carrier of their information**—that is, a website,

social network, or blog. Nevertheless, caution is still needed, as consumers also differentiate information by its credibility, and referring to a credible and established source can be helpful to a certain extent on most of the possible sources.

The results imply that some traits are more relevant than others when it comes to the frequency at which a source is used. The hedonic nature of a source, for example, positively affects the source's usage, and its interactive nature drives consumer engagement (e.g., Schultz, 2017). This information can be useful for both marketing managers and policy makers. Marketing managers already exercise this in their campaigns by heavily engaging in **content creation and sharing** in social media, forums, and blogs, which are **hedonically perceived sources** that are also more frequently used for obtaining food and nutrition information. Policy makers, on the other hand, while creating messages of greater importance and informative value than marketing messages, have only just started using hedonic sources for the communication of their messages and recommendations. Thus, the heavier usage of hedonic information sources would facilitate message sharing and adoption. The second study revealed the information processing patterns for information from different sources. Such knowledge is relevant for information carrier (i.e., online source) selections made by marketers, opinion leaders, policy makers, and other online content creators. Understanding the how consumers process the information that they receive from online sources helps adjust marketing campaigns, the type of ads and promotions used by marketers, and the channels of communication that are relevant for policy makers. Using **short and concise messages** can be useful for **hedonic** sources. As **official** sources provoke systematic processing in certain situations, they can benefit from including **additional information**. This is especially true for situations about controversial topics or topics where recommendations change throughout years, which have a great chance of confusing consumers.

The confirmation that inconsistent information influences consumers' information processing once should provide additional warning to content creators—especially marketers and policy makers. Information today is created at a pace that makes it impossible for consumers to process all of it. Inconsistent information creates confusion, and such a state hinders reaction, leading to accessing information that confirms or justifies the existing behavior. Therefore, consumers need **education on how to cope with the information abundance and complexity** in everyday life, how to spot a credible source, and how to understand the information reported in a formal, scientific manner. Constant confusion can lead to questioning even the basic truths, which can potentially lead to anarchy and extreme behavior. Reacting in a timely manner and providing consumers with the best weapon available—knowledge—can help create a world of understanding and informing that removes this risk.

The inconsistencies in the information that is available to consumers do not need to be as frequent as they currently are. Thus, a systematic and devoted approach to information

creation and dissemination is necessary to provide consumers with a **less hostile environment** for decision making and information processing. While it may be unrealistic to expect control over the content published on the Internet, raising awareness of the consequences and accountability for the content published can potentially be a less invasive approach that can bring results.

Finally, this PhD research gives some relevant findings from the **policy and scientific perspective**. Consumers need support to understand and process online food and nutrition information. Therefore, it is of the utmost importance that scientific and official health institutions strive to **become the first go-to source of food and nutrition information online**. Today, consumers are usually more open to accepting information from commercial sources than that from health and official institutions because such information is practical, easy to implement, and communicated clearly and simply (Spiteri Cornish & Moraes, 2015). Evaluating the patterns of consumers' information search and processing online is relevant to providing them with the proper information in their desired terms.

The **prevalence of convenience and habit** over the quality and relevance of information when selecting an information source should be a strong enough motive for public organizations, institutions, and policy makers to genuinely engage in achieving a better understanding of popular hedonic sources and their reach. A devoted and continuous following of the ever-changing trends is necessary to provide consumers with the appropriate information at their own convenience. With the increase in content on popular platforms that is hard to control and very often includes inappropriate information and advice about food, it is of the utmost importance to create content that is attractive and appealing to the desired audience, carried out by the individuals they trust (e.g., opinion leaders and social media influencers), and shown **via channels that are the most convenient to consumers**, including social media.

Consumers usually blame official institutions for confusion about the healthiness of food, as inconsistencies were present in past (Spiteri Cornish & Moraes, 2015), and as recommendations changed multiple times as a result of novel research. Nevertheless, such institutions must increase their efforts to distinguish themselves from other information providers. **Offering actionable, practical, and straightforward advice** that takes into account the hectic lifestyle of today's consumers might be appealing. Since social life is one of the most important things to modern consumers, and since word of mouth is still among the strongest decision influencers, creating content that is interesting, shareable, and eating out-friendly (e.g., guidelines and recommendations for take-out or restaurant meal selection) can help official institutions gain and maintain the momentum as the lead source of online food and nutrition information.

Policy makers therefore must strive to obtain the status of most credible information source regarding food and nutrition. While it is only natural to expect that scientific efforts in the

future will efficiently keep challenging public knowledge and assumptions, the communication of the **novel findings**, their superiority to the past ones, and their clear breakdown to the actions that can and should be made has been underwhelming in the past. Thus, consumers have remained confused, as the official sources that they found to be the most relevant and credible were independently creating conflict by providing inconsistent information (Spiteri Cornish & Moraes, 2015).

8.2.2 Implications for consumers

Today's world of **perpetual confusion** evidently impacts consumers' patterns of information processing and attitude formation. The world of abundance has triggered the mechanisms of scarcity of our cognitive resources; the manner in which people approach information evaluation and processing today might be significantly different from the patterns established and identified in psychology research several decades ago. Even the important questions and decisions, such as nutrition and food choices, are easily becoming part of heuristics despite the much-needed systematic and critical evaluation of the available information.

Our pre-study indicated the lack of connection between the information quality and informativeness of a source and its usage frequency for obtaining food and nutrition information. Instead, the hedonic nature of the sources seemed to be more influential, implying the relative **lack of awareness** about the relevance of data and its influence on choices made by the general population. Greater efforts to improve **media literacy** are needed from consumers as well. Individuals must understand the importance of the ability to critically evaluate the available information, its credibility, and its relevance (Wang, McKee, Torbica, & Stuckler, 2019). Obtaining and maintaining this skill seems to be only gaining in importance with the increase in the inconsistencies in information.

Apart from examining information sources, their characteristics, and their usage frequency, we also evaluated the influence of information that consumers receive on their information processing, attitudes, and behavioral intentions. While we know that consumers want to make healthy food choices and take proper care of their health (e.g., Román et al., 2017), the confusion often interferes and prevents consumers from doing so.

Digital information literacy on food and nutrition is also important for improving food choices among consumers (Silk et al., 2008; Spiteri Cornish & Moraes, 2015). While the amount of information and variety in information sources is increasing, the direction of food choices that consumers make is not necessarily following the trend of better options. During a time in which obesity represents a greater and more widely spread nutrition problem than hunger (Ingram, 2020), it is necessary to understand the influence that information can have on food choices and the mechanisms by which they are created. The effort from the side of consumers themselves is necessary to improve digital literacy, which will help them better

understand the information that they access and its potential influence on their attitudes, intentions, and behavior.

Therefore, consumers must **understand the importance of proper information** in making food choices. The awareness of policy makers regarding the importance of serving proper information on the appropriate media is increasing. As a consequence, it can often be seen that **educational content** is present the form of apps, social media posts, or games (e.g., Azevedo et al., 2019; Moorhead et al., 2013).

Consumers must also engage with this content to get the most out of it. As branded content is often perceived to be more interesting and, consequently, selected as the information to which consumers will pay attention, **branding official institutions** and their advice on hedonic media might trigger positive responses among consumers and increase their interest in accessing and using this information in their decision-making process.

Finally, our last proposed implication is grounded around the idea that consumers and their information are becoming products. A popular saying in today's marketing circles is "If you're not paying for it, you are the product." Consumers are lured in to access information from various sources, as it seems to be free and engaging. In this process, however, they are often unaware of one of the basic principles in economics: *there is no free lunch*. The need to be constantly informed and the fear of missing out go hand-in-hand with confusion and uncertainty, as the content is often overwhelming and inconsistent. In addition, more serious consequences, such as addiction, anxiety, and depression, can emerge from constant exposure to content served on hedonic sources (e.g., Dhir, Yossatorn, Kaur, & Chen, 2018).

Consumers must **take control of their digital lives**, including the information that they leave in the online environment to access content of their interest. By being more informed about these sources, they will be better equipped to understand their intentions and business practices and to evaluate their credibility and trustworthiness. Only with the nourishment of this **healthy curiosity about online information sources**—after all, these sources get to know individuals better than many of their friends through their digital activities—will consumers be able to effectively combat inconsistencies in information and confusion that can emerge from it.

It is nevertheless important to realize that consumers need clear **guidance and education** to be and feel equipped to make sense of the information overload and inconsistency to which they are constantly exposed. Constantly confused consumers are not the best at creating strong attitudes based on facts and thorough information processing, which makes the grounds for nourishing quality convictions weaker but presents an opportunity for ungrounded extreme attitudes to flourish. This thesis was written with the intention of drawing attention to the practical social matters presented above and, hopefully, their greatest contributions and implications.

8.3 Limitations of the thesis and possible future research directions

While this thesis aimed at comprehensively addressing the theoretical concepts and empirical assessment of the issues of consumer confusion, attitude strength, and information processing in the food and nutrition online setting, it is not without limitations. In the first part of the thesis, the theoretical background of the four main concepts was provided. Consumer confusion, attitude strength, the HSM of information processing, and the context of online food and nutrition information were presented. Additionally, these four areas were briefly examined using bibliometric tools, which have their limitations. In the last three chapters of the thesis, empirical research was conducted, and its limitations are also addressed in this chapter.

Bibliometric studies conducted with the purpose of evaluating the four literature fields were conducted on data sets that were created using a **single database** (i.e., Scopus or WoS). Furthermore, the manuscripts chosen were limited in terms of language and, frequently, type (i.e., books and journal articles). While this is a somewhat usual procedure in similar studies, it nonetheless has its consequences, mainly in decreased generalizability of the results to genuinely entire literature. Hence, the inclusion of additional sources and manuscripts in local languages could identify additional, and even different, patterns of research and contribute to the broader applicability and generalization of the results.

The empirical studies conducted in this dissertation bring additional limitations and, consequently, open doors for further research on the topic. Firstly, the data for all three studies was collected using a **US sample**. In order to achieve generalizability, future research might incorporate or compare results from different parts of the world. This is especially relevant since food and nutrition play different roles in different **cultures**, and the information might be perceived differently (Rodríguez-Arauz, Ramírez-Esparza & Smith-Castro, 2016; Gomez & Torelli, 2015). In addition, assessment credibility and inclination to consult different information sources varies across countries (e.g., Aschemann-Witzel, & Grunert, 2015). Hence, expanding the research to different countries and cultures can improve the understanding of differences in online information classifications among international consumers.

In addition to this, our samples do not allow for the generalization of findings to all consumer segments. Namely, while the samples did include respondents from different age categories, the **average age of respondents**—33.14 years in the pre-study, 32.8 years in Study 1, and 33.12 years in Study 2—shows that the samples are relatively young. While young consumers are considered the heaviest users of technological devices and the Internet, older consumers are also increasingly showing their interest in digital solutions and information providers, especially in health-related domains (Wildenbos, Peute, & Jaspers, 2018). Further research is necessary to understand whether different age groups experience confusion with online information sources in different manners.

Several additional limitations of this research should be noted. One of the most important limitations of this research lies how the **manipulations** were presented to respondents in Study 1. Due to the limitations of the study design, participants saw two app screenshots at the same time. Similarly, inconsistent information in Study 2 was presented in the form of a single post. While inconsistent information can be found in single articles as well, real-world exposure to such information in most cases happens over a longer period of time. Therefore, longitudinal or follow-up studies may be able to better capture the genuine and long-term effects that inconsistent information can have on consumers' confusion, attitudes, behavioral intentions, and behaviors. Such studies could assess consumer attitudes at different points in time, which was not the case in the studies conducted in this PhD thesis (e.g., the attitudes were collected prior to manipulation and immediately after participants saw the post; assessments of attitudes over a certain period of time after being subjected to the manipulation were not measured in this research).

Additionally, while being one of the core constructs of this research, consumer confusion was directly observed and modeled only in Study 1. In Study 2, consumer confusion was assessed only indirectly, through a manipulation check and the incorporation of inconsistent information in the manipulations used. **Explicit inclusion of consumer confusion** when testing models is necessary in future research to reveal all of the ways in which this construct influences information processing.

Finally, a **lack of measuring actual consumer behavior** is also a limitation worth mentioning. While previous research has confirmed the negative effects of consumer confusion on dietary behaviors due to inconsistent information (Spiteri Cornish & Moraes, 2015), its influence on real behavior was not measured in the research presented within this thesis. Instead, the results of this research show significant effects of confusion on attitudes that consumers form and their behavioral (i.e., purchase) intention. Further research that includes the measurement of the actual behavior and decision making in such situations would strengthen the findings and conclusions of this research.

Finally, while answering some of the open questions in the consumer confusion discussion, this research also leaves many questions open. Future research might be able to provide more precise answers about the consumer confusion and information processing that occur in various scenarios by implementing more sophisticated research tools (e.g., devices that track the neurological and biological response and activity of participants). In addition, concepts such as confirmation bias are applicable to future studies—understanding the emergence of confirmation bias when accessing information from different types of sources can improve knowledge and facilitate the appropriate policy changes to help combat extreme attitudes with no grounds and the polarization of societies.

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APPENDICES

APPENDIX 1 – Consumer confusion operationalization – selected scales

Consumer confusion measurement scale by Leek and Kun (2006)

<i>Unclarity confusion</i>
Computers are too complex; I cannot evaluate them comprehensively.
Computer technology is changing too fast; I am not sure what is going on.
Computers have a huge range of functions; sometime I forget my initial purchase goal because I am distracted by other functions.
When you choose a computer you choose the hardware then the software.
It is very difficult to evaluate whether the hardware and software are compatible.
Computers are a high technology product; I do not have much confidence in my ability to use it in the correct way.
There is too much professional jargon; I cannot understand it all.
<i>Similarity confusion</i>
It wouldn't make much difference which brand of computer I chose.
There is no significant technological difference among the manufacturers.
Each brand has its own image.
<i>Overchoice confusion</i>
The number of brands, services and models provided by the different computer manufacturers are very confusing.

Consumer confusion proneness measurement scale by Walsh et al. (2007)

<i>Similarity confusion</i>
Due to the great similarity of many products it is often difficult to detect new products
Some brands look so similar that it is uncertain whether they are made by the same manufacturer or not.
Sometimes I want to buy a product seen in an advertisement, but cannot identify it clearly between scores of similar products.
<i>Overload confusion</i>
I do not always know exactly which products meet my needs best.
There are so many brands to choose from that I sometime feel confused.
Due to the host of stores it is sometimes difficult to decide where to shop.
Most brands are very similar and are therefore hard to distinguish.
<i>Ambiguity confusion</i>
Products such as CD players or VCR often have so many features that a comparison of different brands is barely possible.
The information I get from advertising often are so vague that it is hard to know what a product can actually perform.
When buying a product I rarely feel sufficiently informed.
When purchasing certain products, such as a computer or hifi, I feel uncertain as to product features that are particularly important for me.
When purchasing certain products, I need the help of sales personnel to understand differences between products.

Consumer confusion measurement scale by Ermeç Sertoğlu and Kavak (2017)

<i>Confusion stemmed from presence of others/others' thoughts</i>
Because I give importance to others' thoughts, I have difficulty in deciding.
I have difficulty in deciding with the thought that my decisions wouldn't please everyone.
I have difficulty in deciding with the worry of being disfavored/disliked by others.
I have difficulty in deciding as I'm susceptible to other people's ideas.
I have difficulty in deciding for fear of failure.
I have difficulty in deciding because I'm concerned about being different from others.
<i>Confusion stemmed from personal characteristics</i>
Because I'm choosy, I have difficulty in deciding.
I have difficulty in deciding as I scrutinize too carefully.
I have difficulty in deciding as I'm a perfectionist.
I can't make a choice in case of different products and models as I live up to my habits.
<i>Price confusion</i>
I have difficulty in making buying decision when I think that I may be paying different prices for similar products.
Sometimes I have difficulty in deciding if I think that I may not get my money's worth.
It is more difficult to make a decision when buying high priced products.
<i>Product confusion</i>
I feel confused when different names are given to different models of the same brand, like automobiles.
Some brand names-symbols are so similar that I think they're produced by the same manufacturer.
For multi-functional products such as computers, sometimes I forget which I'm really looking for as I'm distracted by the other functions.

Confusion measurement scale by Lehman et al. (2012)

(Self-assessment of respondents' affective state – first three describing confusion)
Anxiety
Confusion
Frustration
Engagement
Surprise
Boredom
Curiosity
Delight
Happiness

Confusion measurement scale by Effron and Miller (2012)

'To which extent did the reading [about the subject] make you feel ... ?
Shocked
Suspicious
Amazed
Confused
Skeptical

Consumer confusion measurement scale by Fitzgerald et al. (2019)

Cognitive aspect of consumer confusion
It is hard to know whether or not [the product] reduces the risk of cancer.
I am uncertain about how [the product] impacts cancer risk.
Affective aspect of consumer confusion
Confused
Unsure
Irritated
Annoyed

Consumer confusion measurement scale by Garaus and Wagner (2016)

Dimension	Item
Irritation (emotion)	Irritated
	Annoyed
	Unnerved
Inefficiency (cognition)	Efficient
	Careful
	Productive
	High performing
Helplessness (conation)	Lost
	Helpless
	Awkward
	Baffled
	Weak
	Overstrained

APPENDIX 2 – Consumer confusion bibliometrics - supplementary information

Consumer confusion – bibliometric sample main information

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1966:2020
Sources (Journals, Books, etc)	228
Documents	375
Average years from publication	9.85
Average citations per documents	23.34
Average citations per year per doc	2.169
References	17607
DOCUMENT TYPES	
Article	338
Review	37
DOCUMENT CONTENTS	
Keywords Plus (ID)	932
Author's Keywords (DE)	1021
AUTHORS	
Authors	841
Author Appearances	909
Authors of single-authored documents	106
Authors of multi-authored documents	735
AUTHORS COLLABORATION	
Single-authored documents	109
Documents per Author	0.446
Authors per Document	2.24
Co-Authors per Documents	2.42
Collaboration Index	2.76

Source: Own work

Consumer confusion – reference co-citation results (tabular representation)

Cluster	Publications
<p>Cluster 1 (red) – Consumer confusion</p>	<p>Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. <i>Journal of personality and social psychology</i></p> <p>Chryssochoidis, G. (2000). Repercussions of consumer confusion for late introduced differentiated products. <i>European Journal of Marketing</i></p> <p>Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. <i>Journal of marketing</i></p> <p>Leek, S., & Chansawatkit, S. (2006). Consumer confusion in the Thai mobile phone market. <i>Journal of Consumer Behaviour: An International Research Review</i></p> <p>Matzler, K., Stieger, D., & Füller, J. (2011). Consumer confusion in internet-based mass customization: Testing a network of antecedents and consequences. <i>Journal of Consumer Policy</i></p> <p>Mitchell, V. W., & Papavassiliou, V. (1999). Marketing causes and implications of consumer confusion. <i>Journal of Product & Brand Management</i>.</p> <p>Turnbull, P. W., Leek, S., & Ying, G. (2000). Customer confusion: The mobile phone market. <i>Journal of Marketing Management</i></p> <p>Walsh, G., Hennig-Thurau, T., & Mitchell, V. W. (2007). Consumer confusion proneness: scale development, validation, and application. <i>Journal of Marketing Management</i></p> <p>Walsh, G., & Mitchell, V. W. (2010). The effect of consumer confusion proneness on word of mouth, trust, and customer satisfaction. <i>European Journal of marketing</i></p>
<p>Cluster 2 (green) – consumer decision making</p>	<p>Bettman, J. R., Luce, M. F., & Payne, J. W. (1998). Constructive consumer choice processes. <i>Journal of consumer research</i></p> <p>Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing?. <i>Journal of personality and social psychology</i></p> <p>Shim, S., & Gehrt, K. C. (1996). Hispanic and Native American adolescents: An exploratory study of their approach to shopping. <i>Journal of retailing</i></p> <p>Fan, J. X., & Xiao, J. J. (1998). Consumer decision-making styles of young-adult Chinese. <i>Journal of Consumer Affairs</i></p> <p>Lysonski, S., Durvasula, S., & Zotos, Y. (1996). Consumer decision-making styles: a multi-country investigation. <i>European Journal of Marketing</i></p> <p>Foxman, E. R., Berger, P. W., & Cote, J. A. (1992). Consumer brand confusion: A conceptual framework. <i>Psychology & Marketing</i>, 9(2), 123-141.</p> <p>Foxman, E. R., Muehling, D. D., & Berger, P. W. (1990). An investigation of factors contributing to consumer brand confusion. <i>Journal of Consumer Affairs</i></p>
<p>Cluster 3 (blue) – brand confusion</p>	<p>Balabanis, G., & Craven, S. (1997). Consumer confusion from own brand lookalikes: an exploratory investigation. <i>Journal of marketing management</i></p> <p>Drummond, G., & Rule, G. (2005). Consumer confusion in the UK wine industry. <i>Journal of Wine Research</i></p> <p>Huffman, C., & Kahn, B. E. (1998). Variety for sale: mass customization or mass confusion?. <i>Journal of retailing</i></p> <p>Jacoby, J., Speller, D. E., & Berning, C. K. (1974). Brand choice behavior as a function of information load: Replication and extension. <i>Journal of consumer research</i></p> <p>Loken, B., Ross, I., & Hinkle, R. L. (1986). Consumer “confusion” of origin and brand similarity perceptions. <i>Journal of Public Policy & Marketing</i></p> <p>Poiesz, T. B., & Verhallen, T. M. (1989). Brand confusion in advertising. <i>International Journal of Advertising</i></p>

Source: Own work

APPENDIX 3– Attitude strength bibliometrics - supplementary information

Attitude strength – bibliometric sample main information

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1964:2020
Sources (Journals, Books, etc)	91
Documents	258
Average years from publication	13
Average citations per documents	58.94
Average citations per year per doc	4.15
References	8232
DOCUMENT TYPES	
Article	233
article; book chapter	1
article; early access	3
article; proceedings paper	7
Review	11
review; book chapter	3
DOCUMENT CONTENTS	
Keywords Plus (ID)	705
Author's Keywords (DE)	469
AUTHORS	
Authors	476
Author Appearances	720
Authors of single-authored documents	37
Authors of multi-authored documents	439
AUTHORS COLLABORATION	
Single-authored documents	41
Documents per Author	0.542
Authors per Document	1.84
Co-Authors per Documents	2.79
Collaboration Index	2.02

Source: Own work

Attitude strength literature – source co-citation (tabular presentation)

Cluster 1 – Psychology literature	Cluster 2 – Marketing and Consumer science literature
<p>Advances in Experimental Social Psychology Attitude Strength: Antecedents and Consequences Attitude Structure and Function British Journal of Social Psychology Dual-Process Theories in Social Psychology Educational and Psychological Measurement European Journal of Social Psychology European Review of Social Psychology Journal of Abnormal and Social Psychology Journal of Experimental Social Psychology Journal of Personality and Social Psychology Personality and Social Psychology Bulletin Personality and Social Psychology Review Journal of Personality Journal of Applied Psychology Journal of Applied Social Psychology American Journal of Political Science Political Psychology American Political Science Review American Psychologist Organizational Behavior and Human Decision Processes Social Cognition Social Psychological and Personality Science Social Psychology Quarterly Psychological Bulletin Psychological Science Psychological Review Psychology of Attitudes Public Opinion Quarterly Journal of Social Issues Human Relations Handbook of Motivation and Cognition Handbook of Social Psychology Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research</p>	<p>Journal of Consumer Research Journal of Consumer Psychology Journal of Marketing Research Journal of Marketing Psychology & Marketing Annual Review of Psychology Communication and Persuasion</p>

Source: Own work

APPENDIX 4 – Heuristic-systematic model of information processing bibliometrics - supplementary information

Heuristic-systematic model of information processing – bibliometric sample main information

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1980:2020
Sources (Journals, Books, etc)	204
Documents	338
Average years from publication	10.7
Average citations per documents	46.46
Average citations per year per doc	2.777
References	17148
DOCUMENT TYPES	
article	299
book	1
book chapter	15
review	23
DOCUMENT CONTENTS	
Keywords Plus (ID)	880
Author's Keywords (DE)	829
AUTHORS	
Authors	751
Author Appearances	888
Authors of single-authored documents	58
Authors of multi-authored documents	693
AUTHORS COLLABORATION	
Single-authored documents	60
Documents per Author	0.45
Authors per Document	2.22
Co-Authors per Documents	2.63
Collaboration Index	2.49

Source: Own work

Heuristic-systematic model of information processing – source co-citation (tabular presentation)

Cluster 1 – consumer research	Cluster 2 – psychology research	Cluster 3 – communication research	Cluster 4 – political science and social psychology research
Advances in Consumer Research Computers in Human Behavior Decision Support Systems Information & Management Information Systems Research International Journal of Electronic Commerce Internet Research Journal of Advertising Journal of Advertising Research Journal of Applied Psychology Journal of Computer-Mediated Communication Journal of Business Ethics Journal of Business Research Journal of Consumer Psychology Journal of Consumer Research Journal of Management Information Systems Journal of Marketing Journal of Marketing Research Journal of the Academy of Marketing Science Journal of the American Society for Information Science and Technology MIS Quarterly	Science Social Cognition Psychological Bulletin Psychological Science Psychological Review Psychological Inquiry British Journal of Social Psychology European Journal of Social Psychology European Review of Social Psychology Advances in Experimental Social Psychology American Psychologist Annual review of Psychology Behavior Research and Therapy Journal of Abnormal and Social Psychology Journal of Experimental Social Psychology Journal of Personality and Social Psychology Personality and Social Psychology Bulletin Organizational Behavior and Human Decision Processes	Communication and Persuasion Media Psychology Psychology & Marketing Public Opinion Quarterly Risk Analysis Journal of Health Communication Health Communication Communication Research Communication Monographs Human Communication Research Journal of Communication Journal of Applied Social Psychology Social Influence The Psychology of Attitudes	American Journal of Political Science American Political Science Review Dual-Process Theories in Social Psychology Unintended Thought

Source: Own work

APPENDIX 5 – Food and nutrition information online bibliometrics - supplementary information

Food and nutrition information online – bibliometric sample main information

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1993:2021
Sources (Journals, Books, etc)	195
Documents	424
Average years from publication	6.08
Average citations per documents	26.07
Average citations per year per doc	4.208
References	20354
DOCUMENT TYPES	
article	389
review	35
DOCUMENT CONTENTS	
Keywords Plus (ID)	1913
Author's Keywords (DE)	1263
AUTHORS	
Authors	1537
Author Appearances	1713
Authors of single-authored documents	40
Authors of multi-authored documents	1497
AUTHORS COLLABORATION	
Single-authored documents	40
Documents per Author	0.272
Authors per Document	3.68
Co-Authors per Documents	4.1
Collaboration Index	3.96

Source: Own work

Food and nutrition information online literature: Source co-citation analysis (sources list)

Cluster 1 (red) – consumer research	Cluster 2 (green) – health research	Cluster 3 (blue) – food policy and communication
British Food Journal Computers in Human Behavior Decision Support Systems European Journal of Marketing International Journal of Consumer Studies International Journal of Hospitality Management International Journal of Information Management Internet Research Journal of Advertising Journal of Business Research Journal of Consumer Behavior Journal of Consumer Research Journal of Interactive Marketing Journal of Marketing Journal of Marketing Research Journal of Personality and Social Psychology Journal of Retailing Journal of Retailing and Consumer Services Journal of the Academy of Marketing Science Management Science MIS Quarterly	American Journal of Clinical Nutrition American Journal of Preventive Medicine American Journal of Public Health Annals of Behavioral Medicine BMC Public Health BMJ British Journal of Nutrition European Journal of Clinical Nutrition The New England Journal of Medicine JAMA Journal of Medical Internet Research Journal of Nutrition Education and Behavior Journal of the American Dietetic Association Health Education Research PLOS One Preventive Medicine Lancet Obesity Reviews Obesity Pediatrics Public Health Nutrition Science	Appetite Food Control Food Policy International Journal of Environmental Research and Public Health Risk Analysis Food Quality and Preference

Source: Own work

APPENDIX 6 - Study 1 – survey

The following study is conducted by the Faculty of Economics, University of Ljubljana, Slovenia. This is a purely academic study and serves no commercial purpose. We are examining food-related attitudes and perception of consumers. Your participation is very valuable to us. Please read the questions carefully and follow the instructions. There are no right or wrong answers. We are only interested in your personal views. Completing the questionnaire will take approximately 14 minutes of your time. Please take your time to read the instructions and fill in the questionnaire. All information you provide will be used anonymously, and you will not be identified at any point. Thank you very much for your participation in this study!

Q1 - Please take a look the muesli bar below. This is the product description from an online store selling this granola bar:

"Crunchy oven baked muesli with delicious vine fruits and a blend of roasted nuts, seeds and coconut."



How would you evaluate the muesli bar Carman's?

Unappealing								Appealing
Bad								Good
Unpleasant								Pleasant
Unfavorable								Favorable
Unlikeable								Likeable

In your opinion, how healthy is muesli bar Carman's?

Very unhealthy								Very healthy
----------------	--	--	--	--	--	--	--	--------------

In your opinion, how appropriate is Carman's muesli bar for a healthy menu?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

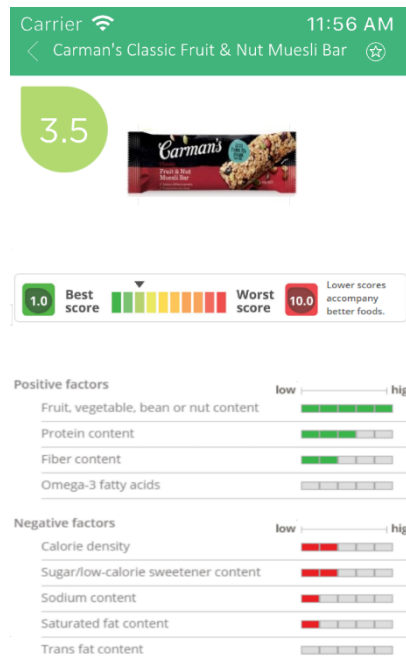
In your opinion, how appropriate is Carman's muesli bar in a healthy diet?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

More and more people are using apps to evaluate their food options. Imagine that while you are in a retail store, you used **two apps to scan the product, Carman's muesli bar**. Both apps are from non-profit, non-partisan organizations that provide food scores for more than 80,000 products.

Below are the screenshots of the result of your search with the apps. **Please consider both screenshots before you answer the rest of the questionnaire.**

Group 1 (control group)



OR

3.5

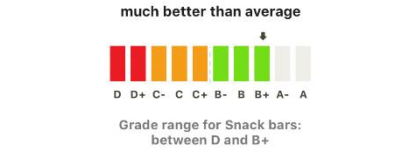



PRODUCT EXPLANATIONS NUTRITION ALTERNATIVES

Carman's Classic Fruit & Nut Muesli Bar



B+



- ✓ Nice! 100% whole grain
- ⓘ For dieters: FoodPoints value is 4
- ⚠ Multiple sugar ingredients listed
- ✓ A top product in its category
- ⓘ Learn why bars don't get high grades
- ⓘ Natural flavors added. Learn why
- ⓘ Learn about corn syrup, found here
- ⓘ RECIPE: Vegan granola bar
- ⓘ Learn about soy lecithin, found here

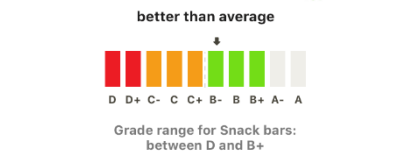
Group 2 (treatment group)

PRODUCT EXPLANATIONS NUTRITION ALTERNATIVES

Carman's Classic Fruit & Nut Muesli Bar



B-



- ⓘ Mostly whole grains here
- ⚠ Tiny amount of real fruit in here
- ⓘ For dieters: FoodPoints value is 2
- ⚠ Serving size unusually small
- ⚠ Multiple sugar ingredients listed
- ⚠ Learn about industrial caramel coloring
- ⓘ Learn why bars don't get high grades
- ⓘ RECIPE: Vegan granola bar
- ⓘ Learn about corn syrup, found here
- ⓘ What's the deal with glycerin?
- ⓘ Learn about soy lecithin, found here

9.0




OR

Carrier 11:56 AM
 < Carman's Classic Fruit & Nut Muesli Bar



Carrier 11:56 AM
 < Carman's Classic Fruit & Nut Muesli...

PRODUCT EXPLANATIONS NUTRITION ALTERNATIVES



better than average



Grade range for Snack bars:
 between D and B+

- Mostly whole grains here >
- Tiny amount of real fruit in here >
- For dieters: FoodPoints value is 2 >
- Serving size unusually small >
- Multiple sugar ingredients listed >
- Learn about industrial caramel coloring >
- Learn why bars don't get high grades >
- RECIPE: Vegan granola bar >
- Learn about corn syrup, found here >
- What's the deal with glycerin? >
- Learn about soy lecithin, found here >

Please indicate to which extent do you experience the following emotions **when evaluating information** on the 2 apps screenshots:

	Not at all						Extremely
Confused							
Frustrated							
Overwhelmed							
Anxious							

To which extent do you agree or disagree with the following statements, if this muesli bar was available at the store?

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
It is very likely that I would buy Carman's in the future.							
I would purchase Carman's the							

next time I need such a product.							
I would definitely try Carman's in the future.							

Please indicate to which extent you agree with following statements about the **brand Carman's**.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
I trust Carman's.							
I can rely on Carman's.							
Please select "Somewhat disagree".							
Carman's is an honest brand.							
Carman's is safe.							

Please indicate to which extent you agree with following statements about the **brand Carman's**.

Getting products from Carman's...

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
... is risky.							
... can have uncertain outcomes.							
... can lead to bad results.							
... makes me anxious.							
... would cause me to worry.							

IF ATTENTION CHECK IS PASSED

How would you evaluate the muesli bar Carman's?

Unappealing								Appealing
Bad								Good
Unpleasant								Pleasant
Unfavorable								Favorable
Unlikeable								Likeable

In your opinion, how healthy is muesli bar Carman's?

Very unhealthy								Very healthy
----------------	--	--	--	--	--	--	--	--------------

In your opinion, how appropriate is Carman's muesli bar for a healthy menu?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

In your opinion, how appropriate is Carman's muesli bar in a healthy diet?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

Please indicate the level of certainty you feel when it comes to the following issues:

	Not at all						Extremely
How certain are you of your attitude about this product's healthiness?							
How convinced are you of your attitude about this product's healthiness?							
How much confidence do you have in your attitude toward this product's healthiness?							

Please indicate the degree to which you agree or disagree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
After reading the information provided in the two app							

screenshots, I felt puzzled.							
The information provided in the two app screenshots gave contradictory information about muesli bar's healthiness.							

Please indicate the degree to which you personally agree with the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
The nutritional score web pages of the product were clear and easy to understand.							
The nutritional score web pages of the product were helpful for decision-making.							

Please rate the extent to which you think the **information you read in the apps** were:

	Not at all						Extremely
Accurate							
Believable							
Credible							
Convincing							
Good reference for purchasing products.							

Please answer the set of the questions on this page concentrating on the brand Carman's.

The muesli bar of Carman's is of high quality.

Strongly disagree								Strongly agree
-------------------	--	--	--	--	--	--	--	----------------

How do you evaluate the muesli bar Carman's with regards to its packaging?

Very negative								Very positive
---------------	--	--	--	--	--	--	--	---------------

Have you previously heard of Carman's brand?

Yes
No

Have you previously tasted Carman's muesli bar?

Yes
No

Do you like muesli bars?

Not at all								Very much
------------	--	--	--	--	--	--	--	-----------

How often do you eat muesli bars?

Never
A few times a year
Monthly
Weekly
Daily

How high is the probability that you will buy muesli bar in the next seven days?

Very unlikely								Very likely
---------------	--	--	--	--	--	--	--	-------------

If you were standing in front of the shelf in a supermarket, how likely is it, that you would choose a muesli bar Carman's?

Very unlikely								Very likely
---------------	--	--	--	--	--	--	--	-------------

How often do you buy healthy food products?

Never
A few times a year
Monthly
Weekly
Daily

Have you seen any of the two apps or their websites before?

Yes
No
I do not remember

How often do you use nutrition score websites or apps?

Never
A few times a year
Monthly
Weekly
Daily

Please specify to which extent you agree or disagree that **food apps in general** possess these characteristics:

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
Trustworthiness							
Expertise							
Honesty							

Finally, we have some questions about you personally.

How old are you?

Please indicate your gender.

Male
Female
Other
Do not want to say

What was your total household income before taxes for the most recent calendar year (January through December)? By your household, we mean all persons living in your primary home who share basic finances with you.

(Please include income received by all members of your household and from all sources, including salaries, pensions, interest, dividends, bonuses, capital gains, and profits.)

Less than \$5,000
\$5,000 - \$9,999
\$10,000 - \$14,999
\$15,000 - \$19,999
\$20,000 - \$24,999
\$25,000 - \$29,999
\$30,000 - \$34,999
\$35,000 - \$39,999
\$40,000 - \$44,999
\$45,000 - \$49,999
\$50,000 - \$59,999
\$60,000 - \$74,999
\$75,000 - \$99,999
\$100,000 - \$149,999
\$150,000 - \$199,999
\$200,000 - \$249,999
\$250,000 or more

Please indicate your approximate height:

Please indicate your approximate weight (in lbs):

Do you have any food related allergies? If yes, please indicate to which food you are allergic.

You have answered all the questions in the survey. Thank you for your cooperation. Please, click the "End" button to close this tab.

APPENDIX 7 - Pre-study – survey

The following study is conducted by the Faculty of Economics, University of Ljubljana, Slovenia. This is a purely academic study and serves no commercial purpose. We are examining **consumer perception of online food-related information**. Your participation is very valuable to us. Please read the questions carefully and follow the instructions. There are no right or wrong answers. We are only interested in your personal views.

Completing the questionnaire will take approximately **15 minutes** of your time. All information you provide will be used anonymously, and you will not be identified at any point. Thank you very much for your participation in this study!

By clicking "I agree", I hereby give my explicit consent for the processing of the personal data (age, gender, income, education), as collected in this survey questionnaire. The personal data will be processed solely for the purpose of carrying out the scientific research project. All personal data obtained with the survey will be stored under a research code (anonymization), thus fully protecting the identity of the participants, while only summary results (anonymized and presented in different statistical forms) will be publicly available.

The personal data will be processed until the consent is withdrawn or until the end of the scientific research project, after which they will be stored in anonymous form for research purposes in ADP - Social Science Data Archives (<https://www.adp.fdv.uni-lj.si/eng/>).

The given consent may be withdrawn at any time by a written notice to Faculty of Economics, Ljubljana University (FELU), Kardeljeva ploščad 17, 1000 Ljubljana, Slovenia.

For any further information regarding the processing of the data or consent in question, you may contact the authorized person for the protection of personal data at FELU Jure Jeklič (jure.jeklic@ef.uni-lj.si).

FELU ensures that personal data collected on the basis of this consent will be used only for the above mentioned purposes and can not be transferred to third parties without your written consent. The legal basis for the processing of personal data in the public sector is regulated by Article 9 of the Personal Data Protection Act (Official Gazette of the Republic of Slovenia, No. 86/2004), which states that processing of personal data in the public sector without legal basis, can only be done with the personal consent of the individual. This consent and the processing of personal data itself is also justified by the provisions of the General Data Protection Regulation in EU (GDPR).

By clicking "I agree" and participating in the survey, and by consequently consenting, you

declare that you have read and understood the terms of this statement and fully agree with them.

I agree
I disagree

The aim of this study is to evaluate consumer attitudes towards different online sources of information on food and nutrition. In this first step, we would like you to carefully think about which **social network platform** you access the most **food and nutrition information** on (i.e. read and engage with posts). Please provide the **name** of that **social network platform** below. All other questions in this survey should be answered with this specific platform, and the food and nutrition information that it provides in mind.

OR

The aim of this study is to evaluate consumer attitudes towards different online sources of information on food and nutrition. In this first step, we would like you to carefully think about which **professional websites (e.g. government websites, medical associations websites, scientific online sources)** you access the most **food and nutrition information** on. Please provide the **name** of that **website** below. All other questions in this survey should be answered with this specific website, and the food and nutrition information that it provides in mind.

OR

The aim of this study is to evaluate consumer attitudes towards different online sources of information on food and nutrition. In this first step, we would like you to carefully think about which **blogs** you access the most **food and nutrition information** on (i.e. read and engage with posts). Please provide the **name** of that **blog** below. All other questions in this survey should be answered with this specific blog, and the food and nutrition information that it provides in mind.

OR

The aim of this study is to evaluate consumer attitudes towards different online sources of information on food and nutrition. In this first step, we would like you to carefully think about which **mobile apps** you access the most **food and nutrition information** on. Please provide the **name** of that **app** below. All other questions in this survey should be answered with this specific app, and the food and nutrition information that it provides in mind.

OR

The aim of this study is to evaluate consumer attitudes towards different online sources of information on food and nutrition. In this first step, we would like you to carefully think about which **online question and answer communities (i.e. forums, discussion boards)** you access the most **food and nutrition information** on. Please provide the **name** of that **community (forum)** below. All other questions in this survey should be answered with this specific community (forum), and the food and nutrition information that it provides in mind.

OR

The aim of this study is to evaluate consumer attitudes towards different online sources of information on food and nutrition. In this first step, we would like you to carefully think about which **commercial websites (e.g. news, other websites with .com domain)** you access the most **food and nutrition information** on. Please provide the **name** of that **website** below. All other questions in this survey should be answered with this specific website, and the food and nutrition information that it provides in mind.

How often do you use [source]?

Never
Rarely (less than once a month)
Once a month
Several times a month
Once a week
Several times a week
Daily
Multiple times per day

How often do you read food and nutrition information (posts) on [source]?

Never
Rarely (less than once a month)
Once a month
Several times a month
Once a week
Several times a week
Daily
Multiple times per day

I believe that, **as a source of information on food and nutrition**, [source] is (overall):

Useless								Useful
Foolish								Wise
Unsafe								Safe

Harmful								Beneficial
Imperfect								Perfect
Unhealthy								Wholesome
Worthless								Valuable

I feel that, **as a source of information on food and nutrition**, [source] is (overall):

Boring								Exciting
Angering								Relaxing
Inappropriate								Likeable
Saddening								Delightful
Disgusting								Acceptable
Sorrowing								Enjoyable

How would you evaluate [source] **as a source of information on food and nutrition**?

	Not at all							Extremely
Friendly								
Kind								
Likeable								
Nice								
Capable								
Competent								
Efficient								
Skillful								

Please mark to which extent do you find [source] **as a source of information on food and nutrition** to be:

Ineffective								Effective
Unhelpful								Helpful
Unnecessary								Necessary
Not functional								Functional
Impractical								Practical
Not fun								Fun
Dull								Exciting
Not thriving								Thrilling
Not delightful								Delightful
Unenjoyable								Enjoyable
Not at all informative								Very informative
Invaluable								Valuable

How would you evaluate [source] **as a source of information on food and nutrition**?

	Not at all							Extremely
Attention getting								
Boring								
Creative								
Emotional								
Energetic								

Genuine/sincere							
Honest							
Humorous							
Informative							
Irritating							
Memorable							
Pleasant							
Strong							
Unique							
Warmhearted							
Relatable							
Understandable							
Relevant							
Consider using							
Post believable							

How would you evaluate [source] as a source of information on food and nutrition?

	Not at all						Extremely
Credible							
Reliable							
Trustworthy							
Experienced							
Of great expertise							
Factual							
Accurate							
Timely							
Objective							
Easy to use							
Clear							
Meaningful							
Significant for your decision-making process							
Important							
Flexible							
Easily accessible							
Easily available							
Convenient to use							

Please rate the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
[source] provides valuable tips about food and nutrition.							
[source] is helpful for me to evaluate the food and							

nutrition information.							
[source] is helpful to familiarize myself with food and nutrition.							
[source] is helpful for me to understand the information about food and nutrition.							

Please indicate your level of agreement with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
[source] provides food and nutrition information that is unbiased.							
[source] provides food and nutrition information that is balanced.							
[source] provides in-depth food and nutrition information.							
[source] is comprehensive.							
[source] has my interests at heart.							
[source] is concerned about its visitors.							
[source] is trustworthy.							
[source] is ethical.							

When using [source] , to which extent do you **search for specific food and nutrition content**?

Not at all								All the time
------------	--	--	--	--	--	--	--	--------------

Please rate how **distracted** you felt the last time (reading food and nutrition information) on [source]?

Not at all distracted								Completely distracted
-----------------------	--	--	--	--	--	--	--	-----------------------

Please rate how **amused** you felt the last time (reading food and nutrition information) on [source]?

Not at all amused								Completely amused
-------------------	--	--	--	--	--	--	--	-------------------

How motivated are you to read food and nutrition information online?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

How interesting do you find reading food and nutrition information online?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

How well informed are you about food and nutrition information?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

How knowledgeable are you about food and nutrition information?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

Please state your level of agreement with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
I am concerned about food and nutrition.							
Information about food and nutrition is very relevant to me.							
Understanding the information about food and nutrition is important to me.							

Please state how often do you use the following online platforms for obtaining food and nutrition information:

	Never	Rarely (less than once a week)	Once a week	Daily	Multiple times a day
Social networks (e.g. Facebook, Twitter)					
Government websites (e.g. Health.gov, Nutrition.gov)					
Commercial websites (e.g. Healthline)					

Mobile apps (e.g. MyFitnessPal, MyNetDiary)					
Online communities and forums (e.g. Reddit, Quora)					
Other					

Finally, we have several questions about you personally.

Please state to which extent do the following claims describe you:

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
I like to gossip at times.							
There have been occasions when I took advantage of someone.							
I'm always willing to admit it when I make a mistake.							
I sometimes try to get even rather than forgive and forget.							
At times I have really insisted on having things my own way.							
I have never been irked when people expressed ideas very different from my own.							
I have never deliberately said something that hurt someone's feelings.							

Please state to which extent do the following claims describe you:

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
To make sure I buy the right product or brand, I often observe							

what others are buying and using.							
If I have little experience with a product, I often ask my friends about the product.							
I often consult other people to help choose the best alternative available from a product class.							
I frequently gather information from friends or family about a product before I buy.							

How old are you?

Please indicate your gender.

Male
Female
Other
Do not want to say

Please indicate your approximate height:

Please indicate your approximate weight (in lbs):

Do you have any food related allergies? If yes, please indicate to which food you are allergic.

What was your total household income before taxes for the most recent calendar year (January through December)? By your household, we mean all persons living in your primary home who share basic finances with you.

(Please include income received by all members of your household and from all sources, including salaries, pensions, interest, dividends, bonuses, capital gains, and profits.)

Less than \$5,000
\$5,000 - \$9,999
\$10,000 - \$14,999
\$15,000 - \$19,999
\$20,000 - \$24,999
\$25,000 - \$29,999
\$30,000 - \$34,999
\$35,000 - \$39,999
\$40,000 - \$44,999
\$45,000 - \$49,999
\$50,000 - \$59,999
\$60,000 - \$74,999
\$75,000 - \$99,999
\$100,000 - \$149,999
\$150,000 - \$199,999
\$200,000 - \$249,999
\$250,000 or more

Please indicate the highest level of education you obtained.

Up to high school diploma
Some college courses
Bachelor's degree
Master's degree
Doctoral degree
Other

You have answered all the questions in the survey. Thank you for your cooperation. Please, click the "End" button to close this tab.

APPENDIX 8 - Study 2 – survey

The following study is conducted by the School of Economics and Business, University of Ljubljana, Slovenia. This is a purely academic study and serves no commercial purpose. We are examining consumer perceptions of online food-related information. Your participation is very valuable to us. Please read the questions carefully and follow the instructions. There are no right or wrong answers. We are only interested in your personal views. Completing the questionnaire will take about 12 minutes of your time. All information you provide will be used anonymously, and you will not be identified at any time.

Thank you very much for your participation in this study!

By clicking "I agree", I hereby give my explicit consent for the processing of the personal data (age, gender, income, education), as collected in this survey questionnaire. The personal data will be processed solely for the purpose of carrying out the scientific research project. All personal data obtained with the survey will be stored under a research code (anonymization), thus fully protecting the identity of the participants, while only summary results (anonymized and presented in different statistical forms) will be publicly available.

The personal data will be processed until the consent is withdrawn or until the end of the scientific research project, after which they will be stored in anonymous form for research purposes in ADP - Social Science Data Archives (<https://www.adp.fdv.uni-lj.si/eng/>).

The given consent may be withdrawn at any time by a written notice to Faculty of Economics, Ljubljana University (FELU), Kardeljeva ploščad 17, 1000 Ljubljana, Slovenia.

For any further information regarding the processing of the data or consent in question, you may contact the authorized person for the protection of personal data at FELU Jure Jeklič (jure.jeklic@ef.uni-lj.si).

FELU ensures that personal data collected on the basis of this consent will be used only for the above mentioned purposes and can not be transferred to third parties without your written consent. The legal basis for the processing of personal data in the public sector is regulated by Article 9 of the Personal Data Protection Act (Official Gazette of the Republic of Slovenia, No. 86/2004), which states that processing of personal data in the public sector without legal basis, can only be done with the personal consent of the individual. This consent and the processing of personal data itself is also justified by the provisions of the General Data Protection Regulation in EU (GDPR).

By clicking "I agree" and participating in the survey, and by consequently consenting, you declare that you have read and understood the terms of this statement and fully agree with them.

I agree
I disagree

In the following set of questions, please state your assessments and attitudes about coconut oil.

How do you evaluate coconut oil?

Unappealing								Appealing
Bad								Good
Unpleasant								Pleasant
Unfavorable								Favorable
Unlikeable								Likeable

In your opinion, how healthy is coconut oil?

Very unhealthy								Very healthy
----------------	--	--	--	--	--	--	--	--------------

In your opinion, how appropriate is coconut for a healthy menu?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

In your opinion, how appropriate is coconut in a healthy diet?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

Please imagine the following scenario: During your online research about coconut oil, you come across this post (see below). Please read the post and then proceed with the questionnaire.



Coconut oil and your health

By American Heart Association News



Studies show that coconut oil is very different from most other cooking oils and it contains a unique composition of fatty acids. The fatty acids are about 90% saturated. According to series of scientific clinical studies, the fatty acids in coconut oil can encourage your body to burn fat, and they provide quick energy to your body and brain. They also raise HDL (good) cholesterol in your blood, which may help reduce heart disease risk.

As a cooking fat, coconut oil gained its popularity as it is generally considered to be the good kind because it raised HDL, or good cholesterol levels, despite its high saturated fat content. According to the American Heart Association advisory however, this oil actually raises bad cholesterol levels (LDL) enough for it to be potentially dangerous to our health. The American Heart Association advises against eating it, saying it can put people at risk for cardiovascular disease.

OR



Coconut oil and your health

By American Heart Association News



As a cooking fat, coconut oil gained its popularity as it is generally considered to be the good kind because it raised HDL, or good cholesterol levels, despite its high saturated fat content. According to the American Heart Association advisory however, this oil actually raises bad cholesterol levels (LDL) enough for it to be potentially dangerous to our health. The American Heart Association advises against eating it, saying it can put people at risk for cardiovascular disease.

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OR



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Namely, studies indicate that regularly eating coconut oil deteriorates the levels of lipids circulating in the blood, potentially increasing the risk of heart disease. It has been shown that eating 50 grams of coconut oil daily for a month (compared to butter or extra-virgin olive oil) increased the bad LDL cholesterol significantly.

OR



Coconut oil and your health

By American Heart Association News



Coconut oil is very different from most other cooking oils and contains a unique composition of fatty acids. The fatty acids are about 90% saturated. According to American Heart Association advisory, the fatty acids in coconut oil can encourage your body to burn fat, and they provide quick energy to your body and brain. They also raise HDL (good) cholesterol in your blood, which may help reduce heart disease risk.

Namely, studies indicate that regularly eating coconut oil improves the levels of lipids circulating in the blood, potentially reducing the risk of heart disease. It has been shown that eating 50 grams of coconut oil daily for a month (compared to butter or extra-virgin olive oil) increased the good HDL cholesterol significantly.

OR

 Parker Williams ...

Coconut oil and your health

Studies show that coconut oil is very different from most other cooking oils and it contains a unique composition of fatty acids. The fatty acids are about 90% saturated. According to series of scientific clinical studies, the fatty acids in coconut oil can encourage your body to burn fat, and they provide quick energy to your body and brain. They also raise HDL (good) cholesterol in your blood, which may help reduce heart disease risk.

As a cooking fat, coconut oil gained its popularity as it is generally considered to be the good kind because it raised HDL, or good cholesterol levels, despite its high saturated fat content. According to the American Heart Association advisory however, this oil actually raises bad cholesterol levels (LDL) enough for it to be potentially dangerous to our health. The American Heart Association advises against eating it, saying it can put people at risk for cardiovascular disease.



 Like  Comment

OR

 Parker Williams ...

Coconut oil and your health

As a cooking fat, coconut oil gained its popularity as it is generally considered to be the good kind because it raised HDL, or good cholesterol levels, despite its high saturated fat content. According to the American Heart Association advisory however, this oil actually raises bad cholesterol levels (LDL) enough for it to be potentially dangerous to our health. The American Heart Association advises against eating it, saying it can put people at risk for cardiovascular disease.

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 Like  Comment

OR

 **Parker Williams**
1 m ·  

Coconut oil and your health

As a cooking fat, coconut oil gained its popularity as it is generally considered to be the good kind because it raised HDL, or good cholesterol levels, despite its high saturated fat content. According to the American Heart Association advisory however, this oil actually raises bad cholesterol levels (LDL) enough for it to be potentially dangerous to our health. The American Heart Association advises against eating it, saying it can put people at risk for cardiovascular disease.

Namely, studies indicate that regularly eating coconut oil deteriorates the levels of lipids circulating in the blood, potentially increasing the risk of heart disease. It has been shown that eating 50 grams of coconut oil daily for a month (compared to butter or extra-virgin olive oil) increased the bad LDL cholesterol significantly.



 Like  Comment

OR

 **Parker Williams**


Coconut oil and your health

Coconut oil is very different from most other cooking oils and contains a unique composition of fatty acids. The fatty acids are about 90% saturated. According to American Heart Association advisory, the fatty acids in coconut oil can encourage your body to burn fat, and they provide quick energy to your body and brain. They also raise HDL (good) cholesterol in your blood, which may help reduce heart disease risk.

Namely, studies indicate that regularly eating coconut oil improves the levels of lipids circulating in the blood, potentially reducing the risk of heart disease. It has been shown that eating 50 grams of coconut oil daily for a month (compared to butter or extra-virgin olive oil) increased the good HDL cholesterol significantly.



 Like  Comment

Please indicate the extent to which you agree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
When reading information provided in the post, I have focused on key points.							
My past experience in similar situations helped me evaluate the information from the post.							
I was given more than enough information to evaluate the product.							
I have made a strong effort to evaluate the information presented in the post.							
I carefully thought about the information I have read.							
I believe I would need information from more sources in order to assess the product.							
I tried to judge given information about coconut oil from an objective point of view.							
I accepted given information without hesitation.							

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
From the information presented, it is hard to know whether or not coconut oil is healthy.							
From the information presented, I am uncertain of coconut oil's effect on health.							

Please rate how well given emotions describe your feelings when evaluating the information from the post you read in this study.

	Does not describe my feelings				Clearly describes my feelings
Confused					
Annoyed					
Unsure					
Irritated					

Please indicate the extent to which you agree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
It is very likely that I would buy coconut oil in the future.							
I would purchase coconut oil the next time I need such a product.							
I would definitely try coconut oil in the future.							

How do you evaluate coconut oil?

Unappealing								Appealing
Bad								Good
Unpleasant								Pleasant
Unfavorable								Favorable
Unlikeable								Likeable

In your opinion, how healthy is coconut oil?

Very unhealthy								Very healthy
----------------	--	--	--	--	--	--	--	--------------

In your opinion, how appropriate is coconut for a healthy menu?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

In your opinion, how appropriate is coconut in a healthy diet?

Very inappropriate								Very appropriate
--------------------	--	--	--	--	--	--	--	------------------

Please rate how interesting you find the topic of food and nutrition?

Not at all								Very much
------------	--	--	--	--	--	--	--	-----------

How strong is your attitude towards coconut oil healthiness?

Very weak								Very strong
-----------	--	--	--	--	--	--	--	-------------

How certain are you of your attitude towards coconut oil healthiness?

Not at all								Very certain
------------	--	--	--	--	--	--	--	--------------

Please indicate the extent to which you agree with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
After reading information in the post, I felt confused.							
The information provided in the post gave contradictory information about							

coconut oil's healthiness.							
----------------------------	--	--	--	--	--	--	--

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
The information provided in the post is up to date.							
The information provided in the post is accurate.							
The information provided in the post is comprehensive.							
The information provided in the post is factual.							

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
The person(s) who generated the information in the post I read is trustworthy.							
The person(s) who generated the information in the post I read is knowledgeable.							
The person(s) who generated the information in the post I read is credible.							

Please mark the source of the information you read on the post.

Facebook
American Heart Association

Healthline
Other

How often do you use this source?

Rarely
Monthly
Weekly
Daily
Multiple times per day

Please rate to which extent this source can be described with the following attributes.

	Not at all						Extremely
Attention getting							
Creative							
Emotional							
Energetic							
Genuine/sincere							
Honest							
Humorous							
Informative							
Unique							
Warmhearted							
Understandable							
Post believable							

When using this source, to which extent do you **search for specific food and nutrition content**?

Not at all								All the time
------------	--	--	--	--	--	--	--	--------------

Please rate how **distracted** you felt when evaluating coconut oil information on [source]?

Not at all distracted								Completely distracted
-----------------------	--	--	--	--	--	--	--	-----------------------

Please rate how **amused** you felt when evaluating coconut oil information on [source]?

Not at all amused								Completely amused
-------------------	--	--	--	--	--	--	--	-------------------

How motivated are you to read food and nutrition information online?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

How interesting do you find reading food and nutrition information online?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

How well informed are you about food and nutrition information?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

How knowledgeable are you about food and nutrition?

Not at all								Extremely
------------	--	--	--	--	--	--	--	-----------

Please state your level of agreement with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
I am concerned about food and nutrition.							
Information about food and nutrition is very relevant to me.							
Understanding the information about food and nutrition is important to me.							

Finally, we have some questions about you personally.

How old are you?

Please indicate your gender.

Male
Female

Other
Do not want to say

What was your total household income before taxes for the most recent calendar year (January through December)? By your household, we mean all persons living in your primary home who share basic finances with you.

(Please include income received by all members of your household and from all sources, including salaries, pensions, interest, dividends, bonuses, capital gains, and profits.)

Less than \$5,000
\$5,000 - \$9,999
\$10,000 - \$14,999
\$15,000 - \$19,999
\$20,000 - \$24,999
\$25,000 - \$29,999
\$30,000 - \$34,999
\$35,000 - \$39,999
\$40,000 - \$44,999
\$45,000 - \$49,999
\$50,000 - \$59,999
\$60,000 - \$74,999
\$75,000 - \$99,999
\$100,000 - \$149,999
\$150,000 - \$199,999
\$200,000 - \$249,999
\$250,000 or more

Please indicate the highest level of education you obtained.

Up to high school diploma
Some college courses
Bachelor's degree
Master's degree
Doctoral degree
Other

You have answered all the questions in the survey. Thank you for your cooperation. Please, click the "End" button to close this tab

APPENDIX 9 – Study 2 results

Estimates overview - Informative source & consistent information

Relationship			Estimate	S.E.	C.R.	P
system	<---	mot	.031	.052	.605	.545
system	<---	d	-.143	.035	-4.032	***
system	<---	know	.245	.061	4.003	***
heurs	<---	credib	.696	.052	13.337	***
heurs	<---	a	.075	.025	3.016	.003
pheal	<---	system	.154	.184	.838	.402
pheal	<---	heurs	.066	.169	.388	.698
attit	<---	pheal	.844	.030	28.206	***
attit	<---	heurs	.137	.059	2.344	.019
attit	<---	system	-.037	.064	-.574	.566
pinten	<---	pheal	-.136	.101	-1.349	.177
pinten	<---	attit	1.079	.110	9.819	***

Source: Own work

Standardized loadings - Informative source & consistent information

Relationship			Estimate
heurs	<---	credib	.715
heurs	<---	a	.162
system	<---	know	.393
system	<---	d	-.283
system	<---	mot	.059
pheal	<---	heurs	.036
pheal	<---	system	.078
attit	<---	pheal	.920
attit	<---	heurs	.082
attit	<---	system	-.020
pinten	<---	attit	1.016
pinten	<---	pheal	-.140

Source: Own work

Squared multiple correlations - Informative source & consistent information

	Estimate
heurs	.618
system	.264
pheal	.009
attit	.859
pinten	.789

Source: Own work

Indirect effects - Informative source & consistent information

Indirect Path	Unstandardized Estimate	Lower	Upper	P-Value	Standardized Estimate
credib --> heurs --> attit	0.096	0.011	0.223	0.049	0.059*
credib --> heurs --> attit - -> pinten	0.103	0.013	0.271	0.045	0.059*
a --> heurs --> attit	0.010	0.002	0.025	0.023	0.013*
a --> heurs --> attit --> pinten	0.011	0.003	0.029	0.024	0.013*
heurs --> attit --> pinten	0.148	0.016	0.360	0.048	0.083*
pheal --> attit --> pinten	0.910	0.731	1.068	0.001	0.934**

Source: Own work

Estimates overview - Informative source & inconsistent information

Relationship			Estimate	S.E.	C.R.	P
system	<---	mot	.001	.057	.024	.981
system	<---	d	-.055	.042	-1.316	.188
system	<---	know	.166	.062	2.669	.008
heurs	<---	credib	.645	.047	13.638	***
heurs	<---	a	.052	.026	1.987	.047
pheal	<---	system	.166	.131	1.268	.205
pheal	<---	heurs	.351	.127	2.760	.006
attit	<---	pheal	.784	.040	19.492	***
attit	<---	heurs	.147	.063	2.321	.020
attit	<---	system	-.105	.064	-1.634	.092
pinten	<---	pheal	-.129	.080	-1.619	.106
pinten	<---	attit	1.093	.086	12.758	***

Source: Own work

Standardized loadings - Informative source & inconsistent information

Relationship			Estimate
heurs	<---	credib	.741
heurs	<---	a	.109
system	<---	know	.255
system	<---	d	-.101
system	<---	mot	.002
pheal	<---	heurs	.226
pheal	<---	system	.104
attit	<---	pheal	.842
attit	<---	heurs	.102
attit	<---	system	-.080
pinten	<---	attit	.981
pinten	<---	pheal	-.124

Source: Own work

Squared multiple correlations - Informative source & inconsistent information

	Estimate	
heurs		.640
system		.084
pheal		.073
attit		.746
pinten		.769

Source: Own work

Indirect effects - Informative source & inconsistent information

Indirect Path	Unstandardized Estimate	Lower	Upper	P-Value	Standardized Estimate
credib --> heurs --> pheal	0.226	0.069	0.381	0.015	0.167*
credib --> heurs --> pheal --> attit	0.177	0.056	0.299	0.014	0.167*
credib --> heurs --> pheal --> attit --> pinten	0.194	0.060	0.327	0.014	0.167*
credib --> heurs --> pheal --> pinten	-0.029	-0.082	-0.002	0.068	0.167 †
credib --> heurs --> attit	0.095	0.002	0.186	0.091	0.075 †
credib --> heurs --> attit --> pinten	0.104	0.001	0.209	0.094	0.075 †
a --> heurs --> pheal	0.018	0.004	0.043	0.021	0.025*
a --> heurs --> pheal --> attit	0.014	0.003	0.033	0.020	0.025*
a --> heurs --> pheal --> attit --> pinten	0.016	0.003	0.037	0.020	0.025*
a --> heurs --> pheal --> pinten	-0.002	-0.009	0.000	0.053	0.025 †
a --> heurs --> attit	0.008	0.000	0.024	0.080	0.011 †
a --> heurs --> attit --> pinten	0.008	0.000	0.027	0.083	0.011 †
heurs --> pheal --> attit	0.275	0.088	0.449	0.014	0.190*
heurs --> pheal --> attit --> pinten	0.300	0.100	0.498	0.013	0.190*
heurs --> pheal --> pinten	-0.045	-0.123	-0.004	0.068	-0.028 †
heurs --> attit --> pinten	0.161	0.002	0.320	0.094	0.100 †
pheal --> attit --> pinten	0.857	0.722	1.031	0.001	0.826***

Source: Own work

Estimates overview - Hedonic source & consistent information

Relationship			Estimate	S.E.	C.R.	P
system	<---	mot	.167	.064	2.593	.010
system	<---	d	-.045	.038	-1.169	.242
system	<---	know	-.106	.072	-1.469	.142
heurs	<---	credib	.620	.044	13.979	***
heurs	<---	a	.071	.033	2.118	.034
pheal	<---	system	.085	.159	.532	.594
pheal	<---	heurs	.168	.144	1.170	.242
attit	<---	pheal	.824	.038	21.460	***
attit	<---	heurs	.117	.062	1.894	.058
attit	<---	system	.025	.068	.361	.718
pinten	<---	pheal	-.024	.089	-.273	.785
pinten	<---	attit	.994	.095	10.473	***

Source: Own work

Standardized loadings - Hedonic source & consistent information

Relationship			Estimate
heurs	<---	credib	.737
heurs	<---	a	.112
system	<---	know	-.159
system	<---	d	-.092
system	<---	mot	.282
pheal	<---	heurs	.111
pheal	<---	system	.050
attit	<---	pheal	.877
attit	<---	heurs	.082
attit	<---	system	.016
pinten	<---	attit	.916
pinten	<---	pheal	-.024

Source: Own work

Squared multiple correlations - Hedonic source & consistent information

	Estimate
heurs	.588
system	.053
pheal	.019
attit	.797
pinten	.800

Source: Own work

Indirect effects - Hedonic source & consistent information

Indirect Path	Unstandardized Estimate	Lower	Upper	P-Value	Standardized Estimate
credib --> heurs --> attit	0.072	0.010	0.151	0.054	0.060 †
credib --> heurs --> attit - -> pinten	0.072	0.010	0.146	0.054	0.060 †
a --> heurs --> attit	0.008	0.001	0.025	0.040	0.009*
a --> heurs --> attit --> pinten	0.008	0.001	0.023	0.043	0.009*
heurs --> attit --> pinten	0.116	0.016	0.233	0.056	0.075 †
pheal --> attit --> pinten	0.819	0.648	1.072	0.001	0.803**

Source: Own work

Estimates overview - Hedonic source & inconsistent information

Relationship			Estimate	S.E.	C.R.	P
system	<---	mot	.333	.063	5.318	***
system	<---	d	-.075	.039	-1.929	.054
system	<---	know	-.085	.067	-1.268	.205
heurs	<---	credib	.718	.046	15.734	***
heurs	<---	a	.073	.028	2.625	.009
pheal	<---	system	.145	.103	1.400	.162
pheal	<---	heurs	.527	.092	5.726	***
attit	<---	pheal	.893	.055	16.179	***
attit	<---	heurs	.024	.063	.388	.698
attit	<---	system	.086	.064	1.354	.176
pinten	<---	pheal	.044	.105	.419	.675
pinten	<---	attit	1.073	.099	10.818	***

Source: Own work

Squared multiple correlations - Hedonic source & inconsistent information

	Estimate
heurs	.702
system	.255
pheal	.246
attit	.751
pinten	.802

Source: Own work

Standardized loadings - Hedonic source & inconsistent information

Relationship			Estimate
heurs	<---	credib	.791
heurs	<---	a	.132
system	<---	know	-.131
system	<---	d	-.151
system	<---	mot	.542
pheal	<---	heurs	.460
pheal	<---	system	.113
attit	<---	pheal	.841
attit	<---	heurs	.020
attit	<---	system	.063
pinten	<---	attit	.866
pinten	<---	pheal	.034

Source: Own work

Indirect effects - Hedonic source & inconsistent information

Indirect Path	Unstandardized Estimate	Lower	Upper	P-Value	Standardized Estimate
credib --> heurs --> pheal	0.378	0.262	0.489	0.001	0.364**
credib --> heurs --> pheal --> attit	0.338	0.238	0.442	0.001	0.364***
credib --> heurs --> pheal --> attit --> pinten	0.363	0.241	0.510	0.001	0.364***
credib --> heurs --> pheal --> pinten	0.017	-0.052	0.088	0.644	0.364
a --> heurs --> pheal	0.038	0.016	0.067	0.007	0.061**
a --> heurs --> pheal --> attit	0.034	0.014	0.060	0.006	0.061**
a --> heurs --> pheal --> attit --> pinten	0.037	0.016	0.068	0.005	0.061**
heurs --> pheal --> attit	0.471	0.345	0.600	0.001	0.387***
heurs --> pheal --> attit --> pinten	0.505	0.348	0.682	0.001	0.387***
pheal --> attit --> pinten	0.959	0.777	1.157	0.001	0.729***

Source: Own work

APPENDIX 10 – Povzetek doktorske disertacije

Glavna ideja te disertacije se nanaša na zmedo porabnikov glede spletnih informacij o hrani in prehrani. Medtem ko sta obilica in nedoslednost informacij okolje, na katerega so se porabniki navadili, prinaša ta situacija tudi več izzivov. Čeprav področje zmede porabnikov pridobiva na pomenu tako v poljudni kot znanstveni literaturi, ostaja premalo raziskana (Fitzgerald in drugi, 2019).

Ker je zmeda porabnikov močan dejavnik, ki vpliva tako na čustva kot na kognicijo posameznikov, ima več posledic za stališča in vedenje porabnikov (Fitzgerald in drugi, 2019; Mitchell & Papavassiliou, 1999). Zmedeni porabniki se soočajo z vrsto neprijetnih občutkov, kot so negotovost, tesnoba, preobremenjenost in frustracija (Mitchell & Papavassiliou, 1999). Poleg tega te občutke običajno spremlja kognitivna preobremenitev, ko se porabniki soočijo z zmedenimi situacijami (Fitzgerald in drugi, 2019). Ni presenetljivo, da je oblikovanje stališč in vedenje v takšni situaciji zahtevna naloga za kognicijo. Kot posledice zmede lahko omenimo obotavljanje, zmanjšanje jakosti stališča, težave pri obdelovanju informacij in oblikovanju/spremembi stališča, pa tudi prelaganje ali neizvajanje vedenja (Mitchell & Papavassiliou, 1999).

Poleg vpliva na stališča in namere lahko zmeda porabnikov močno vpliva tudi na to, kako porabniki pristopajo k informacijam (tj. kako obdelujejo informacije). Pokazalo se je, da se vlaganje truda in skrbna obdelava informacij povečujeta v situacijah, ko so porabniki zmedeni in ne vedo, ali so predstavljene informacije resnične ali napačne, ker vsebujejo nedosledne ali celo nasprotujoče si izjave in dejstva (Yang, Chu & Kahlor, 2019; Kaye & Johnson, 2021). Zanimivo je, da imajo tudi najbolj motivirani porabniki težave pri obdelavi informacij in doseganju želene (ali optimalne) odločitve, ko je prisotna zmeda porabnikov (Vogrincic-Haselbacher in drugi, 2021).

Obdelava nekonsistentnih informacij je lahko za posameznike zelo zahtevna, saj je ena glavnih značilnosti človeka potreba po doslednosti v njihovi kogniciji (Festinger, 1957; Gawronski, 2012). Čeprav je bila obdelava informacij obravnavana z uporabo več različnih teorij, se zdi, da v raziskavah prevladujejo teorije dvojnega procesa. Čeprav te teorije včasih uporabljajo različno terminologijo, imajo skupno jedro (Evans, 2009). Predlagajo namreč, da ljudje obdelujejo informacije bodisi počasi in z veliko truda (značilnost analitične ali centralne poti) ali pa je obdelava v veliki meri avtomatska, hitra in z malo napora (hevristična ali periferna pot) (Evans, 1984; Evans, 2009; Petty & Cacioppo, 1986).

Ta dva načina obdelave sta v literaturi opisana z različnimi izrazi (običajno se odražata v imenih procesnih poti), vključno z deliberativnim, analitičnim in racionalnim za sistematično pot ter avtomatskim, intuitivnim in izkustvenim za hevristično pot obdelave (Epstein, Pacini, Denes-Raj & Heier, 1996). Empirična raziskava v doktorski disertaciji bo primenila Chaikenin (1980) pristop obdelavi informacij, saj se ta raziskava zelo tesno

povezuje s stališči, spremembo in močjo stališč, in upošteva tudi možnost sočasne prisotnosti hevristične in sistematične poti pri obdelavi informacij. Predlagani hevristično-sistematični model (skrajšano HSM) temelji na razlikovanju med sistematičnimi (napornimi) in hevrističnimi (avtomatskimi) potmi, ki se uporabljajo za obdelavo informacij pri oblikovanju stališč in njihovem spreminjanju.

V procesu razmišljanja in odločanja posamezniki oblikujejo svoja stališča, prepričanja in mnenja, na katera vplivajo številne izkušnje in dogodki (Eagly & Chaiken, 1993). Kognitivni in čustveni gonilniki oblikovanja stališča (tj. baze stališč) so v literaturi precej temeljito proučevani, in sicer tako sočasno kot vsaka skupina gonilnikov posebej (Fabrigar & Petty, 1999; Van den Berg, Manstead, van der Pligt & Wigboldus, 2006). Oblikovana stališča se lahko razlikujejo po svoji stabilnosti in moči, imajo različen vpliv na vedenje posameznikov ter jih je lažje ali težje spremeniti (Krosnick & Petty, 1995). Jakost stališč kot pokazatelj stabilnosti in vplivnosti stališč je zaradi tega še ena pomembna tema, raziskana v tej disertaciji.

Z namenom, da bi omenjene konstrukte izmerili in ovrednotili v skladu z realnimi pogoji, smo v naše študije uvedli še en pomemben element – (spletne) vire informacij. Upoštevanje virov informacij kot dela našega konteksta nam je pomagalo razviti ustrezne manipulacije, ki so omogočile empirično oceniti stopnjo zmede in obdelave informacij pri različnih spletnih virih informacij.

Cilj te disertacije je bil torej združiti in preučiti tri raziskovalna področja iz socialne psihologije in trženja: zmedo porabnikov, moč stališč in hevristično-sistematični model obdelave informacij. Ta tri področja apliciramo na kontekst spletnih informacij o hrani in prehrani in te vsebine razdelamo v osmih poglavjih. Raziskava je potekala v obliki štirih teoretičnih in bibliometričnih analiz področja znanja ter treh empiričnih študij, ki so preverjale opisane konstrukte in odnose med njimi. Izbran kontekst je prispeval k povečanju pomena ugotovitev te disertacije za javno zdravje.

Analiza teoretičnih konstruktov in njihovih povezav v teoretičnem delu disertacije je osnova za empirično oceno relevantnih učinkov. Bibliometrične študije štirih področij, tj. zmeda porabnikov, moč stališč, hevristično-sistematični model in spletne informacije o hrani in prehrani (kontekst študije), so pokazale povezave med nekaterimi od teh področij. Na primer, konstrukta iz socialne psihologije, pomembna za to raziskavo (tj. jakost stališč in hevristično-sistematična obdelava informacij) že imata vzpostavljeno močno povezavo. K literaturi na obeh področjih prispeva več istih avtorjev (npr. Chaiken in Petty), podobne pa so tudi ključne besede (npr. stališča in obdelava informacij). Pomen obdelave informacij v študijah zmede porabnikov smo podkrepili z rezultati, pridobljenimi v analizi ključnih besed na področju literature o zmede porabnikov. Analiza konteksta študije (tj. spletnih informacij o hrani in prehrani) je pokazala, da obstoječe raziskave na tem področju pogosto vključujejo študije s področij, kot sta trženje in psihologija.

Analiza presečišča štirih področij je pokazala, da ni nobenih obstoječih študij na to temo, kar je predstavljalo dodatno motivacijo za proučevanje v tej disertaciji. V obstoječi literaturi je bilo večkrat zaslediti pozive po dodatnih raziskavah, ki bi izboljšale naše razumevanje zmede porabnikov in njenega vpliva na obdelavo informacij, stališča porabnikov, namero in vedenje (npr. Fitzgerald in drugi, 2019; Spiteri Cornish & Moraes, 2015). Raziskava v tej disertaciji zato ponuja edinstveno celostno oceno zmede porabnikov in njenega vpliva na obdelavo informacij ter moč stališča v kontekstu spletne hrane in prehrane. Izvedene so bile tri empirične študije (ena opisovalna in dve vzročni) z namenom razširitve obstoječega znanja o teh konstruktih in njihovih razmerjih.

Naša prva eksperimentalna študija (Študija 1) je ocenjevala štiri hipoteze glede povezav med relevantnimi konstrukti:

- H1a: Prisotnost informacijske nedoslednosti vodi v nižjo jakost stališča.
- H1b: Zmeda porabnikov je mediator v povezavi med doslednostjo informacij in jakostjo stališča.
- H2a: Prisotnost informacijske nedoslednosti vodi do spremembe stališča.
- H2b: Zmeda porabnikov in jakost stališča sta mediatorja v povezavi med doslednostjo informacij in spremembo stališča.

V skladu z našimi pričakovanji (in hipotezami) smo z analizo podatkov odkrili negativen učinek zmede porabnikov (ki jo povzročajo nedoslednosti v predloženih informacijah) na jakost stališča. Jakost stališča med anketiranci, ki so bili izpostavljeni neskladnim informacijam, je bila bistveno nižja. Poleg tega so ti anketiranci pogosteje spremenili svoje stališče do predmeta raziskave (izdelka) zaradi zmedenosti in šibkega stališča, ki so ga oblikovali.

Naši rezultati so bili v skladu z obstoječo literaturo, ki je vključevala nedoslednosti v informacijah in dimenzije jakosti stališča. Prejšnje raziskave so pokazale, da negativni učinki nedoslednosti v razpoložljivih informacijah vplivajo na več lastnosti jakosti stališča, kot sta gotovost stališč (Smith in drugi, 2008) in ambivalentnost stališč (npr. Siddiqi in drugi, 2019). Naše ugotovitve kažejo, da učinki nekonsistentnih informacij (merjeni z novim konstruktom, imenovanim zmeda porabnikov) presegajo raven ene same lastnosti jakosti stališča in vplivajo na jakost stališč kot celoto.

Poleg dokazanih učinkov na jakost stališča se je pokazalo, da zmeda porabnikov (kot posledica nedoslednih informacij) vpliva tudi na spremembo stališča. Ugotovili smo, da so porabniki, zmedeni zaradi nedoslednosti v informacijah, katerim so izpostavljeni, pogosto nagnjeni k spremembi svojega stališča in pogosto dajejo nižje ocene izdelkov (tj. oblikujejo manj pozitivno stališče). Te ugotovitve so skladne z literaturo o zmede porabnikov, ki navaja, da zmeda porabnikov povzroči porabnikovo spremembo stališč in odločitev (Mitchell & Papavassiliou, 1999).

V drugi eksperimentalni študiji (Študija 2) smo pozornost namenili načinu, kako porabniki pristopajo k informacijam, ki prihajajo iz različnih virov (glede na obdelavo) ob prisotnosti (odsotnosti) zmede porabnikov, ki jo sproži neskladnost informacij. Z namenom, da bi bolje razumeli, kako porabniki dostopajo do informacij na spletu (in potencialne vzroke zmede), smo v predštudiji najprej preučili vire, iz katerih porabniki dostopajo do informacij o hrani in hranilni vrednosti na spletu. Izbranih je bilo šest najpogosteje uporabljenih vrst virov, porabniki pa so bili pozvani, da jih ocenijo glede na kakovost in vsebino informacij o hrani in hranilni vrednosti, ki jih zagotavljajo. Ker naš temeljit pregled literature ni odkril prejšnjih študij, ki bi na ta način proučile spletne vire informacij glede hrane in prehrane (tj. ocenile diferenciacijo teh virov na podlagi predlaganih značilnosti), je klasifikacija spletnih virov informacij en prispevek, ki ga ponuja ta disertacija.

Vrednotenje informacijskih virov je bilo izvedeno s pomočjo šestih raziskovalnih vprašanj kot vodil:

- RV1: Kako porabniki razlikujejo med spletnimi viri informacij glede na njihovo kognitivno in čustveno naravo?
- RV2: Kako porabniki razlikujejo med spletnimi viri informacij na podlagi njihove hedonične (vs. funkcionalne, informativne) vrednosti?
- RV3: Kako porabniki razlikujejo med spletnimi viri informacij glede na njihovo zaznano koristnost?
- RV4: Kako porabniki ocenjujejo razlike v kakovosti informacij, ki jih zagotavljajo spletni viri informacij?
- RV5: Kako porabniki razlikujejo med spletnimi viri informacij glede na zaznane ovire za uporabo (enostavna uporaba, dostopnost)?
- RV6: Kako so ti konstrukti (tj. lastnosti virov iz RV1-4) povezani s pogostostjo uporabe vira za pridobivanje informacij o hrani in hranilni vrednosti?

Rezultati kažejo, da porabniki res razlikujejo med viri glede na večino preučenih značilnosti. Ugotovili smo na primer jasno razlikovanje med zaznano koristnostjo virov, kakovostjo informacij ter njihovo informativno in hedonično vrednostjo. Kot je bilo pričakovati, so bili uradni viri in viri, podprti z dokazi (javne in znanstvene spletne strani), ocenjeni kot najbolj koristni, taki, ki ponujajo informacije najvišje kakovosti, in informativni. Po drugi strani pa so viri, kot so družbena omrežja in forumi, zaradi visoke vrednosti skupnosti in zabavnih vsebin dosegli najvišjo oceno, ko gre za hedonistično vrednost vira.

Raziskava tako kaže, da porabniki močno razlikujejo informacijske vire glede na kognitivno naravo (javnoznanstveni viri so bili ocenjeni najvišje, družbena omrežja pa najnižje), vendar pa se informacijski viri niso značilno razlikovali glede na čustveno naravo. To pomeni, da porabniki niso razlikovali spletnih virov informacij glede na čustva, ki smo jih merili za zajemanje čustvene narave virov. Odsotnost razlik lahko kaže na pomanjkanje vrednotenja

virov informacij z afektivnega vidika s strani porabnikov. Medtem ko se hedonična in zabavna čustva med viri bistveno razlikujejo (kot je dokazano z oceno hedonistične vrednosti virov), se zdi, da porabniki ne pripisujejo drugih čustev virom informacij, ki jih uporabljajo.

Vidik, ki ga je vredno omeniti, je pogostost uporabe in njena primerljivost glede na značilnosti vira. Rezultati so pokazali, da je bila uporaba manj informativnih, a zelo hedoničnih virov (družbenih omrežij) za pridobivanje informacij o hrani in prehrani pogostejša v primerjavi z drugimi, bolj informativnimi, a manj hedonističnimi viri (javne ali znanstvene spletne strani). Nadaljnje ugotovitve so pokazale, da kakovost informacij o viru in informativna vrednost vira nista imeli statistično pomembnega vpliva na pogostost uporabe vira informacij za pridobivanje spletnih informacij o hrani in hranilni vrednosti.

Takšni rezultati kažejo velik pomen priročnosti, hedonistične vrednosti in navade pri iskanju in dostopu do informacij porabnikov, kar je skladno s prejšnjimi ugotovitvami (Venkatesh, Thong & Xu, 2012). Medtem ko porabniki razlikujejo med spletnimi viri informacij glede na njihovo koristnost, kakovost informacij in informativnost, še vedno dostopajo do informacij prek virov, ki nimajo visoke ocene na teh treh značilnostih.

Vendar pa hedonistični viri prinašajo določene težave, zlasti ko gre za kakovost in resničnost posredovanih informacij. Zaradi pomembnosti interneta za obveščanje splošne populacije raziskovalci že pozivajo k ozaveščanju o dezinformacijah, ki se širijo prek priljubljenih (hedonističnih) platform, kot so družbeni mediji (Pagoto, Waring & Xu, 2019).

Po obsežnem pregledu spletnih virov informacij o hrani in prehrani ter dojetanja porabnikov o njih smo se poglobili v raziskavo teoretičnih konstruktov, pomembnih za to disertacijo. Kolikor nam je znano, je bila to prva študija (študija 2), ki je vire informacij raziskovala kot hedonistične in informativne ter primerjala njihov vpliv na obdelavo informacij. Slednja se odvija, ko porabniki preberejo informacije, ki jih posreduje hedoničen ali informativen vir. Študija je omogočila začetek razprave o vplivu, ki ga lahko imajo viri informacij na obdelavo informacij, ne da bi bilo treba oceniti druge značilnosti virov (npr. verodostojnost vira, strokovno znanje in podobni signali, ki so jih doslej uporabljale podobne študije).

Za preverjanje odnosov, pomembnih za drugo študijo, in da bi razumeli vpliv vira informacij na obdelavo informacij, je bilo zastavljenih enajst hipotez:

- H1: Zabava in verodostojnost vplivata na hevristično obdelavo informacij.
- H2: Motivacija, znanje in motnja vplivajo na sistematično obdelavo informacij.
- H3a: Porabniki uporabljajo tako hevristične kot sistematične informacijske procese pri oblikovanju stališča do zdravosti izdelka, ko so soočeni z doslednimi informacijami na informativnem viru informacij.

- H3b: Porabniki uporabljajo tako hevristične kot sistematične informacijske procese pri oblikovanju stališča do izdelka, ko so soočeni z doslednimi informacijami na informativnem viru informacij.
- H4a: Porabniki uporabljajo tako hevristične kot sistematične informacijske procese pri oblikovanju stališča do zdravosti izdelka, ko so soočeni z nedoslednimi informacijami na informativnem viru informacij.
- H4b: Porabniki uporabljajo tako hevristične kot sistematične informacijske procese pri oblikovanju stališča do izdelka, ko so soočeni z nedoslednimi informacijami na informativnem viru informacij.
- H5a: Porabniki uporabljajo hevristične informacijske procese pri oblikovanju stališča do zdravosti izdelka, ko so soočeni z doslednimi informacijami na hedonističnem viru informacij.
- H5b: Porabniki uporabljajo hevristične informacijske procese pri oblikovanju stališča do izdelka, ko so soočeni z doslednimi informacijami na hedonističnem viru informacij.
- H6a: Porabniki uporabljajo tako hevristične kot sistematične informacijske procese pri oblikovanju stališča do zdravosti izdelka, ko so soočeni z nedoslednimi informacijami na hedonističnem viru informacij.
- H6b: Porabniki uporabljajo tako hevristične kot sistematične informacijske procese pri oblikovanju stališča do izdelka, ko so soočeni z nedoslednimi informacijami na hedonističnem viru informacij.
- H7: Stališče do zdravosti izdelka vpliva na nakupno namero prek stališča do izdelka.

V naši analizi smo ugotovili in potrdili pozitiven vpliv zabave in kredibilnosti na hevristično obdelavo informacij. Medtem ko se verodostojnost pogosto uporablja za preučevanje hevristične obdelave informacij, je bil pomen zabave za obdelavo informacij novost, ki jo je pokazala ta raziskava. Takšna ugotovitev je potrdila ugotovitve obstoječe raziskave, da lahko pozitivni občutki prispevajo k sprožitvi hevristične obdelave informacij (Tiedens & Linton, 2001). Ta pozitiven občutek je bil predstavljen in preizkušen v obliki (stopnje) zabave.

Ko je šlo za sistematično obdelavo informacij, preučevanje predhodnikov v različnih scenarijih ni prineslo tako enotnih ugotovitev. Pokazalo se je, da motivacija vpliva na sistematično obdelavo informacij, ko so informacije prišle iz hedonističnih informacijskih virov. Ker so hedonistični viri, kot so družbena omrežja, običajno viri z nizko vključenostjo, postane motivacija za obdelavo informacij ključna komponenta za obdelavo informacij (Hughes in drugi, 2019; MacInnis in drugi, 1991). Ko pa gre za informativne vire informacij, se zdi, da znanje prevladuje med dejavniki, ki so predhodniki sistematični obdelavi informacij. Ker sistematična obdelava informacij običajno zahteva trud ter vse relevantne informacije in znanje, je pomen znanja pri sistematični obdelavi informacij v primeru informativnih virov (Hughes in drugi, 2019) razumljiv.

Na splošno so naši rezultati pokazali mnogo manjšo težnjo po sistematičnem pristopu k obdelavi informacij, kot smo pričakovali. Na primer, pri obdelavi informacij, ki prihajajo iz hedonističnih virov informacij, ni bila zaznana nobena sistematična obdelava informacij, ne glede na doslednost posredovanih informacij. To lahko kaže na določeno raven prilagajanja porabnikov na zmedene in nedosledne informacije iz hedonističnih virov. Ker je stopnja motenj na družbenih omrežjih bistveno višja kot na informativnih medijih, uporabljenih v tej študiji, je prilagajanje temu lahko eden od mehanizmov, da bi se porabniki spopadli z zmedo in motenjem, kar zmanjša njihove učinke na obdelavo informacij.

Ko se porabniki soočajo z informacijami na družbenih omrežjih, jih ne poskušajo razumeti tako, da bi se potrudili v branju, vrednotenju in sistematični obdelavi informacij. Namesto tega se lahko zatečejo k preprosti, avtomatski obdelavi informacij samo zaradi vira, iz katerega informacije prihajajo, ne glede na kompleksnost informacij. Prevladujoča uporaba hedonističnih virov informacij (zabava in sprostitev) bi lahko dodatno pojasnila majhne napore v obdelavi informacij (Hughes in drugi, 2019). Izkazalo se je, da je zabava pomembna za hevristično obdelavo informacij in jo uporabniki pogosto iščejo, zato se uporabniki, ki prihajajo na te platforme, nameravajo sprostiti in poiskati zabavo in so lahko manj nagnjeni k resnemu obdelovanju posredovanih informacij.

Po drugi strani pa je pri doslednih informacijah obdelava informacij neposredno vplivala na stališče do izdelka in le hiter, hevristični način se je izkazal za statistično značilnega, neodvisno od vrste vira (informativni ali hedoničen). Dosledne informacije niso tako zapletene za obdelavo informacij v primerjavi z nedoslednimi (Ackerman, 1988), zato je to lahko del razlage, da med značilnimi dejavniki ni bilo podrobnejše obdelave in ocene zdravosti izdelka (skozi stališče). Namesto da bi uporabili vse razpoložljive informacije, so se porabniki zanašali na hevristične namige in pospešili proces tako, da so preskočili korak vrednotenja lastnosti izdelka (tj. zdravja) ter hevristično obdelali in ustvarili stališče do izdelka na splošno. To pomeni minimalno vključenost v obdelavo konsistentnih informacij, ki jih zagotavljajo hedonistični in informativni viri informacij.

Obstoječa literatura kaže, da nedoslednosti v informacijah povečujejo kompleksnost obdelave informacij, spodkopavajo zaupanje porabnikov v presojo in povečujejo kritično ter bolj sistematično ocenjevanje (Maheswaran & Chaiken, 1991; Kim in drugi, 2018). Naši rezultati so podprli pojav sistematične obdelave informacij le v primeru stališča do izdelka v primeru informativnega vira. Zato se zdi, da je raven, do katere se porabniki dejansko sistematično približujejo obdelavi neskladnih informacij, odvisna tudi od vrste vira informacij, ne le od kompleksnosti informacij.

Ko so bile nedosledne informacije na voljo iz informativnega vira (znanstvena spletna stran), so se porabniki pri oblikovanju stališča poslužili sistematične in hevristične obdelave informacij. Pokazalo se, da zapletenost nedoslednih informacij in narava vira z visoko stopnjo vključenosti (kot je prikazano v podpoglavju 6.3.2.3) sprožita sistematično obdelavo

informacij (Ackerman, 1988; Hughes in drugi, 2019) in sta bila v tem scenariju obe prisotni. Poleg tega so prejšnje raziskave namigovale, da lahko zanesljivost vira poveča stopnjo obdelave, ki je del sistematične obdelave informacij (Priester & Petty, 1995). Znano je tudi, da nedoslednost v informacijah povzroča negativne občutke (zmedenost, negotovost), ki porabnike pogosto vodijo k analitičnemu pristopu k obdelavi informacij (Schwarz & Clore, 1983; Tiedens & Linton, 2001). Pojav sistematične poti pri obdelavi nekonsistentnih informacij iz informativnega vira torej ni presenetljiv.

V situacijah, kjer so prisotni kompleksnost, zmeda in nedoslednost, porabniki običajno uporabljajo vse razpoložljive informacije (Kim in drugi, 2018), zato je pričakovati prisotnost hevristične obdelave informacij, ko se porabniki soočajo z nekonsistentnimi informacijami iz informativnih virov. Obdelovanje nasprotujočih si informacij je kognitivno zahtevna naloga, namigi in hevristika pa lahko pomagajo pri tem procesu (npr. Ackerman, 1988).

Nekonsistentne informacije iz hedonističnega vira informacij so privedle do hevrističnega vrednotenja značilnosti izdelka (tj. zdravosti), kar je vplivalo na stališče do izdelka in nakupno namero. Nizka vpletenost pri Facebooku kot viru informacij (Hughes in drugi, 2019) je pomembna, ko gre za izbiro hevristične poti obdelave informacij pred sistematično. Poleg tega je pomanjkanje sistematičnega pristopa k obdelavi in oblikovanju stališč v primeru informacij iz hedonističnih virov lahko posledica dolgotrajne izpostavljenosti nekonsistentnim in napačnim informacijam o takšnih virih (npr. Ramachandran in drugi, 2018; Pagoto in drugi, 2019). Nevključitev v sistematično obdelavo informacij ob soočanju z informacijami iz hedonističnih virov je zato lahko mehanizem za spopadanje z obilico in nedoslednostjo informacij, ki jih zagotavljajo ti viri. Čeprav naj bi v teoriji kompleksnost informacij močno vplivala na potrebo in vključevanje v sistematično obdelavo informacij, to nam v primeru hedonističnih informacijskih virov ni uspelo empirično pokazati. Zgoraj navedeni dejavniki (npr. nizka vključenost, pomanjkanje vključenosti v obdelovanje kot mehanizem za spopadanje) lahko privedejo do pomanjkanja sistematične obdelave informacij, čeprav bodo za potrditev te teze potrebne nadaljnje raziskave (zaradi trenutnega pomanjkanja raziskav, ki bi to pojasnile).

V skladu z obstoječo literaturo naše ugotovitve kažejo na vpliv stališča do zdravost izdelka na nakupno namero prek celostnega stališča do izdelka. Ker se je zdravost izdelka že pokazala kot (pozitiven) dejavnik, ki vpliva na stališče do izdelka in nakupno namero (npr. Rana & Paul, 2020), naša študija nudi dodatno potrditev te povezave.

Porabniki so zaradi zahtevane stopnje angažiranosti pogosto bolj kritični pri sistematičnem ocenjevanju informacij. Danes se veliko informacij prenaša prek družbenih omrežij, kar bi lahko napačno ustvarilo vtis, da zainteresiranim stranem (tj. podjetjem) ni potrebno skrbeti za kakovost informacij, ki jih razširjajo. Kombinacija omejene zmogljivosti obdelave porabnikov in zmanjšane pripravljenosti, da se potrudijo v obdelavi informacij, utira hitro

pot do preprostega pristopa k vrednotenju informacij (če se sploh uporablja izdelava informacij) (Vogrincic-Haselbacher in drugi, 2021).

Iz predstavljenih rezultatov je razvidno, da disertacija prispeva k znanju s področij trženja in socialne psihologije na več načinov. Disertacija ponuja bibliometrične raziskave štirih področij in njihovih povezav, ki do sedaj niso bila raziskana z uporabo teh metod. Empirični rezultati naše raziskave so nakazali več pomembnih povezav. Ena od njih je povezava med zmedo porabnikov in jakostjo stališč, ki do sedaj ni bila raziskovana na ta način.

Poleg tega disertacija prispeva k boljšemu razumevanju spletnih virov informacij in načinov, kako jih porabniki zaznavajo. Rezultati naše predštudije so pokazali, da porabniki dejansko razlikujejo med spletnimi viri informacij na podlagi hedonističnih in informativnih lastnosti teh virov, kar ponuja novo znanje o virih informacij. V naši drugi študiji smo doprinesli k znanju s področja hevrstično sistematične obdelave informacij. S pomočjo naših manipulacij nam je uspelo dokazati, da so značilnosti virov informacij (hedonične in informativne) relevanten dejavnik, ki vpliva na način, kako porabniki obdelujejo informacije. Ta ugotovitev razširja obstoječe znanje o virih informacij pri preučevanju hevrstično-sistematičnega modela, kjer je njegova glavna vloga prikazana kot hevrstika, ki lahko pristransko vpliva na obdelavo informacij (npr. Chaiken, 1980).

Implikacije te doktorske raziskave najbolj poudarjajo pomen izobraževanja porabnikov in managerjev o pomenu in posledicah zmede porabnikov. Dodatno izobraževanje ima potencial pomagati porabnikom pri boljšem razumevanju informacij, sprejemanju odločitev o nakupu in zmanjševanju njihove dovzetnosti za zmedo zaradi nezmožnosti razlikovanja med resničnostjo različnih virov informacij, s katerimi so vsakodnevno obkroženi. Razvoj in izboljšanje digitalne, medijske in prehranske pismenosti porabnikov je torej izjemnega pomena za zmanjševanje zmede in sprejemanje boljših odločitev o hrani.

Način prikazovanja informacij (količina, vsebina, dolžina besedil) bi v idealnem scenariju bil prilagojen virom informacij. Bolj hedonični viri so namreč ustrežnejši za delitev kratkih in jasnih navodil ter informacij, medtem ko so porabniki bolj pripravljeni k podrobnemu branju informacij na uradnih in znanstvenih virih. Hedonični viri so pogosteje uporabljeni za pridobivanje informacij ne glede na njihovo manjšo kakovost, zato je tudi prilagoditev uradnih informacij tem virom (npr. objavljanje nasvetov na družbenih omrežij s strani uradnih inštitucij) izjemnega pomena za izboljšanje kakovosti informacij, do katerih dostopajo porabniki.

Čeprav smo v tej disertaciji želeli doseči celovito obravnavo teoretičnih konceptov in empirične ocene zmede porabnikov, jakosti stališč in obdelave informacij s spleta, ima ta disertacija tudi nekaj omejitev. Kot najpomembnejšo moramo omeniti relativno mlad vzorec (povprečna starost anketirancev je bila okrog 33 let) in neupoštevanje kulturnih razlik. Čeprav mladi porabniki veljajo za najpogostejše uporabnike tehnoloških naprav in interneta, se tudi starejši vse bolj zanimajo za digitalne rešitve in ponudnike informacij, zlasti na

področju zdravja (Wildenbos, Peute & Jaspers, 2018), kar bi veljalo preučiti v prihodnjih raziskavah. Vzorec je bil v celoti zajet v ZDA, zato smo morali zanemariti dejstvo, da hrana v različnih kulturah lahko igra različno vlogo (Rodríguez-Arauz, Ramírez-Esparza & Smith-Castro, 2016; Gomez & Torelli, 2015).

Še ena omejitev, ki jo je vredno omeniti, je pomanjkanje merjenja dejanskega vedenja porabnikov. Medtem ko prejšnje raziskave potrjujejo negativne učinke zmede porabnikov (zaradi nedoslednih informacij) na prehransko vedenje (Spiteri Cornish & Moraes, 2015), njen vpliv na resnično vedenje v okviru te disertacije ni bil merjen. Rezultati pričujoče raziskave kažejo pomemben učinek zmede na stališča, ki jih oblikujejo porabniki, in njihove vedenjske (tj. nakupne) namere. Nadaljnje raziskave, ki bi vključevale merjenje dejanskega vedenja in odločanja v takih situacijah, bi okrepile ugotovitve in zaključke te raziskave.