Advancing Theory of Consumer Satisfaction and Word-of-Mouth

Product and Service Performance Counts – But so do Performance Expectations

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Abstract

Consumer satisfaction and Word-of-Mouth (WOM) are interrelated phenomena that are crucial to the successful marketing of products and services. Yet, psychological theory regarding both phenomena lacks integration, and empirical evidence on key processes, such as satisfaction formation through expectancy-disconfirmation and intra-individual WOM transmission, is heterogeneous or even missing. The present thesis addresses these issues in three studies. In the first study, a model of intra-individual WOM transmission, covering the span from the reception of WOM to the sending of WOM, was developed and experimentally tested. Results suggest that the sending of WOM is solely determined by product performance and that intra-individual WOM transmission might "become stuck" during the unclear expectancy-disconfirmation process. In order to clarify the role of expectancy-disconfirmation as a key element of intra-individual WOM transmission, expectancy-disconfirmation theories were conceptually and empirically assessed in a systematic way, in the form of a qualitative review of the respective literatures (Study 2) and a meta-analysis (Study 3). The qualitative review derives suggestions for how conceptual inconsistencies and methodological shortcomings of expectancy-disconfirmation theories can be resolved. In particular, a coherent disconfirmation typology is developed and more suitable methods for operationalizing concepts of disconfirmation are presented. The results of the meta-analysis indicate that consumers assimilate their satisfaction ratings toward their expectations and that disconfirmation and consumer satisfaction are very closely related psychological constructs. Taken together, the findings of the three studies suggest that perceived performance is the crucial antecedent to consumer satisfaction, but that expectations also matter. Furthermore, the assimilation of satisfaction ratings toward expectations is the most likely link between the reception of WOM and the sending of WOM.

Zusammenfassung

Die Phänomene Konsumentenzufriedenheit und *Word-of-Mouth* (kurz WOM, z. Dt. auch „Mundpropaganda") sind entscheidende Einflussfaktoren auf den Markterfolg von Produkten und Dienstleistungen. Wissenschaftliche Erklärungen dieser Phänomene beruhen jedoch auf einer Vielzahl einzelner psychologischer Modelle und es fehlt eine theoretische Integration der einzelnen Modelle in eine umfassende und konsistente Gesamttheorie. Zudem ist die empirische Evidenz zu den angenommenen psychologischen Prozessen, wie z.B. dem Erwartungs-Diskonfirmations Prozess als Grundlage von Konsumentenzufriedenheit, uneinheitlich und teilweise unvollständig. Die vorliegende Dissertation greift diese Probleme in drei Studien auf. In *Studie 1* wird ein Drei-Stufen Modell der intra-individuellen Übertragung von WOM entwickelt, das den psychologischen Prozess zwischen dem Empfangen von WOM und dem Senden von WOM beschreibt. In einer experimentellen Überprüfung des drei-Stufen Modells zeigte sich, dass ausschließlich die Produktqualität die Konsumentenzufriedenheit und das Senden von WOM verursacht, die Qualitätserwartungen an das Produkt hingegen keinen Einfluss auf die Konsumentenzufriedenheit haben. Dieses Ergebnis steht im Widerspruch zu der aus den Erwartungs-Diskonfirmations Theorien abgeleiteten Vorhersage und legt für sich genommen nahe, dass die intra-individuelle Übertragung von WOM im Prozess zwischen den Qualitätserwartungen und der Konsumentenzufriedenheit unterbrochen wird. Die Bedeutung der Ergebnisse aus Studie 1 für die Theorien der Erwartungs-Diskonfirmation und der intra-individuellen Übertragung von WOM sind jedoch nur schwer zu beurteilen, da in der Erwartungs-Diskonfirmations Literatur keine einheitlichen und klaren Aussagen zum konkreten Erwartungs-Diskonfirmations Prozess und zu den zu erwartenden Effekten gemacht werden. Aus diesem Grund wurden die Erwartungs-Diskonfirmations Theorien in Studie 2 und 3

konzeptionell und empirisch untersucht. In *Studie 2*, einem qualitativen Review, wurden Empfehlungen erarbeitet, wie konzeptionelle Widersprüche und methodische Mängel in der Erwartungs-Diskonfirmations Forschung überwunden werden können. Konkret wird eine umfassende Diskonfirmations-Typologie entwickelt, die bisherige Widersprüche zu diesem Konzept auflöst, und es werden geeignete Methoden zur Operationalisierung und Analyse des Diskonfirmations-Konzeptes vorgeschlagen. In *Studie 3* wurden die Vorhersagen der Erwartungs-Diskonfirmations Theorien meta-analytisch untersucht. Die Meta-Analyse zeigte einen positiven Effekt von Qualitätserwartungen auf Konsumentenzufriedenheit, was die Vorhersagen von Assimilations-Theorien bestätigt und im Gegensatz zum Ergebnis von Studie 1 steht. Weiterhin zeigte die Meta-Analyse einen sehr starken Zusammenhang von Diskonfirmation und Konsumentenzufriedenheit, was nahe legt, dass die Konstrukte Diskonfirmation und Konsumentenzufriedenheit empirisch nicht distinkt sind. Zusammengenommen implizieren die Ergebnisse der drei Studien, dass die wahrgenommene Produkt- bzw. Dienstleistungsqualität der bedeutsamste Einflussfaktor auf Konsumentenzufriedenheit ist, aber auch Qualitätserwartungen auch eine Rolle spielen. Darüber hinaus stellt der positive Effekt von Qualitätserwartungen auf Konsumentenzufriedenheit ein mögliches Bindeglied in der intra-individuellen Übertragung von WOM dar. Schlussendlich werden Perspektiven für die zukünftige Theorieentwicklung in den Bereichen der Konsumentenzufriedenheit und des WOM diskutiert und es wird vorgeschlagen, Diskonfirmation nicht als die wahrgenommene Diskrepanz von Qualitätswahrnehmung und Qualitätserwartung, sondern als psychologischen Prozess zu konzeptualisieren.

Acknowledgements

Table of Contents

List of Tables

List of Figures

Chapter 1: General Introduction

Consumer satisfaction and Word-of-Mouth (WOM) are interrelated phenomena that are crucial to the successful marketing of products and services. Satisfied consumers are likely to stay "loyal customers", but also to send positive WOM to other consumers (Pansari & Kumar, 2017; Szymanski & Henard, 2001). Furthermore, it is assumed that received WOM is a major factor for consumer decisions and ultimately business success (Brooks, 1957; De Matos & Rossi, 2008). Because WOM is sent from consumers to other consumers, it is theorized that WOM could spread "like a virus" and that WOM marketing might enable enormous market success with minimal investment (Hinz, Skiera, Barrot, & Becker, 2011; Kozinets, De Valck, Wojnicki, & Wilner, 2010; Watts & Peretti, 2007). However, even though there are accounts of products and services emerging as "superstars" due to the spread of WOM, such success stories are very rare. Furthermore, it appears to be almost impossible to predict in advance what or who will be the next "superstar" (De Vany, 2004; Rosen, 1981; Salganik, Dodds, & Watts, 2006). Considered together, consumer satisfaction and WOM seem to be good *indicators* of product and service success, but a useful theory to *predict* product and service success, based on consumer satisfaction and WOM processes, is missing.

Indeed, both consumer satisfaction and WOM research suffer from a lack of theoretical integration. Although there is plenty of research on the spread of WOM between consumers (J. J. Brown & Reingen, 1987; T. J. Brown, Barry, Dacin, & Gunst, 2005; Kozinets et al., 2010), a comprehensive psychological model of the *intra*-individual process, spanning from the reception of WOM to the sending of WOM, is missing. More specific, while consumer satisfaction is considered to be an antecedent to WOM sending (De Matos & Rossi, 2008; Szymanski &

Henard, 2001), there is no psychological model to explain the process between the reception of

WOM and the formation of consumer satisfaction. Furthermore, the most dominant approach to

explain the formation of consumer satisfaction, namely expectancy-disconfirmation theory,

suffers from both theoretical inconsistencies and a lack of conclusive evidence (Oliver, 2010; Yi,

1990).

The present thesis aims to address the shortcomings of both WOM and consumer

satisfaction research. As a first step, based on theories of social influence, consumer satisfaction

formation, and WOM sending, a comprehensive model of intra-individual WOM transmission,

spanning from the reception of WOM to the sending of WOM, is developed and experimentally

tested. Next, in order to clarify the role of expectancy-disconfirmation as a key element of intra-

individual WOM transmission, expectancy-disconfirmation theories are conceptually and

empirically assessed in two pieces of work. First, in a qualitative review, theoretical and

methodological shortcomings of expectancy-disconfirmation theory are discussed. Second, in a

meta-analysis, the cumulative evidence of expectation and disconfirmation effects on satisfaction

is summarized and predictions of expectancy-disconfirmation theory are tested.

This thesis is structured in five chapters (see Figure 1.1). In *Chapter 1,* on the basis of an

account of WOM transmission and consumer satisfaction theories, the research questions of my

thesis are derived, which are thereafter addressed specifically in Chapters 2, 3, and 4.

Chapter 2 addresses the lack of theory and empirical evidence on intra-individual WOM

transmission, standalone theoretical strands are integrated into a three-step model of intra-

individual WOM transmission. The first step of the model conceptualizes the effect of received

WOM on performance expectations, based on theories of social influence (Cialdini & Goldstein,

2004; Cohen & Golden, 1972; Deutsch & Gerard, 1955; Olson & Dover, 1979). The second step

conceptualizes the effect of performance expectations and their disconfirmation on consumer satisfaction, based on expectancy-disconfirmation theory (Anderson, 1973; Oliver, 1977, 1980; Olshavsky & Miller, 1972). The third step conceptualizes the effect of consumer satisfaction on WOM sending, based on WOM theory (Alexandrov, Lilly, & Babakus, 2013; De Matos & Rossi, 2008; Maxham III & Netemeyer, 2002). The three-step model of intra-individual WOM transmission is tested in a comprehensive experimental study. Because experimental results suggested expectancy-disconfirmation as the crucial, but yet unclear, step of WOM transmission, the remaining two chapters are dedicated to clarify the processes underlying expectancy-disconfirmation.

In *Chapter 3*, based on a qualitative literature review, it is argued that inconsistencies of expectancy-disconfirmation sub-theories (dissonance theory and adaptation level theory) and shortcomings of commonly preferred operationalizations of the disconfirmation concept (viz. difference scores and direct measurement) limit the conclusiveness of expectancy-disconfirmation research. Particularly, the most commonly used "perceived disconfirmation paradigm" (Oliver, 1977, 1980, 1981) was found to be unclear about the formation and antecedents of disconfirmation and confounds discrepancies involving initial expectations with discrepancies involving recalled expectations (Westbrook & Reilly, 1983; Yi, 1990).

In *Chapter 4,* a meta-analysis of expectancy-disconfirmation and consumer satisfaction research is presented with the aim to test hypotheses derived from expectancy-disconfirmation theory regarding the expectation-satisfaction and the disconfirmation-satisfaction relationships, as well as to probe potential moderators of these relationships, such as the target type (products vs. services) and the operationalization of disconfirmation (difference scores vs. direct measurement). The results shed light on crucial unresolved questions of expectancy-

disconfirmation research, such as the relation of disconfirmation to its antecedents and the question if consumers bias their satisfaction ratings toward the initial expectation or away from it.

Chapter 5 offers a general discussion, integrating the results presented in the previous three chapters. In particular, theoretical implications and limitations of the present thesis, suggestions for future research, and recommendations for marketing practice are discussed.
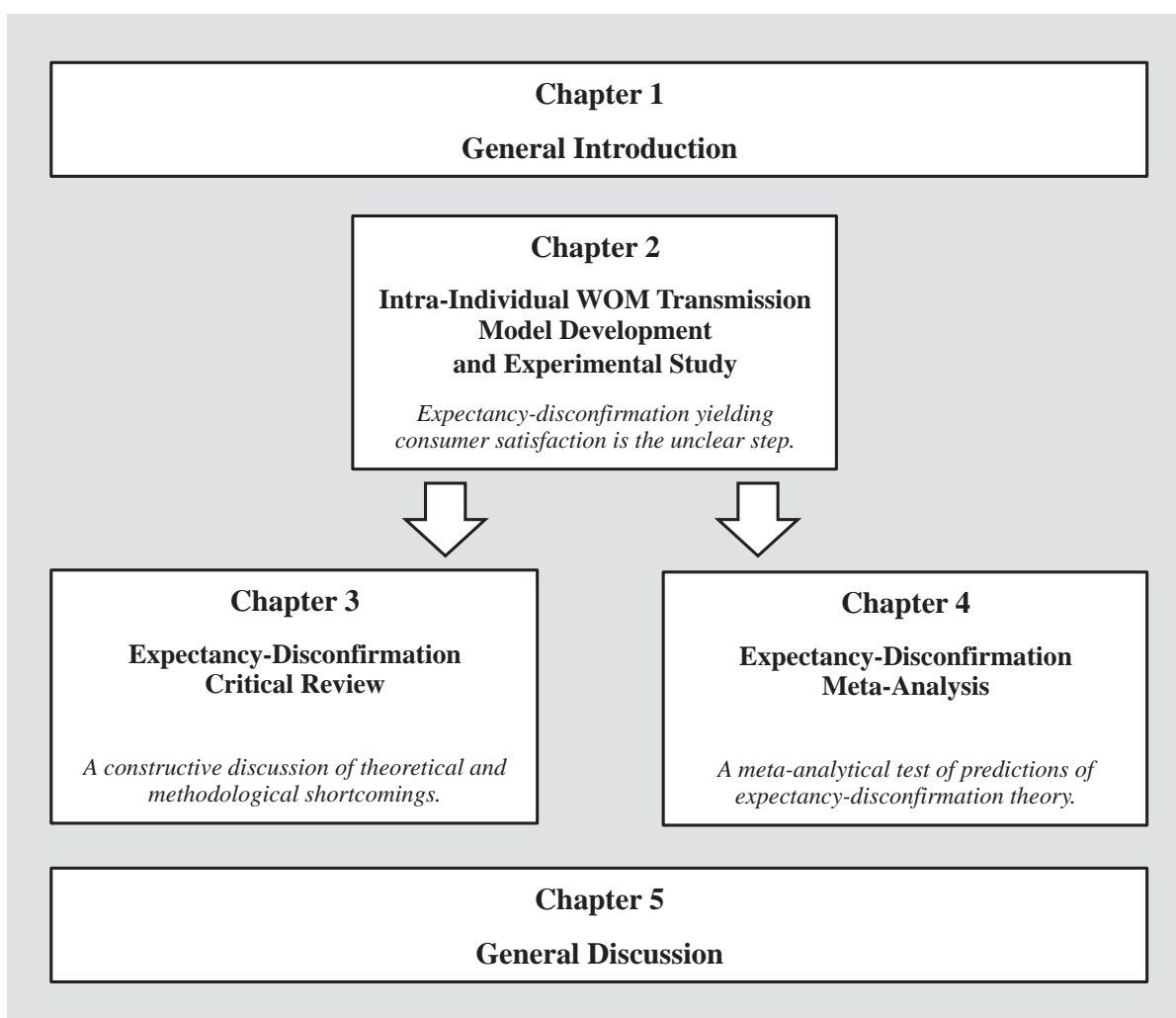
Figure 1.1. Thesis Structure

1.1 Intra-Individual WOM Transmission and Consumer Satisfaction

There is ample evidence that positive WOM is an effective form of informal marketing (e.g., Berger, 2014; Burnkrant & Cousineau, 1975; Cohen & Golden, 1972; East, Hammond, & Lomax, 2008; Venkatesan, 1966) and that WOM appears to be one of the most influential factors for consumer purchase decisions even today (e.g., Alabdullatif & Akram, 2018; Liu, 2006; Packard & Berger, 2017; Rosario, Sotgiu, De Valck, & Bijmolt, 2016; Trusov, Bucklin, & Pauwels, 2009). Furthermore, WOM research has explored the characteristics of social networks, through which WOM is assumed to spread (J. J. Brown & Reingen, 1987; T. J. Brown et al., 2005; Kozinets et al., 2010). However, if WOM messages are supposed to spread through an interpersonal network, these messages need to not only trigger a purchase by the recipient of the message, but need to trigger the sending of WOM to others as well. In other terms, to explain the spread of WOM, both the inter-individual transmission of WOM (from one consumer to another) and the intra-individual transmission of WOM (from the reception to the sending) have to be theoretically addressed.

Yet, comparably little research was dedicated to explore the intra-individual transmission of WOM. Some researchers tested the direct path from the reception of WOM to the sending of WOM, providing mixed evidence (Burnkrant & Cousineau, 1975; File, Cermak, & Prince, 1994). And, other researchers probed parts of the transmission process, such as the influence of WOM on consumer expectations (Parasuraman, Zeithaml, & Berry, 1985) and the influence of consumer satisfaction on the intention to send WOM (Finn, Wang, & Frank, 2009). Taken together, the hitherto approaches suggest that expectations and consumer satisfaction play a role in the intra-individual transmission of WOM. However, a comprehensive and testable model of

intra-individual WOM transmission is missing. The present thesis addresses this gap in the first

research question.

Research Question 1: How can intra-individual WOM transmission be modeled?

The notion that consumer satisfaction is an key antecedent to WOM implies that consumer

satisfaction is also crucial to the explanation of WOM transmission sending (De Matos & Rossi,

2008; Finn et al., 2009; Szymanski & Henard, 2001). However, to conceptualize the full input-

to-output transmission process, antecedents to consumer satisfaction that connect the reception of

WOM to the formation of satisfaction have to be addressed.

The most common approach to explain the formation of satisfaction is expectancy-

disconfirmation theory (Oliver, 2010; Szymanski & Henard, 2001). According to expectancy-

disconfirmation theory, consumer satisfaction is determined by performance expectations,

perceived performance, and the cognitive comparison of perceived performance with

performance expectations, termed disconfirmation (Churchill & Surprenant, 1982; Oliver, 1980).

Thus, as received WOM is assumed to influence performance expectations (Boulding, Kalra,

Staelin, & Zeithaml, 1993; Zeithaml, Berry, & Parasuraman, 1993), and performance

expectations are assumed to influence consumer satisfaction (Anderson, 1973; Oliver, 2010)

expectancy-disconfirmation could bridge the conceptual gap between the reception of WOM and

consumer satisfaction, which in return should lead to WOM sending. This reasoning is

addressed in the second research question.

Research Question 2: Can expectancy-disconfirmation theory explain how received WOM affects consumer satisfaction?

1.2 The Satisfaction Formation Process: Expectancy-Disconfirmation Theory

Even though a vast body of research on expectancy-disconfirmation and consumer satisfaction has accumulated since the 1960s, both a consistent theoretical concept and conclusive empirical evidence regarding the expectancy-disconfirmation process are missing. Therefore, both the shortcomings of expectancy-disconfirmation theory and the lack of empirical integration need to be addressed in a systematic way.

1.2.1 Theoretical and Methodological Shortcomings

In the present thesis it is argued that inconsistencies of expectancy-disconfirmation theory, and the perceived disconfirmation paradigm in particular (Oliver, 1977, 1980, 1981), limit the conclusiveness of disconfirmation research. According to the perceived disconfirmation paradigm, disconfirmation should be conceptualized as a standalone psychological construct and, as such, be measured directly by asking consumers if a performance was *better than expected* or *worse than expected*. In contrast to other operationalizations of disconfirmation, directly measured *perceived* disconfirmation should be unrelated to initial expectations. However, the propositions of the perceived disconfirmation paradigm are problematic, because (a) the assumption of expectation-disconfirmation independence is in contradiction to the definition of disconfirmation as a cognitive comparison between perceived performance and initial expectations, and (b) consumers cannot assess their initial expectations at the time when perceived disconfirmation is measured (Westbrook & Reilly, 1983; Yi, 1990).

With the perceived disconfirmation paradigm, Oliver (1977; 1980; 1981) not only introduced a theoretical framework, but also established direct measurement and linear path-analysis as the common methodological approaches in the realm of disconfirmation research. However, direct measurement is a flawed method to operationalize a discrepancy concept such as disconfirmation, because results including direct measures of discrepancy perceptions are highly ambiguous and potentially biased (Edwards, 2001). Furthermore, linear path models involving perceived disconfirmation are unable to uncover possible non-linear expectancy-disconfirmation effects and are prone to erroneous conclusions (Edwards & Parry, 1993; Venkatesh & Goyal, 2010).

These intertwined theoretical and methodological issues of the perceived disconfirmation paradigm present critical obstacles for expectancy-disconfirmation research. Thus, these issues are addressed in research question 3.

Research Question 3: How can the theoretical inconsistencies and methodological shortcomings of expectancy-disconfirmation research be resolved?

1.2.2 Empirical Integration of Expectancy-Disconfirmation Effects

The core question of expectancy-disconfirmation research is how expectations and their disconfirmation affect consumer satisfaction. Yet, there is no comprehensive theory of expectation effects on satisfaction and multiple sub-theories make competing predictions. More specifically, assimilation theories propose that consumers bias their satisfaction ratings toward their initial expectation (Anderson, 1973; Deighton, 1984; Hoch & Ha, 1986; Olshavsky & Miller, 1972). This contradicts what contrast theory proposes, that is, consumers magnify the

extent of the discrepancy between their expectations and the level of performance they perceive, thereby biasing their satisfaction away from their initial expectations (Anderson, 1973; Cardozo, 1965; Oliver, 2010; Olson & Dover, 1979). Regarding the question whether the assimilation or the contrast effect is relatively stronger than the other, Yi (1990) stated that, even though the evidence is heterogeneous, assimilation effects seem to be more common. Regarding the relation of disconfirmation to consumer satisfaction, disconfirmation theory predicts a positive relationship. This positive effect is assumed because positive disconfirmation indicates the over-fulfillment of expectations and therefore should be associated with high levels of satisfaction (Churchill & Surprenant, 1982; Oliver, 2010). Analogously, negative disconfirmation should be associated with low levels of satisfaction.

Despite a vast body of research on expectancy-disconfirmation, there is no conclusive empirical evidence regarding the above-mentioned predictions. Although the most recent meta-analysis of antecedents to consumer satisfaction by Szymanski and Henard (2001) summarized expectancy-disconfirmation research to some extent, several limitations apply. First, Szymanski and Henard did not include theoretically relevant ambiguities of the expectation and disconfirmation concept that could moderate expectation-satisfaction and disconfirmation-satisfaction effects. Second, Szymanski and Henard found no significant moderators of both the expectations-satisfaction and the disconfirmation-satisfaction relationship. And third, even though Szymanski and Henard's meta-analysis included 50 studies in total, some meta-analytic correlations were based on small samples, among those the highly relevant expectation-satisfaction relationship ($k = 8$ studies).

Therefore, before considering the contribution of new primary research, a more meaningful goal is to systematically summarize the available evidence since 2001, thereby exploiting the

additional body of research that has been accumulated since the last meta-analysis was

published, and to test the predictions of expectancy-disconfirmation theory.

Research Question 4: What is the available evidence regarding the effects predicted by

expectancy-disconfirmation theory.

1.3. Research Overview

The central aim of this thesis is to advance the theoretical and empirical integration of

consumer satisfaction and WOM research. Because the formation of consumer satisfaction by

expectancy-disconfirmation is considered a key element of intra-individual WOM transmission,

both streams of research are relevant to one another.

Figure 1.2 illustrates which chapters of this thesis address which of the four research

questions outlined above, and which key concepts are addressed in the respective chapters. In

Chapter 2 research questions 1 and 2 are addressed. A three-step model of intraindividual WOM

transmission that integrates theories of social influence, consumer satisfaction formation by

expectancy-disconfirmation and WOM Sending, is developed and tested. In a critical review of

expectancy-disconfirmation theory, presented in *Chapter 3,* research question 3 is addressed. In

this review, an in-depth analysis of theoretical inconsistencies and methodological shortcomings

of expectancy-disconfirmation research is provided and proposition how to resolve these issues

are made. In the meta-analysis presented in *Chapter 4*, research question 4 is addressed. In the

meta-analysis, predictions of expectancy-disconfirmation regarding expectation-satisfaction and

disconfirmation-satisfaction effects are tested, as well as moderator hypotheses regarding these

effects.

Chapter	Research Questions	Key Concepts

Chapter 2

RQ1: How can intra-individual WOM transmission be modeled?

RQ2: Can expectancy-disconfirmation theory explain how received WOM affects consumer satisfaction?

Chapter 3

RQ3: How could the theoretical inconsistencies and methodological shortcomings of expectancy-disconfirmation research be resolved?

Chapter 4

RQ4: What is the available evidence regarding the effects predicted by expectancy-disconfirmation theory?

WOM

Expectations and Consumer Satisfaction

(Perceived) Disconfirmation

Note. RQ = Research Question.

Figure 1.2. Research Questions and Key Concepts.

Chapter 2: Performance Counts - An Analysis of Intra-Individual WOM Transmission

2.1 Abstract

Word-of-Mouth (WOM), defined as informal communication between consumers about products and services, is assumed to spread through social networks like a virus and to thereby substantially contribute to market success. Previous research has neglected the intra-individual transmission process, spanning from the reception to the sending of WOM messages, even though the understanding of intra-individual WOM transmission is critical to fully explain the spreading of WOM. Building on theories of social influence, expectancy-disconfirmation and WOM sending, the authors[1] propose a three-step model of intra-individual WOM transmission. For testing the model, we conducted an online experiment with 269 participants. Results show that in accord with the proposed model, WOM messages influence expectations about product performance and product satisfaction influences the sending of WOM. Contrary to predictions of expectancy-disconfirmation theory, only product performance itself but not expectations on product performance seem to influence product satisfaction and thus the sending of WOM. This speaks against a *virus-like* spreading of WOM. Future research needs to address the complexities of intra-individual processes for explaining WOM phenomena.

[1] This chapter is based on an unpublished manuscript authored by Tom Schiebler (first author), Björn Matthaei, Gesa-Kristina Petersen and Felix C. Brodbeck.

2.2 Introduction

Word-of-Mouth (WOM), defined as informal communication between consumers about products and services, is believed to be a major factor for individual consumer decisions (Brooks, 1957; De Matos & Rossi, 2008), in particular for cultural goods like movies (Liu, 2006), books (Chevalier & Mayzlin, 2006) and music (Salganik et al., 2006). Word-of-Mouth-Marketing is advocated as a highly efficient way to increase commercial success, because it is expected that "infected" customers themselves become marketing agents spreading positive WOM about the product or service (Hinz et al., 2011; Kozinets et al., 2010; Watts & Peretti, 2007). Thus, it is of practical interest to understand the individual level processing of WOM, which is fundamental to the spread of WOM in markets.

WOM marketing conveys the understanding that by spreading like a virus, an exponentially higher number of customers can be reached than initially directly addressed by the marketer. The analogy of virus-like spreading suggests that people process received WOM messages in a way that makes them pass these messages on to other people (Watts & Peretti, 2007). Even though some researchers pointed out that the transmission of WOM should not be considered "automatic" (e.g., van der Lans, Van Bruggen, Eliashberg, & Wierenga, 2010), WOM research did little to address the question of whether WOM input affects WOM output in the way suggested by the Viral Marketing metaphor. While WOM research has explored the effects of received WOM messages on consumer purchase decisions (Chevalier & Mayzlin, 2006; East et al., 2008) and the direct antecedents of the sending of WOM messages, as for example, satisfaction, identification and commitment (T. J. Brown et al., 2005; De Matos & Rossi, 2008), the transmission process as a whole (from input to output) was not addressed yet.

The lack of research on intra-individual WOM transmission is particularly critical, because the understanding of the individual level psychology of WOM is crucial to connect individual level WOM behavior to macro level phenomena in markets. This becomes apparent, when social influence in general, and WOM in particular, are discussed as possible causes for extreme behavior of consumer and financial markets that cannot be adequately predicted by market researchers and financial analysts (Bikhchandani & Sharma, 2000; De Vany, 2004; Reinhart & Rogoff, 2008). There is indeed some empirical evidence that social influence might be a factor that leads to the emergence of inequality and unpredictability in cultural markets in the form of unforeseeable superstars (Salganik et al., 2006; Salganik & Watts, 2008, 2009). However, one needs to be careful to interpret these macro level effects as consequences of individual WOM behavior. Most studies on emergent effects of social influence exclusively focused on social influence in the form of *un*intentional signals, which are the by-product of purchase behavior, such as downloading a certain music song (Salganik et al., 2006; Salganik & Watts, 2008, 2009). Empirical studies focusing on the spread of intentional messages are rare and the scarce research available supports the view, that intentional WOM very rarely spreads far beyond the initial sender (Bakshy, Hofman, Mason, & Watts, 2011).

In summary, there is still little understanding of the individual level transmission process of WOM and to what extent individual intentional WOM messaging really spreads through interpersonal networks. There is no comprehensive model of the psychological processes underlying intentional WOM transmission, which could lay the foundation for the prediction of product and service success through the spread of WOM messages. The absence of such a model is particularly puzzling, since marketers are naturally interested in promoting their

products by seeding WOM messages and facilitating the spread of WOM in social networks (Kozinets et al., 2010).

The present study aims at clarifying underlying psychological process on how individuals transmit social WOM messages. Therefore, we integrated different stand-alone strands of research, that each regard only fragments of the individual level process into a comprehensive testable three-step model of intra-individual WOM transmission from the reception of to the sending of WOM (see Figure 2.1).

To test the hypotheses derived from the model, we conducted an individual level experiment in an alleged online market with WOM. Our results emphasize the role of product performance for the spread of WOM and cast some doubt on the claim that WOM marketing alone can achieve a virus-like spreading of positive social messages.

Step 1: Reception of Word-of-Mouth   Step 2: Product Experience   Step 3: Sending of Word-of-Mouth

WOM → Performance Expectations → Disconfirmation Process → Product Satisfaction → Sending of WOM

Perceived Performance
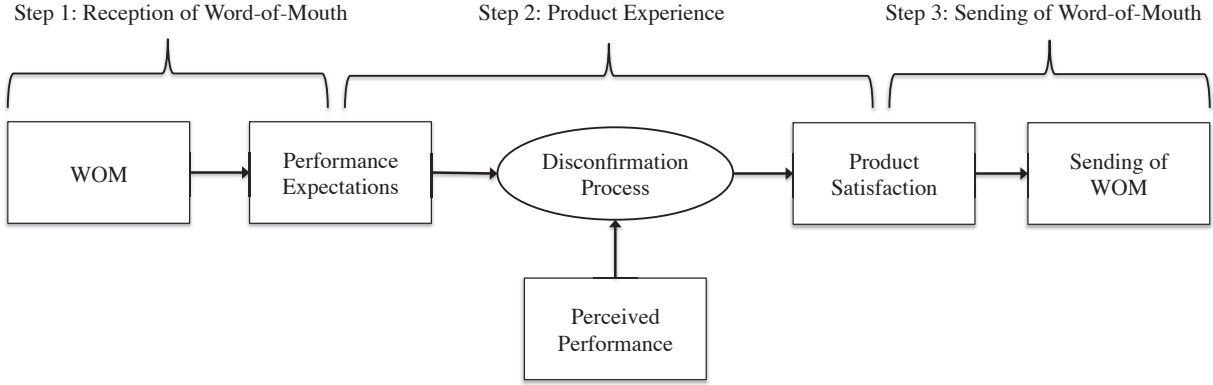
Figure 2.1. The Three-Step Model of Intra-Individual WOM Transmission

2.3 Theoretical Background

2.3.1 The Spread of Word of Mouth

There is ample evidence and an extensive body of theory that interpersonal communication affects the choices people make (Cialdini & Goldstein, 2004; Turner, 1991), including choices on products and services (Burnkrant & Cousineau, 1975; Cohen & Golden, 1972; Venkatesan, 1966). The exchange of information on products and services through interpersonal communication was termed "Word-of-Mouth" or "WOM" (Brooks, 1957). As the term itself implies, WOM theory refers to intentionally produced messages between consumers - in contrast to the mere observation of choices others have made (Chen, Wang, & Xie, 2011) or to indirect social influence (e.g., when people's attitudes are influenced by their exposure to certain objects, and that exposure in turn is influenced by other peoples choices; Denrell, 2008). While commonly studied in the field of end-consumer networks, WOM as well applies to informal information exchange in the business-to-business context (File et al., 1994) and to investment decisions on financial markets (Shiller & Pound, 1989).

WOM is discussed as the most influential factor for individual purchase decisions (Liu, 2006). Moreover, WOM is assumed to spread through interpersonal networks, whereby some individuals ("opinion leaders") should be more influential than others (Brooks, 1957; T. J. Brown et al., 2005). Ultimately, the spread of WOM should aggregate to the market success of products and services (Huang & Chen, 2006).

These propositions of WOM in mind, marketers are naturally interested in promoting positive WOM activity about their products and services. Research has consequently focused on identifying and studying influential individuals, respectively opinion leaders, and their characteristics (Goldenberg, Libai, & Muller, 2001; Li & Du, 2011; Richins & Root-Shaffer,

1988) and on the characteristics of social networks, through which WOM is assumed to spread (J. J. Brown & Reingen, 1987; T. J. Brown et al., 2005; Kozinets et al., 2010).

In contrast, the intraindividual level processes of WOM received comparably little attention; antecedents and consequences of WOM were studied in largely unconnected streams of research. Regarding antecedents of WOM, De Matos and Rossi (2008) conceptualized (product) quality, satisfaction, commitment, loyalty, trust and perceived value as factors influencing WOM. Regarding the consequences of WOM, there is evidence that WOM has effects on attitudes, purchase intentions, and purchase probability, moderated by the valence of the WOM message (East et al., 2008; Herr, Kardes, & Kim, 1991).

In the field of financial markets, research did even less address the very process by which messages are passed on between individuals. The most common approach in studies of WOM in the field of economics was to fit data of observed macro level herding to models of social influence, whilst controlling for plausible alternative explanations (Duflo & Saez, 2002; Hong, Kubik, & Stein, 2005; Ivković & Weisbenner, 2007; Kelly & O Grada, 2000). As an exception to that pattern Shiller and Pound (1989) surveyed institutional and individual investors and found self-reported social influence by WOM messages on investment decisions.

However, regardless of the context of the decision, if WOM messages are supposed to spread through an interpersonal network, these messages need to not only trigger a purchase by the recipient of the message, but need to trigger the sending of WOM to others as well. Thus, to explain the spreading of WOM, in addition to (network) models of inter-individual WOM transmission, a model of intra-individual WOM transmission is necessary. Without such a model that captures the psychological processes from the reception of a message to the sending of a message, the explanation of WOM remains insufficient.

Interestingly, the direct path from the input of WOM to the sending of WOM was rarely addressed or studied empirically and the little hitherto-available evidence is inconclusive. Burnkrant and Cousineau (1975) tested the direct effect of product evaluations, that participants were exposed to, on product evaluations given by the participants, but did not find a significant effect. File et al. (1994) conducted a survey among CEOs regarding the selection of professional service providers and found that input WOM was connected to output WOM. However, since the results of File et al. (1994) are based on self reports collected at one time point, conclusions about causal relationships remain highly speculative.

Fragments of the WOM transmission process were addressed in previous research. Based on a qualitative interview survey Parasuraman et al. (1985) stated, that WOM influences perceived service quality, mediated by expectations. Finn et al. (2009) found a connection from perceived disconfirmation to the intention to recommend e-services, mediated by satisfaction. Though both studies addressed parts of the WOM process, they do not represent a thorough test of the full WOM transmission process (WOM → product experience → WOM). Parasuraman et al.'s (1985) work omitted the sending of WOM (focus on WOM → product experience) and was only of exploratory nature. Finn et al. (2009) did not measure psychological antecedents to disconfirmation perceptions and did not address the psychological process that underlies the service experience (focus on service experience → WOM).

To our knowledge, the only model that conceptualizes WOM as both input and output of psychological processes was proposed by Buttle (1998, p. 246). According to Buttle's model, the "intrapersonal environment" involved in the transmission of WOM comprises an expectation-disconfirmation process. Within that expectation-disconfirmation process, expectations and perceptions are compared and result in either satisfaction, dissatisfaction or

delight. Satisfaction and delight are assumed to promote positive WOM, dissatisfaction is assumed to yield negative WOM. However, because of several shortcomings, Buttle's model cannot be regarded as a comprehensive transmission model of WOM: First, in his model, Buttle does not specify the connection between WOM input and the disconfirmation process. Second, the concrete psychological process by which expectations and perceptions are compared is not addressed. Third, it remains unclear, how satisfaction, dissatisfaction and delight, which are suggested to be distinct psychological states, should predict different levels of WOM valence or WOM activity. Fourth, Buttle did not deduce hypotheses based on his model. Thus, a comprehensive, testable process model of the intra-individual transmission of WOM is still missing and the explanation of WOM spread remains insufficient.

We therefore propose a testable three-step model of the transmission of WOM, connecting the reception of WOM to the sending of WOM (see Figure 2.1) by building on theories of social influence, product experience and WOM sending. The process of WOM transmission is broken down into three steps: (1) The reception of WOM, (2) the product or service experience, and (3) the sending of WOM. First, based on theories of social influence (Cialdini & Goldstein, 2004; Deutsch & Gerard, 1955) and attitude theory (Fishbein & Ajzen, 1975), we expect incoming WOM to affect expectations of product or service quality. Second, based on expectancy-disconfirmation theory (Oliver, 1980; Santos & Boote, 2003), we expect that expectations and quality perceptions interact to yielding product or service satisfaction. Third, according to theories of WOM sending (Alexandrov et al., 2013; De Matos & Rossi, 2008), we expect product or service satisfaction to affect WOM activity and the valence of the WOM sent.

In the following three sections, we deduce hypotheses for each step of the transmission model, based on the respective theories of social influence, expectancy-disconfirmation and WOM sending.

2.3.2 Reception of WOM

In the first step of the model of intra-individual WOM transmission, we conceptualize how the reception of WOM leads to the formation of expectations about product performance. Expectations about products, services and outcomes in general are a key concept in consumer research, however the antecedents of these expectations received comparably little attention. Among the antecedents discussed are prior experience, advertising, and WOM (Boulding et al., 1993; Zeithaml et al., 1993). In the absence of other sources of information, each of these antecedents should be the predominant predictor of subjective expectations. Hence, in a setting where WOM is the main source of information, WOM should strongly affect product expectations.

There are two theoretical explanations for this relationship. The first one is based on the definition of product expectations as "pretrial beliefs about the product" (Olson & Dover, 1979). Following this definition, WOM could be considered a source for attitude formation: WOM exposes people to information, which then affects the believe structure of a person including their expectations (Fishbein & Ajzen, 1975; Olson & Dover, 1979). The second explanation is based on the concept of informational social influence. Deutsch and Gerard (1955, p. 629) defined informational social influence as "influence to accept information from another person as evidence about reality". According to Cialdini and Goldstein (2004) people accept informational influence from others to pursuit the goal to form accurate perceptions of reality and react accordingly. Thus, if people accept the information transmitted by WOM as evidence about a

certain product, they should form corresponding expectations about this product. Informational social influence is expected to be particularly strong, when there is no or only ambiguous prior knowledge about a product (Cohen & Golden, 1972). In summary, both attitude theory and social influence theory predict, that people form or respectively change their expectations about an object according the valence of the social messages they are exposed to. Thus, in our first hypothesis we predict:

Hypothesis 1: The valence of WOM is positively related to the expectations of product performance.

2.3.3 Product Experience

In the second step of our WOM-transmission model, we conceptualize the connection between product expectations and product satisfaction. From a standard economic perspective, product performance should be the only driver of satisfaction with the product. This assumption was challenged by empirical evidence that expectations affect the evaluation of products (Cardozo, 1965): When product performance is low, high expectations lead to inferior evaluations than low expectations. This finding was subsequently interpreted as "a negative disconfirmation of an expectancy, [...] that produced an unfavorable product evaluation" (Engel, Kollat, & Blackwell, 1968, p. 513) and led to the development of expectancy-disconfirmation theory (Anderson, 1973; Oliver, 1977; Olshavsky & Miller, 1972). According to the expectation-disconfirmation theory, disconfirmation is defined as the psychological combination between expectation and perceived performance, which ultimately leads to product satisfaction or dissatisfaction.

Regarding the question, how this psychological combination of expectations and performance perceptions is actually performed, Oliver (1980) proposed the expectation to serve

as an adaptation level, which constitutes a reference point for future perceptions. People are assumed to perceive new stimuli in relation to their adaptation level (Helson, 1964a). If the performance of a product or service matches the expectation, the expectation is confirmed. Performance perceptions falling short of the expectation cause negative disconfirmation, performance perceptions exceeding the expectation lead to positive disconfirmation. Satisfaction is assumed to be the "additive combination of the expectation level and the resulting disconfirmation" (Oliver, 1980; p. 461).

While Oliver did not formally describe the mental combination of expectations and perceived performance perceptions yielding disconfirmation, it is implied to be a difference function (perceived performance minus expectations; Oliver, 1980, p. 461); a notion, that has been picked up by subsequent research (e.g., Bolton & Drew, 1991). However, taken together, the assumptions that disconfirmation is the linear difference of perceived performance minus expectations and that satisfaction is the linear additive combination of expectations and disconfirmation logically imply that satisfaction is only driven by performance, because the two effects of expectation in both processes cancel each other out. Only when at least one of the combinations of perceived performance-expectations and expectations-disconfirmation is *non-linar*, one cannot necessarily assume the above-described nullification of the expectation effect.

Contrast theory (Hovland, Harvey, & Sherif, 1957) was proposed as a mechanism for a nonlinear combination of perceived performance and expectations. If expectations and performance perceptions diverge, contrast theory predicts that people are surprised and subjectively magnify the disparity by shifting their evaluations away from the original expectation (Anderson, 1973; Olshavsky & Miller, 1972).

For the process of satisfaction formation as a part of the proposed model of intra-individual WOM transmission, we argue that expectations that are created by WOM messages - which has been accepted as evidence about reality - should form a strong reference level against which perceptions are compared. A positive disconfirmation of this expectation should cause higher levels of satisfaction; a negative disconfirmation should cause lower levels of satisfaction. Additionally, a significant deviation from individual expectations regarding the product performance should surprise people, increase the perceived disparity and consequently further increase or decrease satisfaction in the direction of the disconfirmation. Thus, according to the reference level model (Oliver, 1980) and contrast theory (Anderson, 1973; Hovland et al., 1957; Oliver & DeSarbo, 1988), we predict:

> *Hypothesis 2a*: The more the experienced product performance exceeds the expected product performance (positive disconfirmation), the higher is the satisfaction with the product.

> *Hypotheses 2b*: The more the experienced product performance falls short of the expected product performance (negative disconfirmation), the lower is the satisfaction with the product.

When expectations and perceived performance match, expectations are confirmed. According to the reference level model (Oliver, 1980), in the case of confirmation one would expect satisfaction to vary according to the level of the initial expectation. According to Santos and Boote (2003), confirmation of high initial expectations should satisfy desires and thus causes strong satisfaction or even delight. Low initial expectations of how the product will perform should fall short of what is tolerable to the person, and confirmation of these low initial

expectations should cause dissatisfaction. Thus, according to the reference level model (Oliver, 1980) and to Santos and Boote (2003) we predict:

> *Hypothesis 2c*: When the experienced product performance matches the expected product performance, satisfaction is positively related to the expected product performance.

2.3.4 Sending of WOM

In the third step of the WOM-transmission model, we connect product satisfaction to the sending of WOM. There has been some disagreement whether product satisfaction should be defined as an attitude. While Oliver (1980) differentiated satisfaction from attitude, the majority of subsequent works explicitly or implicitly define satisfaction either as an attitude-like evaluative judgment (Mano & Oliver, 1993), or as a specific type of attitude itself (Homburg, Koschate, & Hoyer, 2006). However, since attitudes themselves are defined as evaluative cognitions (Eagly & Chaiken, 1993, 2007; Fazio, 2007), this distinction appears unessential. For the present study, following Homburg et al. (2006), we define satisfaction as specific type of attitude.

Looking at the effect of product satisfaction on WOM, two focal outcomes have been differentiated in the literature (e.g., De Matos & Rossi, 2008): WOM *activity*, the intentionally sending of messages, and WOM *valence*, the positive or negative evaluation transmitted by these messages.

Regarding WOM activity, it has been proposed, that both high levels of satisfaction and dissatisfaction trigger the sending of WOM messages. Highly satisfied or even delighted customers are expected to have a desire to share this experience with others (Maxham III & Netemeyer, 2002). Dissatisfied consumers are expected to engage in negative WOM or complaining in order to "vent" negative emotions such as anger or frustration (De Matos &

Rossi, 2008). According to Alexandrov et al. (2013), self needs (self-enhancement, self-affirmation) and social needs (social comparison, social bonding) underlie the intentions to share information and to help others. In their meta-analysis of WOM antecedents De Matos and Rossi (2008) found a linear positive effect of satisfaction on WOM activity of r = .42. However, based on the above described theoretical considerations a u-shaped relationship between satisfaction and WOM activity should be expected, in such a way that both high and low levels of satisfaction yield higher WOM activity, compared to medium levels of satisfaction.

Hypothesis 3a: There is a u-shaped relationship between satisfaction and WOM activity: High and low levels of satisfaction are associated with higher WOM activity than medium levels of satisfaction.

The connection of satisfaction to the valence of WOM received very little direct attention in the theoretical literature about the relationship between satisfaction and WOM. This may be due to the fact that the above mentioned theoretical explanations for people engaging in WOM activity (Alexandrov et al., 2013; De Matos & Rossi, 2008; Maxham III & Netemeyer, 2002) are already implying that people communicate their attitudes truthfully: It appears self-evident that only by sharing the honest evaluation, one can share the emotions experience and/or help others. Indeed, De Matos and Rossi (2008) found a meta-analytical beta weight of .90 of satisfaction predicting WOM valence. Accordingly, we expect a positive relationship between satisfaction and WOM valence.

Hypothesis 3b: There is a positive relationship between the satisfaction with the product and the valence of the WOM sent.

2.4 Method

We tested our hypotheses in an experimental online study using a business-to-business scenario. Participants were instructed to take the role of a drug store manager whose goal is to select the best performing products for his/her store. To incorporate WOM, participants were led to believe they could receive electronic messages from previous participants (i.e., previous 'store managers') and send electronic messages to future participants (i.e., future 'store managers').[2] In fact, we manipulated these messages to achieve experimental control over the stimulus material the participants were exposed to.

We chose a business-to-business setting, because thereby product performance could be scaled objectively in terms of wins and losses. Additionally, wins and losses of a product could be directly linked to the study compensation and thus had real consequences for participants. A potential issue of the business-to-business setting is that participants may perceive themselves in competition with other participants, which would undermine WOM activity motivated by cooperation and helpfulness (Alexandrov et al., 2013). In order to provide a cooperative framing, participants were instructed that both they and the alleged WOM addressees ("other store managers") were all members of the same drug store chain.

In the course of the study, we manipulated two independent variables. As the first independent variable, we manipulated the valence of alleged WOM to induce variance in product performance expectations. As the second independent variable, product performance was

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[2] Even though in early works typical WOM was conceptualized as an oral message (Arndt, 1967), later research included written messages (Herr et al., 1991) and aggregated electronic messages, such as star ratings (Chen et al., 2011).

manipulated to induce variance in perceived performance, independent of the variance in product expectations. As dependent variables, product satisfaction, intentions to send WOM, and actual WOM sending were measured.

2.4.1 Procedure and Study Materials

On the first page of the online study participants were presented a statement of compliance. On the second page the scenario was described and participants were instructed to take the role of a drug store manager and to try to choose the best performing products for their fictional stores. It was announced that there was no prior record for the product's performance at the "participant's own store", but that the drug store chain would transmit ratings of ten "other store managers (participants)" that recently purchased the products for their stores. Participants were furthermore informed that the amount of compensation for the study depended on the performance of the products they chose.

On the following pages participants absolved eleven trials.[3] During the first ten trials, no manipulations took place and each participant was presented a similar sequence of WOM messages in randomized order. Product performances of the displayed products correlated positively with the valence of the associated WOM messages. That is, during the first ten trials the better-rated products also performed better. The purpose of this procedure was to provide a learning phase that resembled a naturalistic experience with WOM - as it would be highly implausible for performance ratings and performance to be completely unrelated. Within each trial, participants had to choose between two products. Each pair of products looked identical, as they were neutral shapes of common drugstore products. Above the product shapes, participants

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[3] For a visualization of the procedure within one trial, see Appendix A.

were reported the alleged WOM of ten previous participants in the form of "thumb up" and

"thump down" counters. For example, positive WOM could take the form of "9-1", which

indicated that nine out of ten previous participants recommended the product ("thump up") and

one participant disadvised the product ("thump down"). After choosing one of the two products,

participants were asked which product performance they expected, measured on a visual scale

ranging from -1000 to +1000 monetary units, which the fictional drug store generated or lost

with a chosen product, graduated in steps of 50 units. Thus, product performance expectations

could take 41 values. Next, participants received feedback on the performance of the chosen

product. Product performance could take values between +1000 and -1000 monetary units,

graduated in steps of 50 units, analogous to the measurement of product performance

expectations. By using the same metric for the expected and actual product performance,

discrepancies should be made immediately salient. At the end of each trial, WOM intentions,

WOM sending and product satisfaction were measured. Intentions to send WOM were measured

with a seven-point likert scale, ranging from (1) "To other store managers I would certainly

disadvise this product" to (7) "To other store managers I would certainly recommend this

product". WOM sending was measured by giving the possibility to either recommend

(visualized by "thumb up") or disadvise (visualized by "thumb down") the chosen product to

"other store managers". As a third option, it was possible to do neither (visualized by a circle).

Satisfaction with the product was measured with a seven-point likert scale, ranging from (1) "I

am very dissatisfied with the product" to (7) "I am very satisfied with this product".

The eleventh trial resembled the previous trials, however, the independent variables WOM

valence and product performance were manipulated. The valence of WOM was manipulated by

randomly displaying one of five different distributions of positive and negative ratings: 9-1, 7-3,

5–5, 3-7 and 1-9. Product performance was manipulated by randomly varying the profit, respectively loss to take on of the 41 values between +1000 and -1000 monetary units, graduated in steps of 50 units. Furthermore, in eleventh trial, identical WOM for both products at choice was presented to ensure that the assignment to the experimental conditions could be fully controlled and did not depend on the participants' choice. For example, participants assigned to the condition "7-3" were presented two products with each seven "thumbs up" and three "thumbs down". At the end of the eleventh trial, the dependent variables WOM intentions, WOM sending and product satisfaction were measured analogous to the first ten trials.

After the completion of eleven trials, participants were asked additional questions on how they perceived the relationship to other store managers, on the perceived credibility of the information exchange, on their suggestibility and on their experience with online-rating systems. For a complete display of these questions, see Appendix B. On the last page of the study, demographic characteristics were measured and participants were thanked for their participation.

2.4.2 Sampling and Participants

Participants were recruited via an e-mail panel established at the psychology department of a German university and by posting the link to the experiment on social websites such as Facebook. Out of 608 participants, 417 completed the study. According to pre-tests, nine minutes was judged to be the minimal conceivable time to complete the study earnestly. A faster completion was only achievable with a "click-through behavior", without paying attention to the content displayed. 147 participants took less than nine minutes to complete the study and were

therefore excluded from the sample.[4] Analysis were conducted with the 269 remaining

participants of which 56% were male, 39% female and 5% did not specify a gender. The age of

the participants ranged from 16 to 60 years with a mean of 26 years.

2.5 Results

2.5.1 Reception of WOM

To test the assumption of Hypothesis 1 that the valence of received WOM messages is

positively related to the expectations of product performance we conducted an oneway ANOVA.

It revealed significant differences in expectations of product performance between participants

that received WOM messages of different valence ($F(4, 265) = 78.67$, $p < .001$, $\eta_p^2 = .54$).[5]

Since the WOM message operationalized as likes - dislikes ratio has to be assumed as an ordinal

scaled variable, we chose nonparametric correlation to exemplify the relationship between these

and the expectations of product performance. Nonparametric correlation coefficients Kendalls

Tau ($\tau = .62$, $p < .01$) and Spearmans Rho ($\varrho = .74$, $p < .01$) indicate a strong positive

relationship between the valence of the received WOM messages and the expectations about

product performance. Thus, Hypothesis 1 was supported.

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[4] To check for the possibility that our results depended on the exclusion strategy, we run all

analyses for both the complete and the filtered sample. An analysis of the complete sample

yields results with similar conclusions as reported in this paper. A detailed comparison of the

results is displayed in Appendix C.

[5] Levene´s test did not reject the assumption of equality of variances ($F(4, 265) = .95$, $p =$

.438).

2.5.2 Product Experience

A common approach for the analysis of disconfirmation processes is to use difference scores of expectancy and performance (e.g. Kopalle & Lehmann, 2001; Swan & Trawick, 1981). However, difference scores provide only vague evidence of a potentially complex, three-dimensional relationship of three variables (Peter, Churchill, & Brown, 1993). In the case of a significant relationship with a difference score, it is not clear if the outcome variable is related to both antecedents, or just one of them (Edwards & Parry, 1993; Venkatesh & Goyal, 2010).

Thus, for a more thorough test of the effects of expectancy-disconfirmation on satisfaction, we conducted a polynomial regression with response surface analysis (Shanock, Baran, Gentry, Pattison, & Heggestad, 2010). Consistent with the general form of the equation to test for relationships using polynomial regression we applied $Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + e$ to test the effects of expectancy-disconfirmation on satisfaction. Table 2.1 displays the resulting coefficients from the polynomial regression. Figure 2.2 shows how these coefficients form a three-dimensional surface, which displays the relationship between expected product performance, perceived product performance and satisfaction.

Table 2.1

Polynomial Regression Response Surface Analysis Results for Expectancy-Disconfirmation and

Satisfaction Relationship

Response Surface Parameter	Standardized Main Effects	p
Confirmation line slope ($b_1 + b_2$)	.850	< .001
Confirmation line curvature ($b_3 + b_4 + b_5$)	.083	.794
Disconfirmation line ($b_1 - b_2$)	.712	< .001
Disconfirmation line curvature ($b_3 - b_4 + b_5$)	.139	.614

Note. n=269.

Table 2.2

Polynomial Regression Predictor Effects for Expectancy-Disconfirmation and Satisfaction

Relationship

Predictor	Standardized Main Effects	p
Intercept (b_0)	3.440 (SD = .154)	< .001
Experienced PQ (b_1)	-.781	< .001
Expected PQ (b_2)	.069	.098
Experienced PQ^2 (b_3)	.149	< .001
Experienced PQ x Expected PQ (b_4)	-.028	.475
Expected PQ^2 (b_5)	-.038	.358
R^2	.616	
Adjusted R^2	.609	

Note. Expected PQ = Expected product quality. Experienced PQ = Experienced product quality. SD = Standard

deviation. n=269.
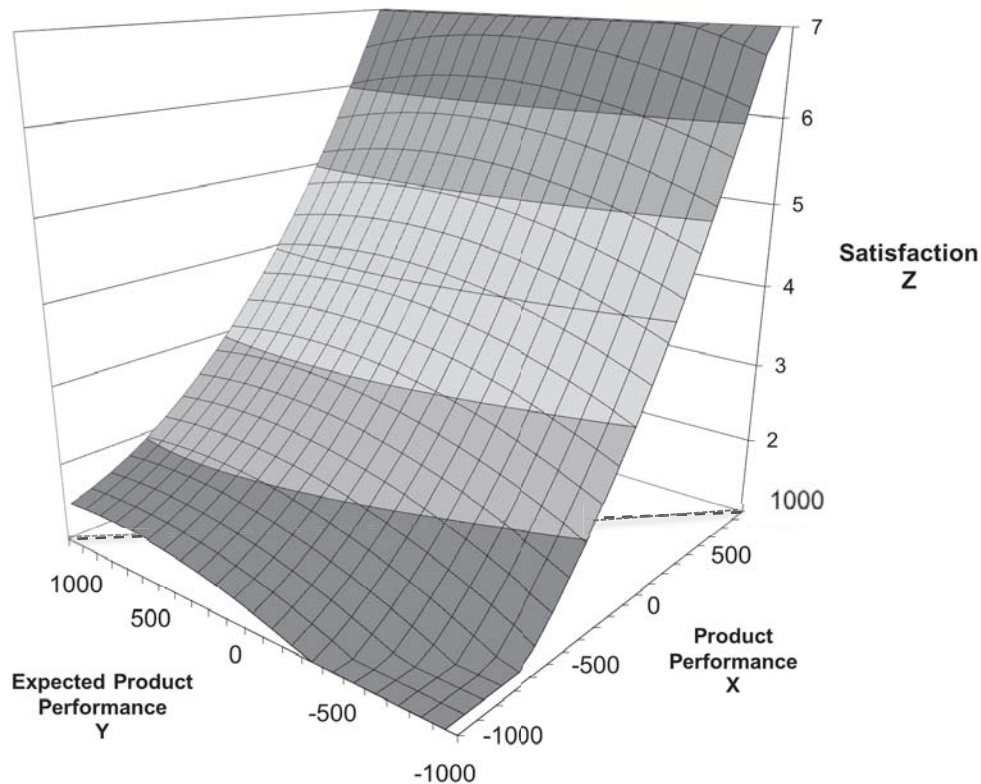
Figure 2.2. Response Surface Analysis

Based on expectancy-disconfirmation theory, only a direct influence of the difference score between expected and experienced product performance onto satisfaction is expected. This implies a significant positive slope for both variables, expected and experienced product performance, as well as a significant positive slope along the line of disconfirmation (when $x = -y$; dashed line in Figure 2.2).

As displayed in Table 2.2, there was no significant interaction between expected and experienced product performance ($b^*_{\text{expected PQ*experienced PQ}} = -.03$, $p = .475$). Furthermore, there was a significant main effect only for experienced product performance ($b^*_{\text{experienced PQ}} = .78$, $p < .001$) but none for expected product performance ($b^*_{\text{expected PQ}} = .07$, $p = .098$). The significant

positive slopes along the lines of disconfirmation and conformation ($b^*_{confirmation} = .85$, $p < .001$; $b^*_{disconfirmation} = .71$, $p < .001$) therefore are driven by the main effect of experienced product performance onto satisfaction. These results do not support Hypotheses 2a and 2b. However, due to the significantly positive slope of the confirmation line, the data supports Hypothesis 2c, which assumes a positive relationship between satisfaction and expected product performance, when the experienced product performance matches the expectations.

2.5.3 Sending of WOM

We hypothesized twofold effects of the participants' degree of satisfaction with their chosen product onto the sending of WOM messages. First, we assumed that the more extreme the satisfaction, respectively dissatisfaction of a participant with the chosen product is, the more likely the participant will send a word-of-mouth message. This assumption implies, that the relationship between the degree of satisfaction with a product and word-of-mouth production is u-shaped. Following Aiken and West (1991), we examined the following equation when testing this relationship:

$$Word\ of\ Mouth\ activty = b_0 + b_1(satisfaction) + b_2(satisfaction\ squared)$$

To reduce non-essential multicollinearity between the linear terms and their quadratic counterparts the degree of satisfaction was grand-mean-centered. To indicate a u-shaped relationship between the degree of satisfaction and word-of-mouth production, b_2 has to be positive and significant whereas b_1 has to be nonsignificant (Aiken & West, 1991, p. 66). The analysis showed not only a significant quadratic effect ($b^*2 = .535$, $p < .001$), but also a significant negative linear effect of satisfaction onto word-of-mouth production ($b^*1 = -.109$, $p = .043$). This supports the notion that very high and low degrees of satisfaction with a product lead to a higher likelihood of word-of-mouth production than medium degrees of satisfaction or

dissatisfaction, although this relationship is not necessarily straightly u-shaped (see Figure 2.3).

In addition, there seems to be a weak negative linear effect: lower degrees of satisfaction lead to

a higher likelihood of word-of-mouth production than higher degrees of satisfaction.
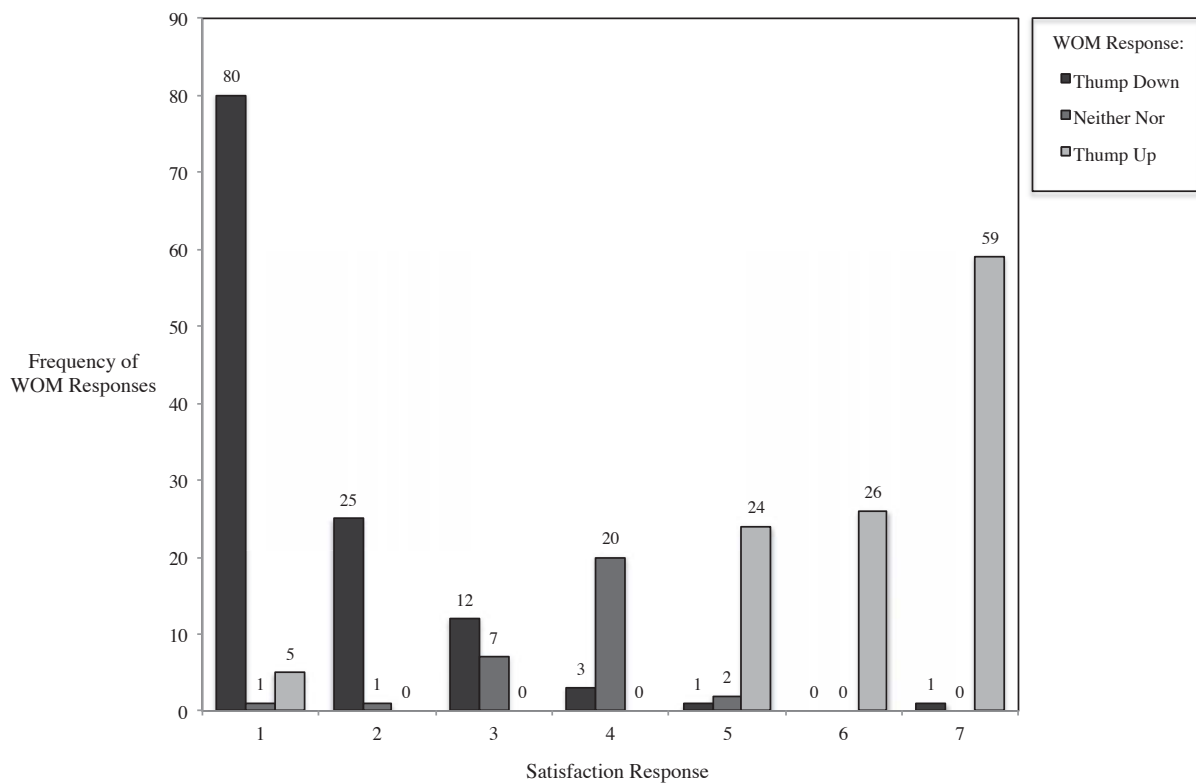
Figure 2.3. Satisfaction and WOM Sending

Secondly, a higher satisfaction with a product should respectively lead to more positive

word-of-mouth valence. We tested this assumption via nominal logistic regression. The model

revealed a significant fit ($\chi^2_{12} = 385.60$, p < .001) and a strong effect of satisfaction with the

product on the valence of the WOM message sent (effect size estimates: McFadden = .76,

Nagelkerke = .89).

2.6 Discussion

In this study, we developed and tested a three-step model of how WOM messages are transmitted through the individual market participant. Our main finding is that the hypotheses considering expectation formation (Step 1) and WOM sending (Step 3) were supported, but not the Hypothesis 2a and Hypothesis 2b (Step 2), considering the expectancy-disconfirmation process. Our data implies that, while incoming WOM affects expectations, expectations do not affect product satisfaction and WOM sending. Instead, product satisfaction seems to crucially depend on the perceived product performance. These findings suggest that product performance is highly relevant for WOM transmission, a notion heavily underrepresented in the current WOM literature.

2.6.1 Theoretical Implications

Regarding step 1 of the three-step model, the valence of WOM messages did positively affect product performance expectations, supporting hypothesis 1. This hypothesis was deduced from two theoretical streams, that make similar predictions: First, WOM messages serve as a basis for attitude formation including beliefs and expectations (Fishbein & Ajzen, 1975; Olson & Dover, 1976). Second, people accept WOM messages as evidence about reality (Deutsch & Gerard, 1955) and form corresponding expectations. Thus, in line with the extensive body of social influence research, our data indicates that WOM does affect people's expectations. However, it is important to note that in our setting WOM was the sole distinctive information source. Therefore, one cannot draw conclusions of the relative impact of WOM on expectations, in competition to other sources of information, such as previous product experience or advertising messages.

Regarding step 2 of the three-step model, we provided the first fully experimental response surface analyses of the expectancy-disconfirmation effect. In contrast to our hypothesis, expected product performance and actual product performance did not interact in predicting product satisfaction. Instead, only actual product performance had a significant effect on product satisfaction. Thus, our results do not support the predictions made by the expectancy-disconfirmation theory (Oliver, 1980; Santos & Boote, 2003) and are not in line with the majority of hitherto empirical findings regarding the effect of expectations on satisfaction (Szymanski & Henard, 2001).

Step 3 of the three-step model conceptualized the sending of WOM. As expected, our data indicated that low and high levels of satisfaction corresponded to higher levels of WOM production than to medium levels of satisfaction. However, there was an additional negative linear effect of satisfaction onto word-of-mouth production, in a way that low levels of satisfaction are related to more WOM production than high levels of satisfaction. This quasi-u-shaped relationship between satisfaction and WOM supports the theoretical assumption that people want to share positive experiences with others and vent negative emotions by telling others (De Matos & Rossi, 2008). An alternative explanation is that people are motivated to help each other, and therefore communicate advices and warnings to others about particularly good or bad products (Alexandrov et al., 2013). In this line, the negative linear effect could be regarded as an indicator that people are more eager to warn others about potential losses, than to advise them about potential gains. However, the negative linear effect was not initially hypothesized and should therefore be interpreted with caution.

Regarding the relationship between satisfaction and the valance of WOM, we found support for our hypothesis that the higher the satisfaction with a product, the more positive

WOM will be sent, the lower the satisfaction with a product, the more negative WOM will be sent. Put simply, the participants sent sincere messages to the other participants. As mentioned above, this could be explained by the need to share emotions, as well as by the motivation to help others by giving sincere advise.

In summary, the results of our study are in contrast to hitherto assumptions about WOM transmission. Most WOM models implicitly assume a simple "input equals output" process to capture consumers passing on WOM (van der Lans et al., 2010; Watts & Peretti, 2007). Our data does not support this notion. While incoming WOM does influence expectations and product choice, once people experience the product performance, their satisfaction is solely effected by this experience and not by their expectation. The satisfaction with the product affects WOM activity and the content that is communicated. Thus, our data suggests that WOM transmission via expectation might "become stuck" in the process of expectancy-disconfirmation.

However, our results do not imply that WOM may not be transmitted at all. We can think of at least two alternative models beyond the scope of our study how WOM input might trigger WOM output. First, there is ample evidence that WOM plays an important role for consumer decisions (Burnkrant & Cousineau, 1975; Cohen & Golden, 1972; Venkatesan, 1966). If WOM affects the consumption choices people make, it thereby influences which products these people experience. Following our results, if this product experience is positive, it should lead to the output of positive WOM. If product experience is negative, it should lead to the output of negative WOM. In this line of though, WOM would not actually be transmitted, but originally generated by every individual consumer. Furthermore, this would suggest that the volume of WOM in markets is more an indicator of product success than evidence of viral WOM. Second,

if people are motivated to help others by giving sincere advise (Alexandrov et al., 2013), credible WOM could be passed to others without first-hand experience of the product. If one accepts WOM as informational influence, respectively as evidence about reality (Deutsch & Gerard, 1955), one could help others by sharing this evidence, respective by sending WOM. This would imply that WOM might spread independent of the actual performance of a product: People would pass on recommendations and warnings they perceive as credible without any first hand experience on the topic.

2.6.2 Limitations and Future Research

The present study has several limitations, some of generic nature and some specific for the WOM transmission processes addressed. First, the operationalization of WOM as aggregated positive or negative messages ("thumb up" or "thumb down") is somewhat different to the classical conception of WOM as an oral message. However, since the advent of the Internet, aggregated electronic messages, such as ("likes" and "dislikes") are common and considered WOM in a particular medium (Chen et al., 2011). Still, the generalizability of the present results to other forms of WOM remains a question to be addressed by future research.

Second, the use of a business-to-business scenario raises the question if the present results could be generalized to end-consumer behavior. By framing other participants as members of the same drug store chain and by giving no incentive for competitive behavior, we aimed to preclude competitiveness that might be untypical for end-consumer networks. Nonetheless, future research is encouraged to contrast results on WOM-transmission acquired in different settings and networks, especially since in certain business-to-business and investment settings competitive attitudes and rivalry may indeed be relevant for the exchange, respective not-exchange of WOM.

Third, the participants were presented a forced choice paradigm, in which they had to choose one of two alternative products with identical WOM ratings. One could speculate that this choice setting might have induced different pre- and post-decisional processes than a free choice setting would have induced. For example, reactance could have been induced due to the lack of a no-choice alternative; dissonance reduction could have been the result of the possibility to attribute a poor choice on the experimental set up. Furthermore, these post-decisional processes such as dissonance reduction might be overlapping with the cognitive processes involved in the disconfirmation processes (Anderson, 1973). Future research should address these issues and further probe the disconfirmation process, taking advantage of methodological tools such as polynomial regression and response surface analysis.

Fourth, the operationalization of product performance might have impeded certain psychological processes involved in the disconfirmation effect: The present study was framed in the realm of retail investment choices and product performance was represented in the terms of wins and losses, with definite numeric feedback provided. We can think of two ways, this could have affected the outcomes. First, the abstract presentation of the products and the lack of personal product experience could have diminished the emotional impact of expectancy-experience discrepancies. According to Santos and Boote (2003), emotional reactions as delight or dissatisfaction are part of the expectancy-disconfirmation process. If abstract product representations and impersonal product experience diminish the emotional involvement, this could reduce the emotionally driven tendency to exaggerate expectancy-experience discrepancies. Second, the definite numeric representation of product performance could have created a highly unambiguous experience that leaves no scope for cognitive biases such as the contrast effect. Indeed, it was found that social influence (Wooten & Reed II, 1998) and

advertising (Hoch & Ha, 1986) only affected product evaluation, if the product experience was ambiguous and that product performance was only directly related to product satisfaction if product experience was unambiguous (Yi, 1993). Following this interpretation, one would propose ambiguity of product experience as a moderator of the disconfirmation effect and WOM transmission.

Foremost, future research could replicate our puzzling findings regarding the disconfirmation effect to counter the possibility of a type II error. Furthermore, the hypothesis that the ambiguity of product experience constitutes a moderator of the disconfirmation effect could be tested and integrated into the expectancy-disconfirmation theory. We argued above that, following Oliver's (1980) disconfirmation model, in the case of strictly linear combinations of expectations, perceived performance and disconfirmation, the two effects of expectations on satisfaction should cancel each other out, resulting in a zero effect of expectations on satisfaction. It seems plausible that, by presenting product performance very unambiguously, we might have unwillingly created the frame conditions for this special case of linear combinations. However, to thoroughly examine this hypothesis, future research needs to experimentally manipulate the ambiguity of product experience as well as to measure the two sub-steps of the disconfirmation process separately: Perceived performance minus expectations yielding disconfirmation and disconfirmation plus initial expectations yielding satisfaction. Thereby, possible nonlinear effects could be located along the assumed disconfirmation process.

We also encourage future research to further investigate, which motives in particular underlie WOM production at different levels of satisfaction and the mediating psychological processes involved. There are categorizations of different psychological functions underlying WOM activity (Berger, 2014), and scales capturing motives to engage in WOM have already

been used to explore different types of WOM agents (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004). We believe that an intriguing avenue for research could be to explore the situation specific process of WOM by looking into the connection of motives for WOM with psychological state variables such as product satisfaction and interpersonal trust.

Motives for WOM might also play an important role for the understanding of WOM transmission. As mentioned above, WOM transmission appears possible without first-hand experience. However, a presupposition for this type of transmission is that people send WOM out of the motivation to help others. Models of WOM production that assume that people send WOM to share or vent emotions, would not predict WOM sending in the absence of direct product experience and subsequent emotional reactions. By testing these assumptions, future research could investigate the context conditions in which different models of WOM production apply.

Finally, future work needs to explore the implications of proposed WOM transmission (or not-transmission) models for the spread of WOM in markets and ultimately for the success of products and services. Because simple "input equals output" models of intra-individual WOM transmission are insufficient, further psychological theory development of individual processes must complement network models of (viral) WOM marketing. Such approaches can lead to intriguing research questions, for example, what market level patterns of WOM activity and product success are to be excepted, when market participants are modeled to act according to the here presented model? How would possible moderators, such as performance ambiguity, affect these WOM activity patterns? Under which circumstances does WOM transmission, without first-hand experience, occur - and does this type of transmission account for phenomena like hypes and hoaxes? Questions like these are hard to address empirically with formalized

theorizing and analytical proof. However, simulation methods, such as agent-based modeling, might help to make theory-based predictions of how individual behavior, network properties and product characteristics interact to yield product success (Libai et al., 2010). These predictions then could serve as hypotheses for further empirical work and theory development.

2.6.3 Implications for Marketing Practice

WOM marketing is advocated as one of most powerful and modern tools for marketing products and services. After "seeding" the product or service among supposedly influential consumers, positive WOM should spread through the network (Kozinets et al., 2010). Are these claims justified? After all, most WOM campaigns are said to fail.

Our results do not challenge the importance of WOM for individual customer decisions. However, for positive WOM to spread, a crucial part of the process seems to be neglected by WOM models: the performance of the product or service itself. Put simply, our results imply that people will consume what is recommended, but only recommend what they like. For the professional marketer this implies that, while seeding strategies and understanding of the customer networks are important to efficiently kick off a WOM campaign, product performance and a positive product experience for customers are decisive factors for the long-term success of this product. Thus, the best recommendation would be to combine "classical" means of market research in order to create a satisfying product or service experience, with WOM marketing strategies to spread the product or service adoption through the network. As trivial as the advice "care for performance and quality" might sound, this fact seems underrepresented in contemporary WOM marketing concepts.

Our results further imply that WOM activity is strongest for high or low levels of satisfaction. Furthermore, tentative findings indicate that WOM activity might be particularly

strong for low levels of satisfaction. Considering the strong connection of product performance and satisfaction these findings imply that seeding a WOM campaign for a product with inferior quality might not only not yield positive WOM, but even create a backslash of negative WOM. While in general professional marketers would try to avoid negative WOM activity, in some fields there might be "no such thing as bad press". In cases when the marketing goal is to create a maximum of WOM activity regardless of the valence, one would recommend creating products that strongly polarize.

2.6.5 Conclusion

In our study, we proposed and tested a comprehensive model of intraindividual WOM transmission. The results support the importance of WOM for the formation of expectations as well as the impact of product satisfaction on WOM sending. Regarding the process of satisfaction formation, our results underline the importance of product performance and imply that initial expectations may not always play the role proposed by the expectancy-disconfirmation theory. Altogether, our results challenge the assumption that WOM is readily passed on by individuals. We encourage future research to replicate these findings and to explore the role of potential moderators of the WOM transmission process, such as the ambiguity of performance perceptions. Finally, we hope that psychological models of individual level WOM processes can complement the understanding and research of the collective dynamics of WOM in markets.

Spanning Chapter 2 and Chapter 3

In Chapter 2, a three-step model of intra-individual WOM transmission was developed based on theories of social influence, expectancy-disconfirmation and WOM sending. Expectancy-disconfirmation effects were hypothesized to link the intra-individual WOM transmission at step 2 of the model. Yet, the results of the online experiment did not reveal any effect of performance expectations on satisfaction. Thus, the results of the experimental study imply that the intra-individual WOM transmission seems to "become stuck" at the stage of expectancy-disconfirmation.

In the course of the interpretation of the 'null' expectations-satisfaction effect it became apparent that expectancy-disconfirmation theory actually resembles a malleable compilation of sub-theories and unclear conceptual propositions. Additionally, there is no current and conclusive summary of the available evidence regarding expectancy-disconfirmation effects. Therefore, the decision was made to conduct both a critical qualitative review of the disconfirmation literature and a meta-analysis of the available evidence regarding expectancy-disconfirmation effects. The review is presented in the following Chapter; the meta-analysis is presented in Chapter 4 of this thesis.

Chapter 3: Expectancy-Disconfirmation Theory - A Critical Review

3.1 Abstract

What are the effects of expectations - and their (dis-)confirmation - on consumer satisfaction? While this question is a dominant topic in consumer research, a conclusive answer and clear evidence-based advise for marketers are still missing. In a critical review, we[6] argue that expectancy-disconfirmation theory, and the perceived disconfirmation paradigm in particular, have not resolved inconsistencies of sub-theories of disconfirmation (dissonance theory and adaptation level theory) and remain unclear on the process of disconfirmation formation. Moreover, the most common operationalizations of disconfirmation (difference scores and direct measurement) and analysis methods (linear path analysis) are unsuitable approaches to the study of discrepancy-based phenomena such as disconfirmation. We propose to address these issues by making use of polynomial regression as an alternative analysis method and by clarifying the disconfirmation concept. We therefore offer a comprehensive model of four disconfirmation types related to four different discrepancies, as a framework for future research.

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[6] This chapter is based on a manuscript submitted for publication to the Journal of Consumer Research in July 2018, authored by Tom Schiebler (first author) and Felix C. Brodbeck.

3.2 Introduction

Imagine you are a craftsman and you personally deliver a piece of work to a customer. Just after the handover, the customer asks you, "Honestly, is this piece very high-quality?" How do you respond? Obviously, you want the customer to be satisfied with your work. But could you influence their judgment positively by praising your work beforehand? Or should you try to be overmodest and hope a pleasant surprise will boost the rating?

This issue describes the core question of disconfirmation research: What are the effects of expectations - and their (dis-)confirmation - on satisfaction? Consumer research on this topic was initiated in the 1960s and has evolved into the predominant framework for consumer satisfaction research, described by expectancy-disconfirmation theory (Cadotte, Woodruff, & Jenkins, 1987; Oliver, 2010). However, despite a multitude of studies on expectancy-disconfirmation, the answer to our introductory question remains unclear. Disconfirmation theory integrated theories of assimilation and contrast (Cardozo, 1965; Olshavsky & Miller, 1972) that suggest contrary action: If satisfaction is assimilated toward initial expectations, one should overstate the performance; if contrast moves satisfaction away from initial expectations, one should aim to lower initial expectations. Yi (1990) tentatively suggested that the majority of studies support assimilation theory, however, there has been no comprehensive review of the theoretical and empirical work assembled since.

Furthermore, the majority of studies on disconfirmation did not focus directly on the question of the direction of disconfirmation effects (assimilation or contrast), but studied the relationships of *perceived* disconfirmation as an independent construct. While a positive relationship of perceived disconfirmation and satisfaction is assumed to indicate a contrast effect (Oliver, 2010), studies rarely tested competing hypotheses regarding assimilation and contrast

effects. Empirical evidence on the role of perceived disconfirmation is mixed: Numerous studies found significant relationships of perceived disconfirmation with consumer satisfaction (Oliver, 2010; Yi, 1990), while other studies found small or zero effects (Alford & Sherrell, 1996; Churchill & Surprenant, 1982). The most recent quantitative summary of the antecedents of satisfaction (Szymanski & Henard, 2001) found a large heterogeneity regarding correlations between disconfirmation, expectations, performance, and satisfaction, with few moderators to explain the variance.[7] Additionally, there is evidence that perceived disconfirmation lacks hypothesized relationships with its assumed antecedents (Spreng & Page Jr, 2003).

In the present review, we argue that the heterogeneity of evidence in disconfirmation research is rooted in unresolved ambiguities and shortcomings regarding underlying disconfirmation theories and in the common, but partially misleading, methodological approaches taken in disconfirmation research. Based on previous qualitative and quantitative reviews (Oliver, 2010; Szymanski & Henard, 2001; Yi, 1990) and our own search, we reviewed over 300 studies on disconfirmation effects. To convey a thorough analysis of the issues of disconfirmation research and to integrate these issues into applicable advice for future research, we structured our review into three parts: In the first part, we give a brief overview of the past course of disconfirmation research. In the second part, we analyze the issues and ambiguities

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[7] Szymanski and Henard (2001) found no moderators for the disconfirmation-satisfaction or expectation-disconfirmation relationship. The expectation-performance, expectation-disconfirmation, performance-disconfirmation and performance-satisfaction relationships were partly moderated by comparison standard (based on prior experience vs. expected), method type (survey vs. experiment) and participants (non-students vs. students).

regarding disconfirmation theories (dissonance, contrast, and adaptation level theory) and disconfirmation testing methodologies (the use of difference scores, direct measurement and linear analysis models). We conclude that certain theoretical and methodological issues have affected initial disconfirmation research, and that ensuing research based on the perceived disconfirmation paradigm has not resolved these issues. Instead, it appears that the frequent use of the perceived disconfirmation paradigm resulted in additional ambiguities. In the third part, we discuss implications for future research and marketing practice, and we propose a comprehensive disconfirmation typology based on a model of underlying discrepancies resulting in an integrative step-by-step roadmap for future disconfirmation research.

3.3 A Brief History of Disconfirmation Research

In the first widely recognized publication on the effects of expectations on consumer satisfaction, Cardozo (1965) applied contrast and assimilation theory to the psychology of product evaluations. Cardozo argued that, in general, contrast effects should move satisfaction ratings away from initial expectations. The only exception would be if a consumer exerts high effort to obtain a product that then fails to meet expectations, the customer should assimilate the satisfaction rating toward the initial expectation to reduce cognitive dissonance. As expected, in the low effort condition, participants with high expectations evaluated a pen less favorably than participants with low expectations, a trend that was reversed for participants in the high effort condition.

Anderson (1973) extended the theoretical framework of assimilation and contrast by introducing generalized negativity and assimilation-contrast as possible psychological mechanisms for disconfirmation. According to the thesis of generalized negativity, the discrepancy between expectation and performance itself is an aversive state, regardless of its

direction. This aversive state should then generalize to the product or service. Thus, any form of disconfirmation, positive or negative, should make evaluations more negative and reduce satisfaction. Assimilation-contrast theory combines the assimilation and contrast model: If the discrepancy between expectations and performance is relatively small, assimilation effects are expected, if the discrepancy is large, contrast effects should dominate the evaluation.

In the early 1970s four experimental studies provided mixed evidence for the disconfirmation propositions of assimilation and contrast effects brought forward in the respective theories. Cohen and Goldberg (1970) and Olson and Dover (1976) both reported inconclusive, nonsignificant results, Olshavsky and Miller (1972) provided evidence for an assimilation effect, while Anderson (1973) found evidence for assimilation-contrast effects. Taken together, there was no clear evidentiary picture of what effects are to be expected due to disconfirmation.

In the late 1970s the field of disconfirmation research shifted its predominant paradigm. Instead of testing competing theories predicting assimilation and contrast effects, most research focused on the role of directly measured perceived disconfirmation. While Oliver (1976) and Swan and Combs (1976) were the first to use scales to measure perceived disconfirmation, Oliver (1977) made the theoretical case for direct measurement of disconfirmation: Disconfirmation should be defined as a subjective psychological variable and, as such, measured by directly asking the participants whether the performance was either *better than expected* or *worse than expected*. Additionally, referring to Weaver and Brickman (1974), Oliver (1977) argued that previous research implied an axiomatic negative correlation between expectations and disconfirmation that would result in a conceptual over-determination if all three variables (expectations, performance and disconfirmation) were included in one model. According to

Oliver (1977), direct measurement solves the over-determination problem by allowing disconfirmation to be independent of initial expectations.

In the following years, Oliver (1980), Oliver (1981) and Churchill and Surprenant (1982) applied and extended the "new paradigm" of direct measurement in three articles that were to become the most heavily cited publications in the field of disconfirmation research. The majority of studies performed after 1977 used the direct measurement paradigm, mostly referring to Oliver (1980). Most of these studies tested the relationship of perceived disconfirmation and satisfaction in path models, controlling for perceived performance, prior expectations and possible intervening variables such as consumption emotions (Oliver, 1993) or disconfirmation sensitivity (Kopalle & Lehmann, 2001).

In the following decades, the perceived disconfirmation paradigm became the "state of the art" of disconfirmation research (Oliver, 2010; Yi, 1990). Most studies that used the perceived disconfirmation paradigm provided only a rudimentary theoretical basis for disconfirmation, by stating that satisfaction is a function of expectations and disconfirmation, without detailing out the underlying process (e.g. Diehl & Poynor, 2010; S.-E. Lee, Johnson, & Gahring, 2008; Oliver, 1993; Phillips & Baumgartner, 2002; Tam, 2011). Some publications presented no theoretical foundation at all, but merely referred to prior literature on disconfirmation (e.g. Shaffer & Sherrell, 1997).

More recent discussions in the field of disconfirmation research have centered around the circumstances under which perceived disconfirmation dominates over performance in predicting satisfaction, as well as whether disconfirmation models should be specified on a global or an attribute-level of performance (Oliver, 2010). Furthermore, the paradigm of perceived disconfirmation has increasingly been applied in specialized fields such as research on public

service satisfaction (e.g.: James, 2009; Morgeson, 2013; Poister & Thomas, 2011; Van Ryzin, 2013), tourist satisfaction (e.g.: Del Bosque & Martín, 2008; S. Lee, Jeon, & Kim, 2011; Loureiro, 2010; Vinh & Long, 2013) or patient satisfaction with medical care (e.g.: Bell, Kravitz, Thom, Krupat, & Azari, 2002; Chong, 2012; McKinley, Stevenson, Adams, & Manku-Scott, 2002; Walton & Hume, 2012). Indeed, the central question of whether the perceived disconfirmation paradigm is universally the most effective approach to disconfirmation research has received little attention in nearly four decades.

Nevertheless, the fundamental questions that guided Cardozo's initial research in 1965 is still not sufficiently addressed: Are assimilation or contrast effects more dominant in satisfaction formation? According to Oliver (2010), both assimilation and contrast could or could not apply in certain settings. Beyond assimilation and contrast, disconfirmation research comprises multiple additional underlying theories, concepts and operationalizations. However, these theories, concepts and operationalizations do not seem to complement each other in a reasonable way, but rather offer competing interpretations and contradictory predictions.

To advance disconfirmation theory in the future, it is crucial to integrate these approaches into a unifying framework that clarifies the scope and interactions of disconfirmation sub-concepts and sub-theories. We believe that the starting point for such an endeavor needs to be a thorough and critical theoretical review of disconfirmation theory that challenges the assumptions of the perceived disconfirmation paradigm. In our view the dominance of this paradigm resulted in a negation of theoretically relevant questions, thereby hampering progress in the domain of expectancy-disconfirmation theories.

3.4 Review of Disconfirmation Research

Our review is based on a systematic search of the existing literature. First, we searched the databases EconLit, Business Source Complete and PsychInfo for sources including the terms "satisfaction", "disconfirmation", "expectation*" and any one of "consumer", "product", "service" or "marketing". The search obtained 4373 records. Titles were screened for relevance. Second, we screened the reference sections of key articles and reviews for relevant titles. Third, we screened issues of highly relevant journals (Journal of Marketing, Journal of Marketing Research, Journal of Consumer Research, Journal of Consumer Behaviour, Journal of the Academy of Marketing Science) for relevant titles. The screening of titles yielded 591 potentially relevant records. Next, we read the abstracts of these records, excluding 136 records as irrelevant. We then assessed the full texts of the remaining 455 records, excluding 130 records as irrelevant. Thus, our review is based on a body of 325 studies on disconfirmation.[8]

3.4.1 Theories Underlying Disconfirmation

While there are numerous disconfirmation effects discussed, the vast majority of research studied either one of the two opposing processes - assimilation and contrast. We therefore focus on the dominating theories underlying these effects: dissonance theory as a foundation of assimilation effects and adaptation level theory and the perceived disconfirmation paradigm as explanations for contrast effects.

Assimilation theories. The majority of disconfirmation studies referred to dissonance theory to explain assimilation effects. According to dissonance theory (Festinger, 1957), the way

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[8] Given the high number of studies on disconfirmation, the review is based on a selection of relevant sources.

people process information after they make a decision is biased: information in favor of the not-chosen alternative(s) and information against the chosen alternative should cause aversive cognitive tension (i.e. dissonance), which people aim to reduce. One way to reduce dissonance is to select and amplify information that makes the chosen alternative more attractive and/or the not-chosen alternative(s) less attractive. Information in favor of the chosen alternative and information against the not-chosen alternative is considered as consonant with the decision and should not cause dissonance.

Cardozo (1965) proposed dissonance reduction as a mechanism for assimilation in consumer psychology, a notion that was picked up by subsequent research (Anderson, 1973; Cohen & Goldberg, 1970; Yi, 1990). These researchers suggested that disconfirmation causes aversive dissonance that could be reduced by shifting the evaluation toward the initial expectation. However, dissonance theory predicts assimilation only in the case of negative disconfirmation (i.e. if a product falls short of what was expected) but not in the case of positive disconfirmation. According to dissonance theory, the information that a chosen product exceeds expectations is *consonant* with the choice and therefore should not trigger any specific reaction. Thus, dissonance theory falls short of explaining assimilation due to positive disconfirmation. To our knowledge, the case of positive disconfirmation has not been addressed in disconfirmation research, even though assimilation has been assumed in the range of positive disconfirmation (e.g. by Anderson, 1973).

However, we assert that dissonance theory can be amended to explain assimilation due to positive disconfirmation: Kopalle and Lehmann (2001) argued that the more perfectionist people are, the more these people should aim to form accurate predictions. Given this, it follows that the inaccuracy of the initial expectation causes aversive dissonance rather than the implications

of the choice, particularly for people high on perfectionism. In summary, the theoretical

foundation of assimilation effects by dissonance theory is incomplete. Future research is needed

to clarify under which circumstances, if at all, positive disconfirmation can be a source of

aversive dissonance that fuels the need to assimilate the evaluation in the negative direction.

Deighton (1984) and Hoch and Ha (1986) introduced an alternative theoretical foundation

for assimilation effects that was later labeled *hypothesis testing theory* (Yi, 1990). Based on

behavioral decision theory (Slovic, Fischhoff, & Lichtenstein, 1977), hypothesis testing theory

posits that consumers represent expectations as hypotheses and test these hypotheses in the

course of consumption with a confirmatory bias toward confirmation. More specific, consumers

are assumed to favor confirmatory evidence during the search, selection and processing of

information. In contrast to dissonance theory, hypothesis testing theory explains assimilation

effects of both negative and positive disconfirmation. Furthermore, Deighton (1984) and Hoch

and Ha (1986) found supporting evidence for hypothesis testing theory. We are thus surprised

that this promising theoretical approach has played a minor role in disconfirmation research, and

we encourage future disconfirmation research to consider both dissonance and hypothesis testing

theory as possible assimilation processes.

Adaptation level theory and the perceived disconfirmation paradigm. In order to

explain contrast effects, early disconfirmation research either referred to adaptation level theory

(Cardozo, 1965; Helson, 1964b) or social judgment theory (Anderson, 1973; Hovland et al.,

1957). However, after Oliver (1980, 1981) proposed adaptation level theory as a theoretical

basis for disconfirmation research, other contrast theories were abandoned. We therefore put our

focus on adaptation level theory as introduced by Oliver (1980, 1981).

According to adaptation level theory (Helson, 1948, 1959, 1964b), individuals create an adaptation level based on their prior experiences and individual characteristics and evaluate future experience in terms of deviations from the adaptation level. Oliver (1980) proposed that prior expectations serve as such an adaptation level, and that post decision deviations from this level lead to either positive, zero or negative disconfirmation, depending on the product exceeding, meeting or falling short of one's expectations. Satisfaction is then assumed to be an additive combination of one's "expectation level" and disconfirmation. Perceived disconfirmation should cause surprise that causes people to magnify the discrepancies, thus yielding a contrast effect (Oliver, 1977, 2010). Furthermore, Oliver (1977) argued that perceived disconfirmation, in contrast to prior disconfirmation conceptualizations, should be unrelated to prior expectations. Oliver (1977, p. 483) acknowledged that "one's expectation level may provide a baseline for disconfirmation", but did not elaborate what this means in terms of the interrelationship of expectations and disconfirmation.

While the perceived disconfirmation paradigm is undoubtedly a success story regarding its proliferation in consumer research, we identified several interrelated issues of this approach: (a) The assumption of expectation-disconfirmation independence is theoretically problematic, (b) it is unclear what the antecedents of perceived disconfirmation should be and (c) it is unclear if the perceived disconfirmation paradigm measures the same underlying discrepancy as commonly assumed. Ultimately, these three issues cast doubt on the utility of perceived disconfirmation as a *predictor* of consumer satisfaction.

Regarding the assumption of expectation-disconfirmation independence, we argue that this notion contradicts the common definitions and practical implications of disconfirmation and yields unresolved theoretical questions. Oliver (1977, p. 480) posited that "[t]he extent to which

[…] expectations are met determines the perceived disconfirmation experience". This definition implies that expectations are indeed negatively related to perceived disconfirmation. Oliver (1980, 1981) further stated that people "compare" performance perceptions and initial expectations and that products exceeding/falling short of expectations cause positive/negative disconfirmation. With these statements Oliver suggests a "performance minus expectation equals disconfirmation" process that is contradictory to the assumption of expectation-disconfirmation independence. Moreover, as a practical implication of perceived disconfirmation effects, Oliver (1977) advised against promoting high expectations, because the resulting negative perceived disconfirmation would lower consumer satisfaction. However, only if one assumes a causal relationship between expectations and perceived disconfirmation does it makes sense to attempt to influence disconfirmation by managing expectations. Put simply, the notion that lowering expectations prevents negative disconfirmation necessarily implies that increasing expectations *causes* negative disconfirmation.

One potential objection to our analysis is that the assumption of expectation-disconfirmation independence is only a minor issue within the perceived disconfirmation paradigm and that it might be resolved by an empirical analysis of that relationship. However, we argue that this it not the case, as the issue of expectation-disconfirmation independence is critical to disconfirmation theory as formulated by Oliver (1980, 1981) and needs to be resolved theoretically. If disconfirmation would be solely defined as performance perceptions *minus* expectations (Churchill & Surprenant, 1982), and satisfaction as disconfirmation *plus* expectations (Oliver, 1980), the opposing expectation effects would cancel each other out, rendering a trivial 'satisfaction equals performance perceptions' prediction. Thus, if

disconfirmation theory is meant to address effects above performance, *some* other process has to be in place.

The notion that disconfirmation is *not* performance perceptions minus expectations leads to the question: If not expectations, then what other antecedents of perceived disconfirmation are relevant, beyond performance? Disconfirmation theorists did not provide an explicit alternative process clarifying how perceived disconfirmation might be formed and how it is different from calculated disconfirmation. Swan and Trawick (1981) argued that perceived disconfirmation might differ from inferred disconfirmation because recalled expectations may be prone to dissonance, assimilation or contrast effects, and thus differ from initial expectations. However, this notion (a) is in contrast to the idea that people use *preconsumption* expectations as comparison standards to form disconfirmation (Oliver, 1981; Oliver, 1993; Zwick, Pieters, & Baumgartner, 1995) and (b) yields a logical problem: Expectations that are used to form disconfirmation cannot be already influenced by effects that are based on disconfirmation. In other terms: How could people determine what dissonance, assimilation or contrast effects apply to expectations *before* they compare expectations and performance to form disconfirmation?

Furthermore, it is doubtful that people use preconsumption expectations as comparison standards to form *perceived* disconfirmation (Oliver, 1981; Oliver, 1993), as expectations and performance can only be compared after the consumption experience when expectations have to be recalled. As already noted by Yi (1990), perceived disconfirmation measures relate to a different discrepancy than other types of disconfirmation: While early approaches that either manipulated performance and prior expectations or computed a difference score of perceived performance and *prior* expectations measured the discrepancy of performance-preconsumption

expectations, direct measures can only access perceptions of the performance-*recalled* expectations discrepancy.

While there is heterogeneity, the bulk of evidence supports a medium to strong positive relationship of perceived disconfirmation and satisfaction (Oliver, 2010; Szymanski & Henard, 2001). This evidence was usually interpreted as support for perceived disconfirmation as a predictor of satisfaction (Yi, 1990) and as support for a contrast effect (Oliver, 2010). The issues discussed above cast doubt on both interpretations. First, there are no clear antecedents of perceived disconfirmation beyond performance, and perceived disconfirmation might not be a predictor, but merely a covariate of consumer satisfaction. Second, as perceived disconfirmation measures discrepancy perceptions of performance and recalled expectations, the relation to contrast effects due to the disconfirmation of initial expectation is unclear.

The ambiguities associated with the perceived disconfirmation paradigm illustrate that it is no silver bullet to resolve the potentially complex process underlying disconfirmation. Instead, the blending of the methodological approach (measuring a discrepancy by asking for discrepancy perceptions) and theory (contrast due to positive emotional reactions) seemed to have obscured the progress of research. In order to constructively address these problems, it is necessary to consider the methodology of disconfirmation measurement and to clarify the understanding of disconfirmation and its underlying discrepancies. We will address both in the remainder of this review.

3.4.2 Disconfirmation Methodology

With the perceived disconfirmation paradigm, Oliver (1977; 1980; 1981) not only introduced a theoretical framework, but also established direct measurement and linear path-analysis as the common methodological approaches in the realm of disconfirmation research. In

this section, we review difference scores, direct measurement and linear path analysis, and illustrate that all of these methods are not suitable to test discrepancy hypotheses and potentially non-linear effects of disconfirmation processes. We conclude by proposing polynomial regression and response surface analysis as alternative approaches to test specific and nonlinear hypotheses.

Shortcomings of disconfirmation measurement. The most common approaches to operationalize disconfirmation were to calculate a difference score between initial expectations and to measure perceived disconfirmation directly. However, both approaches are methodologically flawed.

Regarding the use of difference scores in disconfirmation research, we identified at least five shortcomings. First, difference scores are usually less reliable than their component measures, in particular if the component measures are intercorrelated (Peter et al., 1993). Second, models including difference scores may invite unwarranted conclusions about both effects and non-effect, thus inflating both type I and type II error in hypothesis testing (Edwards, 2001). Third, the inclusion of difference scores may lead to the overspecification of statistical models (Edwards, 2001; Oliver, 1977; Yi, 1990). Fourth, results involving difference score are ambiguous, as it is unclear if a correlate of a difference score is related to one or both component variables (Edwards, 1994; Venkatesh & Goyal, 2010). Fifth, the use of difference scores may obscure non-linear effects such as assimilation-contrast or generalized negativity (Edwards & Parry, 1993; Venkatesh & Goyal, 2010). In summary, the use of difference scores in consumer research is not advisable (Edwards, 2001; Peter et al., 1993).

Direct measurement was originally considered as a viable alternative to the flawed difference score approach (Oliver, 1977, 1980; Yi, 1990). However, apart from the

overspecification issue, direct measurement does not overcome the limitations of difference

scores. As Edwards (2001, p. 268) pointed out, direct measures "merely shift the onus of

creating a difference score from the researcher to the respondent." The above-described issues

of difference scores are independent of who calculates the difference, thus directly measured

disconfirmation merely conceals these issues within the "black box" of the respondent's mind.[9]

We identified at least two additional problems with direct measurement. First, since

disconfirmation perceptions have to be measured post-consumption, processes such as

dissonance or contrast could have already affected the recalled expectations and performance

perceptions a person compares to infer disconfirmation, and thus affect perceived

disconfirmation itself. Consequently, the utility of directly measured disconfirmation to test

dissonance or contrast effects is questionable. Second, direct measurement itself might be

reactive. By asking people to indicate if a product performed better or worse than expected,

people are primed to recall past expectations and to subtract them from the present performance

on some metric (Edwards, 2001). This priming alone could bias the process of satisfaction

formation, compared to a situation without a demand to report a comparison.

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[9] A possible counterargument in defense of direct measurement could be that, because

perceived disconfirmation is assumed to be independent to prior expectations (Oliver, 1977), one

must not necessarily assume that people calculate disconfirmation with a difference. However,

to our knowledge, no alternative process has been proposed and many researchers have either

stated (Phillips & Baumgartner, 2002) or implied (Churchill & Surprenant, 1982) that people

compare performance and expectations alike a subtraction.

Shortcomings of linear path-analysis. The most common approach to analyze disconfirmation data was to test path models of the core variables perceived performance, expectations, perceived disconfirmation and satisfaction. We argue that this purely linear approach limits the conclusiveness of disconfirmation studies.

There are empirical and theoretical indications that disconfirmation effects may be non-linear. Early disconfirmation studies found evidence for assimilation-contrast (Anderson, 1973) and generalized negativity/positivity (Oliver, 1976), both non-linear effects. As elaborated above, according to dissonance theory (Festinger, 1957), positive disconfirmation should not induce dissonance in the same way as negative disconfirmation. Furthermore, if people frame performances falling short of expectations as losses, prospect theory would predict stronger effects for negative disconfirmation than for positive disconfirmation (Tversky & Kahneman, 1991, 1992; Venkatesh & Goyal, 2010). Linear models, including path models, are unable to uncover such non-linear effects and are prone to erroneous conclusions (Edwards & Parry, 1993). Not only may non-linear effects erroneously be identified as linear effects, effects might also be missed completely: By applying a linear model, opposed effects of assimilation-contrast or generalized negativity might cancel each other out, falsely indicating a null-relationship. In summary, direct measurement, difference score approaches and linear path models are flawed approaches to test possibly complex and non-linear disconfirmation effects.

Response surface analysis. To overcome the limitations of difference scores, Edwards and Parry (1993) introduced polynomial regression and response surface analysis to the field of person-environment fit studies in organizational science. By mapping the relationship of three variables (two antecedents and one outcome) onto a three-dimensional surface, it is possible to

visualize, explore and test complex and non-linear congruency and discrepancy hypotheses. We

propose adopting this methodology in disconfirmation research.

Table 3.1

Studies on Disconfirmation Using Polynomial Regression and Response Surface Analysis

Study	Target	N	Suggested Disconfirmation Theories	Design	Main Results	Comment
Brown et al., 2008	Product (Information management software for banks)	648	Contrast theory, need fulfillment	Cross-sectional	Performance main effect	Discussed three basic models: disconfirmation, ideal point, experience only
Venkatesh & Goyal, 2010	Product (human resource information software)	1143	-	Longitudinal	Evidence for generalized negativity	Discussed the advantages of polynomial regression over the use of difference scores
Brown, Venkatesh, & Goyal, 2011	Product (Information sharing software)	1113	Assimilation-contrast, prospect theory	Longitudinal	Evidence for assimilation-contrast and for a higher impact of negative disconfirmation, compared to positive disconfirmation	Applied prospect theory on disconfirmation
Brown, Venkatesh, & Goyal, 2014	Product (Information management software)	1113	Dissonance, contrast, equity	Longitudinal	Evidence for assimilation Contrast	Compared six disconfirmation models with polynomial modeling and response surface analysis
Study 1 of the present thesis	Products (Drug store product)	269	Adaptation Level / Contrast	Experiment (expectations x performance)	Performance main effect	First fully experimental study using polynomial regression

To date, we are aware of five studies that applied polynomial regression and response

surface analysis in the field of disconfirmation research. See Table 3.1 for an overview of these

studies. Remarkably, of these five studies, two found a single performance main effect (Brown,

Venkatesh, Kuruzovich, & Massey, 2008; Study 1 of the present thesis) and three found non-

linear effects (S. A. Brown, Venkatesh, & Goyal, 2011, 2014; Venkatesh & Goyal, 2010).

Taking early disconfirmation studies testing non-linear hypotheses (Anderson, 1973; Oliver,

1976) into consideration, every disconfirmation study designed to test non-linear effects has

either found such effects or no expectancy-disconfirmation effect above performance. While this conclusion is based on a very small sample, it strongly underlines that future disconfirmation research should allow for the possibility of non-linear effects by applying appropriate designs and methodologies, such as response surface analysis.

3.5 Implications for Disconfirmation Research and Marketing Practice

In the last part of our review we integrate our findings to support future research and the advancement of disconfirmation theory. Lastly, we discuss implications for marketing practice based on our conclusions.

3.5.1 New Approaches for Disconfirmation Research

The various issues with disconfirmation research described in this review are interrelated and future research faces the challenge to consider all of these topics simultaneously. We aim to support this challenge in two ways: First, we propose a discrepancy-based typology of disconfirmation. Second, we offer a structured, step-by-step roadmap for disconfirmation research from the identification of a thriving theoretical research question to the connection of the research question to suitable conceptualizations and research methods.

A discrepancy based typology of disconfirmation. In her influential review, Yi (1990) summarized three types of disconfirmation: *Objective disconfirmation* refers to the discrepancy between objective product performance and expectations and is usually experimentally manipulated (Anderson, 1973; Churchill & Surprenant, 1982; Olshavsky & Miller, 1972) or held constant (Cardozo, 1965; Olson & Dover, 1976). Alternatively, *inferred disconfirmation* refers to a difference score between subjective product performance and expectations, whereas *perceived disconfirmation* is measured by asking people to indicate their discrepancy perceptions on a scale.

We argue that this Yi's systematization of disconfirmation types needs to be extended and adjusted. A comprehensive and consistent disconfirmation typology needs (a) to clarify which discrepancy underlies a certain disconfirmation type (which pre- and post-consumptions constructs are compared to determine disconfirmation), and (b) to distinguish the theoretical concept of a discrepancy from the methods used to measure that discrepancy.

In order to derive a comprehensive disconfirmation typology, we propose to differentiate expectations and performance before and after the consumption experience. As the consumer accesses performance in the course of the consumption experience, preconsumption performance has to be accessed independently of the consumer perception. Referring to Yi (1990) we thus label preconsumption performance as objective performance and preconsumption expectations as initial expectations. Consequently, perceived performance, that is only assessable after product experience and a recollection of initial expectations after product experience, termed recalled expectations, are defined as post-consumption variables.[10] The process by which consumers perceive objective performance and form performance perceptions is termed performance experience. The process of recalling expectations is termed expectation modification, referring to all modifications of initial expectations due to memory effects and other biases. For visualization and a summary of our model see Figure 3.1 and Table 3.2.

Based on the differentiation of pre- and post-consumption expectations and performance, we deduce disconfirmation types based on different discrepancies: Both objective and perceived performance could be compared with both initial and recalled expectations. Thus, regarding

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[10] Recalled expectations are not to be confounded with *adjusted* expectations that are defined as post-consumption expectations regarding a repurchase in the future (Yi & La, 2004).

disconfirmation, there are four types of disconfirmation based on four underlying discrepancies.

Regarding the operationalization, in principle all four types of disconfirmation could be either

manipulated or inferred by subtracting measures of the respective components.
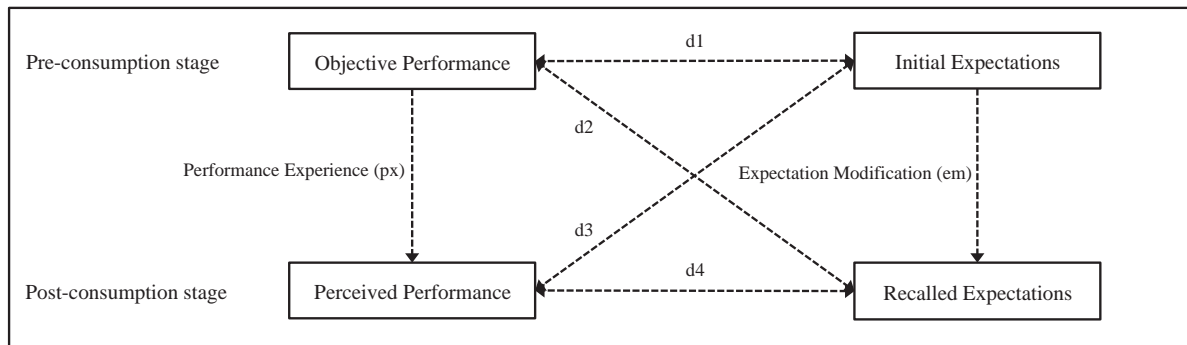
Note. d1 to d4 disconfirmation types.

Figure 3.1. A Discrepancy-Based Model of Disconfirmation

Table 3.2

Systematization of Discrepancies

Discrepancy		Suggested Label (Categorization in Prior Research)	Possible Effects and Biases	Comment
Consumption Processes				
px	Objective Performance | Perceived Performance	**Performance Experience**	Dissonance, hypothesis testing perception, assimilation, contrast	Objective performance usually is operationalized by experimentally manipulating a physical performance property; e.g. by distorting the output of a record player (Tse & Wilton, 1988).
em	Initial Expectations | Recalled Expectations	**Expectation Modification**	Recall Biases, consistency, dissonance, assimilation, contrast	Effects could differ for different expectation types. Normative expectations routed in needs and desires are assumed to be more stable than predictive expectations that should be adjusted after consumption (Yi & La 2004).
Disconfirmation Types				
d1	Objective Performance | Initial Expectations	**Type 1 Disconfirmation** ("Objective Disconfirmation"; Yi, 1990)	-	Only disconfirmation type that involves only preconsumption measures and is, as such, unbiased of consumption processes.
d2	Objective Performance | Recalled Expectations	**Type 2 Disconfirmation**	Prone to all effects and biases that affect em	Very rarely used type of disconfirmation.
d3	Perceived Performance | Initial Expectations	**Type 3 Disconfirmation** ("Inferred Disconfirmation"; Yi 1990)	Prone to all effects and biases that affect px	Most difference scores operationalize type 3 disconfirmation.
d4	Perceived Performance | Recalled Expectation	**Type 4 Disconfirmation** ("Perceived Disconfirmation"; Yi 1990)	Prone to all effects and biases that affect px and em	Perceived disconfirmation items inevitably measure type 4 disconfirmation.

Note. px: Performance experience. em: Expectation modification. d1 to d4: Disconfirmation types.

   The disconfirmation typology we have presented clarifies that different disconfirmation types are prone to different effects and biases. Type 1 disconfirmation, as a pure preconsumption concept, is unaffected by memory biases and consumption effects. However, since a consumer can only mentally compare expectations and performance post consumption, perceived disconfirmation is necessarily a type 4 disconfirmation. As such, perceived disconfirmation is prone to all effects and biases that are involved in the consumption process

and that affect the component variables of perceived disconfirmation – a notion that is critical to the interpretation of disconfirmation studies.

Furthermore, we hope that our typology helps to prevent misconceptions of disconfirmation measures. For example, inferred disconfirmation measured with difference scores does not necessarily indicate a type 3 disconfirmation as suggested by Yi (1990). For example, Nadiri and Hussain (2005) measured type 4 disconfirmation by subtracting recalled expectations from performance perceptions.

Yi (1990) already noted that perceived disconfirmation relates to another type of discrepancy (perceived performance – recalled expectations) than other measures of disconfirmation. However, this implies that perceived disconfirmation / type 4 disconfirmation is an inadequate measure to test the effects of initial expectations – a notion that has been largely ignored by subsequent research. To support the adoption of the disconfirmation typology by future research, we provide an applicable roadmap along the above-described outline.

A roadmap for disconfirmation research. The purpose of empirical research is to identify incomplete and insufficient theory, to propose an amendment or modification of the theory that addresses particular gaps and to probe respective assumptions by deriving and empirically testing hypotheses (Grant & Pollock, 2011). In our review we identified several works that did not thoroughly follow this approach. For example, Tse and Wilton (1988) did not derive any hypotheses but solely offered a post-hoc interpretation of their data. While Oliver and DeSarbo (1988, p. 498) stated hypotheses, these hypotheses included predictions of "very low", "moderately low", "moderately high" and "very high" satisfaction. However, since Oliver and DeSarbo did not specify to which quantitative values these verbal labels correspond, the respective hypotheses are untestable. Finally, in his 2010 review, Oliver described seven

possible results of a regression analysis of expectations, performance and disconfirmation predicting satisfaction, comprising every possible combination of significant/nonsignificant results except the case of no significant findings. Oliver (p. 124) further stated that "any of these combinations is possible and that none can be ruled out (or assumed) a priori." However, if "anything goes" in terms of possible results, a theory offers no concrete testable predictions and thus becomes both essentially irrefutable and unhelpful for management advice. Even though our examples are not representative of disconfirmation research as a whole, they illustrate a tendency toward post-hoc interpretation of data that hinders the advancement of disconfirmation theory (Kerr, 1998).

We believe that the lack of rigorous theory testing in disconfirmation research can be at least partially attributed to the interrelated theoretical and methodological issues described in this review. Results of path models with perceived disconfirmation almost always offer interpretable results. However, if every possible outcome is coherent with a model, there is no chance to refute the model and to advance the cumulative scientific knowledge by falsification. It is our impression that the perceived disconfirmation paradigm might have played the role of a surrogate theory that obscured the incomplete knowledge of the underlying psychological processes. Therefore, in order to support theory-testing in future disconfirmation research, we integrated the conclusions from our review and present them in the form of a step-by-step roadmap for future research, outlined in Figure 3.2.

Research Step	Critical Considerations
1. Identify a research question related to disconfirmation	Identify gaps in the theories of **psychological processes underlying disconfirmation**, such as dissonance reduction, confirmatory hypothesis testing or contrast due to affective responses to disconfirmation.
2. Specify the type(s) of discrepancies	Specify which **type of disconfirmation** (1-4) is suitable to probe the theoretically expected effects. Consider the effects and biases of **performance experience** and **expectation modification** that apply to the disconfirmation types (see Figure 1 and Table 3).
3. Derive hypotheses	Derive hypotheses that **test the underlying theories**. Consider the whole range of **possible expectation-performance configurations**. If need be, illustrate the expected effects with response surfaces (e.g. Brown, Venkatesh, & Goyal, 2014).
4. Specify operationalizations for expectations and disconfirmation and a research design to test the hypotheses	Consider the **restrictions of difference scores and direct measurement**. For maximum external validity consider **pre-post field studies** and control for expectation-performance intercorrelation. For maximum internal validity consider **experimental manipulation** of expectations and performance to induce disconfirmation.
5. Specify analytical strategy Preregister hypotheses and analyses	Specify according to the research design. Consider methods such as polynomial regression and response surface analysis to probe **non-linear** and **complex effects**. If applicable, **preregister** the study.
6. Conduct and report study – Test hypotheses and conduct applicable post-hoc analyses	Discuss **theoretical and practical implications** considering the underlying theory, direction of effect and type of discrepancy. Report post-hoc analyses as **exploratory research**.

Figure 3.2. Roadmap for Future Disconfirmation Research

For illustration, we exemplify the use of our roadmap for a concrete research question. As described above, unamended dissonance theory predicts assimilation effects for negative disconfirmation but not for positive disconfirmation. However, if one assumes that the inaccurateness of the prediction rather than the quality of the choice causes dissonance, one might assume assimilation for positive disconfirmation. This might particularly apply to people with high perfectionism (Step 1). Because dissonance reduction effects might already influence performance perceptions and expectation modification, it is advisable to probe type 1 disconfirmation that is unbiased by these effects (Step 2). One might derive the hypothesis that people low on perfectionism assimilate only in the case of negative disconfirmation, whereas

people high on perfectionism assimilate for both negative and positive disconfirmation (Step 3).

For maximum internal validity to test the new assumptions, expectations and objective

performance should be experimentally manipulated (Step 4). A fine-grained manipulation

enables the analysis with response surface analysis to probe the nonlinear moderator hypothesis

(step 5). Finally, depending on the results of the study, one could draw conclusions regarding

the validity of a dissonance-based explanation of assimilation effects (Step 6).

Our proposed roadmap is not aimed to exhaustively cover the various sub-topics of

disconfirmation research. For example, we excluded questions regarding the role of attribute

level versus holistic expectations and performance perceptions (Oliver, 2010) and different types

of expectations (Santos & Boote, 2003). Our aim was to focus on topics closely related to the

perceived disconfirmation paradigm that received little attention in past research. We believe

that inattention to these topics will likely result in pitfalls that limit the conclusiveness of future

research in the realm of disconfirmation.

Furthermore, our narrative review is no substitute for a thorough quantitative analysis of

disconfirmation effects that could provide additional insights. In particular, the

operationalization of disconfirmation (experimental manipulation, difference score, direct

measurement) can be considered proxies for different types of disconfirmation– and thus can be

used in a moderator analysis that could test propositions regarding the role of initial expectations

and post-consumption perceptions.

Finally, we want to underscore that despite our critique of the past use of the perceived

disconfirmation paradigm, we do not want to devalue perceived disconfirmation as a construct in

general. Instead, we believe that the research on post-consumption discrepancy perceptions

addresses separate questions and should not be confounded with research of disconfirmation of

initial expectations. Ultimately, both areas of research should benefit from a clearer conceptual

distinction between different disconfirmation types and more appropriate research methods.

3.5.2 Implications for Marketing Practice

In light of the heterogeneity of the evidence regarding disconfirmation (Szymanski &

Henard, 2001; Yi, 1990) and numerous unresolved issues discussed in this review, one clear

piece of advice for practitioners is to be cautious with conclusions drawn from any single

disconfirmation study. Particularly, simple recipes such as "positive disconfirmation causes

satisfaction, negative disconfirmation causes dissatisfaction" are unwarranted and misleading

(Oliver, 2010).

Nonetheless, based on our review there are provisional implications for marketing practice.

As almost all disconfirmation studies found a positive main effect of performance on

satisfaction, a basic and rather obvious conclusion is to provide high performing products.

But given a product with a certain performance, what marketing strategy is advisable? As

discussed in the introduction, if one would expect an assimilation effect, expectations should be

boosted by overstatement, as satisfaction would be assimilated toward these expectations.

Contrast effects suggest contrary action, namely to lower expectations by strategic

understatement. Based on our review, we advise a moderate overstatement strategy for two

reasons: First, the overall evidence as of today suggests that assimilation effects are more

dominant. Studies providing direct evidence for contrast effects are very rare compared to

studies providing evidence for assimilation effects (Yi, 1990). Furthermore, as was discussed

above, a strong relationship between perceived disconfirmation (a type 4 disconfirmation) and

satisfaction does not necessarily indicate a contrast effect driven by *initial* expectations. Second,

a moderate overstatement is also the best advice if assimilation-contrast effects are in place,

because such a strategy would aim for the range of disconfirmation with small absolute values, where assimilation effects should dominate. In other words, marketers should exaggerate the performance of their products and services, but do so modestly.

3.6 Conclusion

In our review, we have drawn a critical picture of the state of disconfirmation research. We discussed theoretical and methodological issues that arguably contributed to a lack of integration in theory building. However, despite the heterogeneity of the evidence, there is a clear positive conclusion that can be drawn: Expectations and their disconfirmation matter in the process of satisfaction formation. Given all this, it is clear that the processes underlying disconfirmation effects are worthy of further investigation, from both a theoretical and practical perspective. With our review, we hope to have contributed to the direction of this research.

Spanning Chapter 3 and Chapter 4

As described in Chapter 2, expectancy-disconfirmation is conceptualized as a key link of the intra-individual WOM transmission, spanning the conceptual gap between performance expectations and consumer satisfaction. Yet, as described in Chapter 3, expectancy-disconfirmation theories suffer from conceptual inconsistencies and methodological shortcomings. In addition, despite a vast body of research, there is no current, conclusive and comprehensive summary of the available evidence regarding the predictions of expectancy-disconfirmation theories. This empirical gap is addressed in the following chapter with a meta-analysis of expectancy-disconfirmation research.

Chapter 4: Expectancy-Disconfirmation and Consumer Satisfaction - A Meta-Analysis

4.1 Abstract

Understanding how consumers' expectations and their disconfirmation affect consumer satisfaction is crucial to the successful marketing of products and services. However, previous research on expectancy-disconfirmation theory provided competing predictions and heterogeneous results. We[11] therefore meta-analytically summarized the interrelationships between the key concepts of *performance expectations*, *perceived performance*, *disconfirmation*, and *consumer satisfaction*. The meta-analysis comprises 183 independent samples with N = 46,228 individuals. In line with our Hypotheses, random effects model tests resulted in positive relationships between performance expectations and satisfaction (r = .29), perceived performance and satisfaction (r = .65), and disconfirmation and satisfaction (r = .60). Moderator analyses showed that the positive expectation-satisfaction relationship depends on moderating conditions such as the target of satisfaction (products vs. services; r = .23 vs. r = .33), and that the disconfirmation-satisfaction relationship depends on the operationalization of disconfirmation (measuring perceptions of disconfirmation vs. calculating disconfirmation by subtracting expectations from perceived performance; r = .60 vs. r = .48). The findings indicate that consumers bias their satisfaction ratings toward their own expectations and that disconfirmation and satisfaction are closely related concepts. We discuss the implications of these findings for future theory development and current marketing practice.

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[11] This chapter is based on a manuscript in preparation authored by Tom Schiebler (first author) and Felix C. Brodbeck.

4.2 Introduction

A satisfied consumer is a central objective for businesses. In striving to understand the antecedents of consumer satisfaction, research in the last 50 years has been dominated by expectancy-disconfirmation theory. Expectancy-disconfirmation theory addresses two core functions of businesses: first, influencing consumers' expectations regarding a product or service with marketing communication, and second, shaping consumers' perceptions of the performance of a product or service by quality management. Knowledge about the extent to which consumer expectations, and by extension their confirmation or disconfirmation respectively, affect consumer satisfaction is key to successful marketing.

However, despite decades of research regarding the question of how expectations and their (dis)confirmation influence consumer satisfaction, there is a lack of both theoretical and empirical integration in expectancy-disconfirmation research. There is no comprehensive theory of direct *expectation effects* on satisfaction. Instead, multiple independent sub-theories make partly similar and partly competing predictions. For an example, some assimilation theories propose that consumers bias their satisfaction ratings toward their initial expectation (Anderson, 1973; Deighton, 1984; Hoch & Ha, 1986; Olshavsky & Miller, 1972). This contradicts contrast theories, which propose that consumers magnify the extent of the discrepancy between their expectations and the level of performance they perceive, thereby biasing their satisfaction away from their initial expectations (Anderson, 1973; Cardozo, 1965; Oliver, 2010; Olson & Dover, 1979). Furthermore, some researchers provided evidence that the expectation construct comprises different types of expectations, such as predictive "will be" and normative "should be" expectations (Miller, 1977; Santos & Boote, 2003; Spreng, MacKenzie, & Olshavsky, 1993,

1996; Summers & Granbois, 1977). However, a clear theoretical position on the question of how the effects of different expectation types on satisfaction differ from each other is missing.

According to theories of *disconfirmation effects* on satisfaction, consumers evaluate products and services relative to their prior expectations. Therefore, disconfirmation, defined as the cognitive comparison of perceived performance and prior expectations, should relate to satisfaction in some defined way (Helson, 1948, 1959, 1964b; Oliver, 1980, 1981). However, the disconfirmation concept is theoretically and empirically ambiguous, as it is unclear under which circumstances positive disconfirmation effects are to be expected (Oliver, 2010; see the review in Chapter 3), and disconfirmation often lacks a relationship with its purported antecedent expectations (Spreng & Page Jr, 2003). Furthermore, different operationalizations of disconfirmation, namely subtracting expectations from perceived performance (difference scores) versus asking consumers for their disconfirmation perception with questionnaire items (direct measurement) capture different underlying disconfirmation concepts, which has been neglected in disconfirmation research (Spreng & Page Jr, 2003; see the review in Chapter 3).

The hitherto available empirical evidence on the direction and strength of the effects of expectations and disconfirmation on satisfaction is heterogeneous. In the most recent meta-analysis, Szymanski and Henard (2001) reported positive relationships between expectations and satisfaction of small to medium effect sizes ($\rho = .27$) and positive relationships between disconfirmation and satisfaction of medium to large effect sizes ($\rho = .46$). However, several limitations apply to this meta-analysis: First, Szymanski and Henard did not account for inconsistencies within the concepts of expectations and disconfirmation, such as different expectation types and different operationalizations used for measuring disconfirmation. Second, Szymanski and Henard found no significant moderators that accounted for the large

heterogeneity of both the expectations-satisfaction and the disconfirmation-satisfaction

relationships. And third, even though Szymanski and Henard's meta-analysis included 50

studies in total, some meta-analytic correlations were based on small samples, including the

expectations-satisfaction relationship ($k = 8$ studies).

To address the issues described above and to foster theoretical and empirical integration in

the domain of expectancy-disconfirmation and consumer satisfaction, we offer a current and

comprehensive meta-analytical summary of expectancy-disconfirmation research which

addresses the shortcomings of the previous meta-analysis. We conducted a systematic review of

the literature on expectation and disconfirmation effects on consumer satisfaction with products

and services. Our aim was to test the predictions of expectation and disconfirmation theories, to

estimate the direction and magnitude of the respective effects, and to address theoretically

feasible moderating conditions. Therefore, we deduced hypotheses regarding the

interrelationships of the four core variables in expectancy disconfirmation research, namely,

performance expectations, perceived performance, disconfirmation and consumer satisfaction.

We also developed moderator hypotheses, taking into account inconsistencies such as different

expectation types (Miller, 1977; Santos & Boote, 2003; Spreng et al., 1993, 1996; Summers &

Granbois, 1977) and different operationalizations of disconfirmation (Yi, 1990; see the review in

Chapter 3). Thereby, our meta-analysis contributes to the stream of research on the antecedents

of consumer satisfaction and on the psychological processes underlying satisfaction formation.

4.3 Expectancy-Disconfirmation and Consumer Satisfaction

Consumer satisfaction is a key factor for business success. Satisfied customers complain

less, speak more positively about the products they are satisfied with, and are likely to remain

loyal customers (Pansari & Kumar, 2017; Szymanski & Henard, 2001). Many firms strive to

make and keep their customers satisfied by providing products and services of high quality. Since the 1980s, this business prioritization of consumer satisfaction has been extended to "total quality management", defined as the practice of aligning all business practices toward the satisfaction of the customer (Dean Jr & Bowen, 1994; Powell, 1995).

But what exactly is consumer satisfaction? Homburg et al. (2006) conceptualized satisfaction as a special form of attitude, which in psychological terms is an "evaluative cognition". Oliver (2010, p. 8) defined satisfaction as a "fulfillment response", that is, a consumer's judgment "that a product/service [provides] a pleasurable level of consumption-related fulfillment." These definitions illustrate two different characteristics of the satisfaction concept. First, satisfaction is seen as an attitude, which is directed toward a certain *target* of evaluation. In the case of consumer satisfaction, this target is a product or service. Second, satisfaction is connected to the relative fulfillment of individual needs one expects to be fulfilled by the given product or service.

Expectancy-disconfirmation theory essentially addresses the latter perspective on satisfaction by proposing that satisfaction is determined by the degree to which the performance of a particular product or service, as perceived by a consumer, fulfills his or her individual performance expectations (Oliver, 2010). Consequently, theories of expectancy-disconfirmation comprise at least four core variables: 1) performance expectations, 2) perceived performance, 3) the degree to which perceived performance matches, over-fulfills or under-fulfills individual performance expectations, termed disconfirmation, and 4) consumer satisfaction. The extensive body of research probing the relationships between these four core variables can be divided into two main theoretical streams. The first stream of research focused on direct effects of performance expectations and perceived performance on satisfaction (e.g., Anderson, 1973;

Cardozo, 1965; Deighton, 1984; Hoch & Ha, 1986; Olshavsky & Miller, 1972; Olson & Dover, 1976). In this stream of research, the concept of disconfirmation was typically referred to when theoretically considering the question of how performance expectations, in relation to perceived performance, affects satisfaction. Accordingly, disconfirmation was operationalized as the difference between the two psychological constructs involved and not as a singular psychological construct, which can be directly measured by, for example, asking people about the degree of disconfirmation they experienced. In contrast, the second stream of research considered disconfirmation as a directly measurable psychological construct, which thereby integrated disconfirmation as a variable into theoretical models for predicting consumer satisfaction. Broadly, this stream focused on studying the effects of disconfirmation on satisfaction (e.g., Alford & Sherrell, 1996; Churchill & Surprenant, 1982; Oliver, 1977, 1980; Oliver, 1993).

In Figure 4.1, we synthesize the conceptual frameworks of both streams of expectancy-disconfirmation theory and illustrate the interrelationships of the relevant variables, namely performance expectations, perceived performance, disconfirmation and consumer satisfaction. By following the apparent structure of the respective literatures, we deduce hypotheses based on *theories of direct expectation and perceived performance effects on satisfaction* (H1-H3) and hypotheses based on the literature considering disconfirmation as a psychological construct (*disconfirmation theory*, H4-H6), before considering potential moderators of expectation and disconfirmation effects on satisfaction (H7-H12). By meta-analytically testing these main effect and moderator hypotheses, we provide a comprehensive summary of the available evidence concerning the most relevant theories and sub-theories of expectancy-disconfirmation.
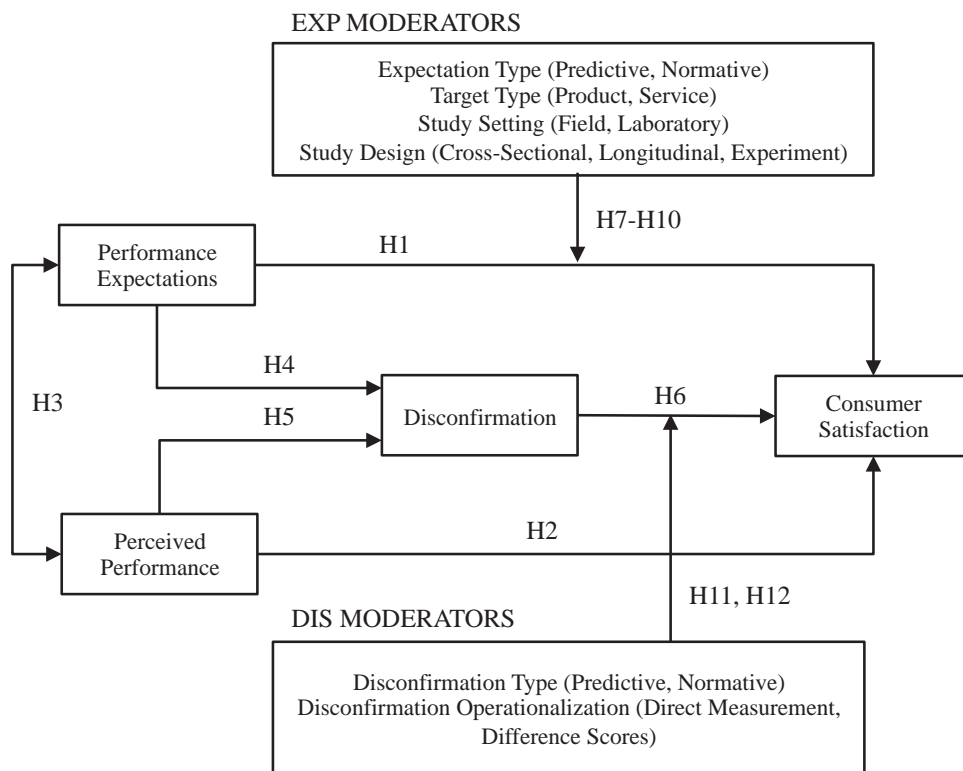
Note. EXP = Expectation effect. DIS = Disconfirmation effect.

Figure 4.1. Expectancy-Disconfirmation Model with Meta-Analytical Hypotheses

4.3.1 Direct Expectation and Perceived Performance Effects on Satisfaction

Performance expectations and satisfaction. Theories about direct expectation effects on

satisfaction are sub-divided into *assimilation theories*, predicting that satisfaction is assimilated

toward expectations, and *contrast theory*, predicting that satisfaction is biased in the opposite

direction of initial expectations (Cardozo, 1965; Oliver, 2010; Yi, 1990). In order to explain

assimilation effects*,* researchers have referred to either dissonance theory (Festinger, 1957) or

hypothesis testing theory (Yi, 1990). According to dissonance based explanations of

assimilation (Anderson, 1973; Cardozo, 1965; Cohen & Goldberg, 1970; Olshavsky & Miller,

1972), disconfirmation causes aversive cognitive dissonance that consumers aim to reduce. Consumers are then assumed to shift their evaluations in the direction of the initial expectation, thereby reducing the discrepancy and consequentially also cognitive dissonance. As an alternative explanation for assimilation effects, hypothesis testing theory (Deighton, 1984; Hoch & Ha, 1986) posits that consumers represent their expectations as hypotheses and test these hypotheses during the consumption with a confirmatory bias. Consequently, the evaluation of satisfaction should be biased toward initial expectations.

In direct opposition to the predictions of assimilation theories, contrast theory posits that when perceived performance deviates from expectations, either a surprise emotion, or the perception of the contrast itself will cause consumers to magnify the discrepancy between perceived performance and expectations (Cardozo, 1965; Hovland et al., 1957; Yi, 1990). Thus, contrast theory predicts that, if the perceived performance does not match the expectations, consumers shift their satisfaction ratings away from the expectations. However, apart from an early study by Cardozo (1965), there is very little evidence in support of direct contrast effects on satisfaction and researchers concluded that the contrast effect might be elusive (Oliver, 1977; Yi, 1990).

Taken together, assimilation and contrast theories offer competing predictions regarding the direction of expectation effects on satisfaction. If satisfaction is assimilated toward expectations, as predicted by dissonance theory (Anderson, 1973) and hypothesis testing theory (Deighton, 1984; Hoch & Ha, 1986), there should be a positive correlation between performance expectations and satisfaction. If, as predicted by contrast theory (Anderson, 1973; Olshavsky & Miller, 1972; Olson & Dover, 1979), consumers shift satisfaction ratings away from expectations, there should be a negative correlation between performance expectations and

satisfaction. However, despite making opposing predictions, assimilation and contrast theories do not exclude each other theoretically, and, in principle, both processes could yield independent competing effects (Oliver, 2010). Thus, in order to make a prediction of the total effect of performance expectations on satisfaction, one has to consider the question of whether the assimilation or the contrast effect is relatively stronger than the other. To our knowledge, this question has been rarely discussed in the consumer satisfaction literature, and a clear theoretical position is missing. However, as mentioned above, researchers noted that contrast effects seem to be elusive and the occurrence of contrast effects seems to depend on moderating conditions, such as the magnitude of the discrepancy (Anderson, 1973; Cardozo, 1965; Hovland et al., 1957; Oliver, 1977; Yi, 1990). Furthermore, Szymanski and Henard (2001) found a significantly positive meta-analytical relationship between expectations and satisfaction, suggesting that, in total, assimilation effects are relatively stronger than contrast effects. Thus, based on these empirical patterns, we predict a positive relationship between performance expectations and satisfaction due to assimilation effects.

Hypothesis 1: Performance expectations and consumer satisfaction are positively related.

Perceived performance and satisfaction. The perceived performance of a product or service has been generally considered to be closely connected to satisfaction ratings (Oliver, 2010). Westbrook and Reilly (1983) presented the value-percept disparity model, based on Locke (1967, 1969), as a theoretical explanation of direct performance effects. Acording to the value-percept disparity model, consumers compare percepts of performance with their values, such as needs and desires. The smaller the disparity between the perceived performance and the consumers' values, the more favorably consumers should evaluate the product or service. Thus,

based on the value-percept disparity model, we predict a positive relationship between perceived

performance and consumer satisfaction.

Hypothesis 2: Perceived performance and consumer satisfaction are positively related.

Interrelation of perceived performance and performance expectations. Apart from the

effects on satisfaction, consumers' expectations and perceived performance of a product or

service should also be interrelated. For one, assimilation effects due to dissonance reduction

(Festinger, 1957) or hypothesis testing perception of the performance (Deighton, 1984; Hoch &

Ha, 1986) should not only shift satisfaction but also perceived performance toward expectations,

implying a positive relationship. In line with this notion, early disconfirmation studies found

assimilation effects of expectations on performance ratings (Anderson, 1973; Olshavsky &

Miller, 1972). Second, consumers' expectations could be considered as at least partly valid

predictions of the actual product or service performance that consumers will perceive when they

consume the product or service, also implying that expectations and perceived performance are

positively related (Szymanski & Henard, 2001). Based on these considerations, we predict

performance expectations to be positively related to perceived performance

Hypothesis 3: Performance expectations and perceived performance are positively

related.

4.3.2 Disconfirmation Theory

We will now shift our focus to address disconfirmation theory, the second stream of

expectancy-disconfirmation research. As outlined above, the core assumption of this stream of

research is that disconfirmation should be modeled as a standalone variable within the

expectancy-disconfirmation framework (Oliver, 2010). This disconfirmation variable is defined

as the cognitive comparison of the initial expectations and perceived performance (Churchill &

Surprenant, 1982; Oliver, 1980, 1981, 2010), with low or negative values of disconfirmation indicating perceived performance falling short of the expectations ("negative disconfirmation"), medium values indicating perceived performance meeting the expectations ("confirmation" or "zero disconfirmation") and high values indicating perceived performance exceeding the expectations ("positive disconfirmation".) Therefore, as displayed in Figure 4.1, perceived performance and performance expectations are the assumed antecedents to disconfirmation. Consumer satisfaction is then assumed to be the outcome of disconfirmation (Oliver, 1980, 2010). Consequently, the role of these three additional relationships has to be considered in disconfirmation theory.

Antecedents of disconfirmation. The very definition of disconfirmation as the cognitive comparison between perceived performance and performance expectations (Churchill & Surprenant, 1982) implies a negative expectation-disconfirmation and a positive perceived performance-disconfirmation relationship. As negative disconfirmation is defined as perceived performance falling short of the expectations, it follows that the more *positive* the expectations, the more likely it is that the perceived performance falls short of the expectations, yielding *negative* disconfirmation (Lankton & Wilson, 2007). Therefore, if positive expectations are associated with negative disconfirmation, a negative expectation-disconfirmation relationship should be the result.

Hypothesis 4: Performance expectations and disconfirmation are negatively related.

Analogously, as positive disconfirmation is defined as performance exceeding expectations, it follows that the more *positive* the perceived performance, the more likely it is that the perceived performance exceeds expectations, yielding *positive* disconfirmation. Thus, if

high levels of perceived performance are associated with positive disconfirmation, a positive expectation-disconfirmation relationship should be the result.

Hypothesis 5: Perceived performance and disconfirmation are positively related.

It should be noted that the relationships of expectations and perceived performance with disconfirmation become more vulnerable to bias the more strongly performance expectations and perceived performance are intercorrelated (Szymanski & Henard, 2001). The more aligned performance expectations and perceived performance become, the smaller the differences between both variables will be. Hence, if disconfirmation is conceptualized as this difference, the correlations between disconfirmation and its components will be based on smaller differences that are more vulnerable to small perturbations and error variance. This implies that the relationships of performance expectations and perceived performance with disconfirmation should be interpreted with caution, if performance expectations and perceived performance are highly intercorrelated.

Disconfirmation and satisfaction. Oliver (1977, 1980, 1981) proposed adaptation level theory as the theoretical underpinning of disconfirmation effects on satisfaction. Adaptation level theory posits that people form an adaptation level based on prior experience and evaluate future experiences in terms of deviations from this level (Helson, 1948, 1959, 1964b). According to Oliver, performance expectations could be considered as an adaptation level that people use as a reference for evaluation. Because positive disconfirmation indicates the over-fulfillment of the expectations, it should be associated with high levels of satisfaction. Analogously, negative disconfirmation should be associated with low levels of satisfaction. Thus, disconfirmation theory implies a positive disconfirmation-satisfaction relationship.

However, there may be instances under which strong assimilation effects dampen the disconfirmation effect. According to Oliver (2010), expectation-assimilation effects suppress disconfirmation effects if performance is difficult or even impossible to assess for the consumer. For example, consumers cannot readily evaluate the long-term health effects of certain medications or the effectiveness of a hand sanitizer. In these cases, because a cognitive comparison process involving perceived performance is difficult or impossible, consumers can only rely on their performance expectations. Yet, we assume that for most common products and services, consumers should be able to at least partly assess the performance, making a total zero disconfirmation effect on satisfaction unlikely. Indeed, Szymanski and Henard (2001) found a strong positive disconfirmation-satisfaction relationship ($\rho = .46$). Thus, although we expect a large heterogeneity of results, we predict a positive relationship of disconfirmation and satisfaction.

Hypothesis 6: Disconfirmation and satisfaction are positively related.

4.3.3 Moderators of Expectation and Disconfirmation Effects on Satisfaction

In past research, the magnitude of expectation and disconfirmation effects on satisfaction varied considerably (Szymanski & Henard, 2001), implying that these effects depend on moderating conditions. In their meta-analysis, Szymanski and Henard (2001) probed several potential moderators, such as the "comparison standard" (expectations based on previous experience of actual performance vs. expectations based on indirect experience, e.g., vicarious learning), the "method type" (surveys vs. experiments) and the "type of offering" (products vs.

services).[12] However, none of these moderators significantly accounted for the large

heterogeneity of the expectation-satisfaction and the disconfirmation-satisfaction correlations.

Two shortcomings might have contributed to the failure of the previous meta-analysis to

identify significant moderators. First, the past moderator analysis omitted theoretically relevant

moderators, such as the expectation type (predictive vs. normative) and the operationalization of

disconfirmation (measuring perceptions of disconfirmation vs. calculating disconfirmation by

subtracting performance expectation from perceived performance). Second, due to the relatively

small study set, some moderation tests were based on very few studies or could not be conducted

at all. For example, as Szymanski and Henard's (2001) meta-analysis included no experiments

reporting an expectation-satisfaction effect size, thus, they could not test if the expectation-

satisfaction relationship depended on the design of the study. In the present meta-analysis, we

address these shortcomings by including theoretically relevant moderators and by exploiting the

additional body of research that has accumulated since the last meta-analysis was published over

17 years ago in 2001.

Moderators of performance expectations – satisfaction relationships.

Expectation Type. Throughout the development of expectancy-disconfirmation research,

different types of expectation have been considered a source of variation of the expectation-

satisfaction relationship. Over 40 years ago, Miller (1977) distinguished four types of

expectations that might play a role in satisfaction formation: the predictive *will-be* expectation,

an ideal *can-be* expectation, a minimum tolerable *must-be* expectation and a deserved *should-be*

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[12] Szymanski and Henard (2001) did not provide further details how the moderator

categories "comparison standard", "method type" and "type of offering" were defined and coded.

expectation. In a review, Santos and Boote (2003) summarized 56 definitions of expectations into nine types of expectation concepts: "ideal", "should", "desired", "predicted", "deserved", "adequate", "minimum tolerable", "intolerable", and "worst imaginable" expectations. For the purpose of a meta-analytical moderator analysis, the multifarious expectation types need to be summarized into higher order expectation types. In order to deduce meaningful higher order expectation types, we considered reviews of the expectation concept by Santos and Boote (2003) and Oliver (2010). Both Santos and Boote (2003) and Oliver (2010) agreed that, apart from predictive expectations, most expectation types could be ranked in accordance to a normative standard. For an example, although a consumer's expectation what constitutes an ideal performance should presumably differ from what he or she considers an adequate or tolerable performance, all of these normative expectation types relate to the subjective normative standard of the consumer. Following these notions, we propose that the normative expectation type subsumes normative expectation sub-types such as the ideal, adequate or tolerable expectation, but is conceptually different from the predictive expectation. Thus, we propose differentiating two higher order expectation types: *predictive* expectations and *normative* expectations.

Considering both assimilation theories and expectation types, we propose that predictive and normative expectations affect satisfaction differently. Although both dissonance theory and hypothesis testing theory predict a positive expectation-satisfaction relationship, the predictions of these two theories differ for different expectation types. The disconfirmation of both the predictive and normative expectation should yield cognitive dissonance (Anderson, 1973; Festinger, 1957); therefore dissonance theory predicts assimilation for both predictive and normative expectations. In contrast, according to hypothesis testing theory (Deighton, 1984; Hoch & Ha, 1986), only a predictive expectation, but not a normative expectation, should serve

as a hypothesis for perception processes. Thus, based on hypothesis testing theory, assimilation is only predicted toward predictive expectations, but not toward normative expectations. If one assumes that both dissonance and hypothesis testing processes underlie assimilation effects, the assimilation effect toward predictive expectations should be the sum of both dissonance reduction and hypothesis testing processes, while the assimilation effect toward normative expectations should be solely based on dissonance reduction processes. These considerations imply that the relationship between performance expectation and satisfaction should be stronger for the predictive type than for the normative type of performance expectations.

Hypothesis 7: Predictive expectations are more positively related to satisfaction than are normative expectations.

Study target. We also consider the target of evaluation (products vs. services) as a potential moderator of the expectation-satisfaction relationship by combining two lines of relevant research. First, Parasuraman et al. (1985) proposed that the evaluation of service performance relies on less tangible cues than the evaluation of product performance, and it involves the evaluation of both processes and outcomes. Consequently, it has been argued that the consumption experience for services is more complex and more ambiguous than the consumption experience for products (Rik, Kitty, & Henk, 1995; Szymanski & Henard, 2001). Second, Yi (1993) proposed ambiguity as a moderator of assimilation effects: In the case of an ambiguous performance that lacks clear objective cues, consumers should rely on top-down processes, using their prior expectations as hypotheses. Due to the confirmation bias of hypothesis testing processes, satisfaction should then be assimilated toward expectation (Hoch, 1984; Hoch & Ha, 1986). Indeed, Yi (1993) and Nyer (1996) found stronger assimilation effects for an ambiguous consumption experience than for an unambiguous consumption experience.

Connecting these lines of research, we predict that the expectation-satisfaction relationship is more positive for services than it is for products.

Hypothesis 8: Expectations of service performance are more positively related to satisfaction than are expectations of product performance.

Study setting. The magnitude of the expectation-satisfaction relationship might also vary depending on the study setting. In laboratory studies participants often form their expectations based on written messages, sometimes in the context of fictional scenarios. Alternatively, in field studies researchers usually measure preexisting expectations that were formed by consumers' previous experience. Yi and La (2003) proposed that expectations based on direct previous experience should be held with higher confidence than expectations formed by other processes. Furthermore, both Spreng and Page (2001) and Yi and La (2003) hypothesized that assimilation effects should be stronger for high-confidence expectations than for low-confidence expectations, because consumers should be reluctant to acknowledge that performance deviates from a high confidence expectation. Connecting these notions, we propose that expectations in field studies are held with higher confidence and yield stronger assimilation effects than expectations in laboratory studies. Thus, we predict a more positive expectation-satisfaction relationship in field studies than in laboratory studies.

Hypothesis 9: The positive performance expectations-satisfaction relationship is more positive in field studies than in laboratory studies.

Study design. Lastly, the study design might also moderate the expectation-satisfaction relationship (Szymanski & Henard, 2001). We differentiated three categories of study design: cross-sectional surveys, longitudinal surveys and experiments. Cross-sectional survey studies measure all variables at the same point in time with the same method. Thus, as cross-sectional

surveys measure *recalled* expectations, these measurements should be particularly susceptible to

hindsight biases (Zwick et al., 1995) and halo effects (Cooper, 1981). In contrast, as longitudinal

survey studies measure the initial pre-consumption expectations, hindsight biases should not

affect expectation measures in longitudinal studies. Experimental studies also measure the initial

pre-consumption expectation, but additionally induce variability in performance expectation

and/or perceived performance experimentally, thereby precluding halo effects. Thus, we predict

a more positive expectation-satisfaction relationship in cross-sectional surveys, compared to both

longitudinal surveys and experiments.

> *Hypothesis 10*: Performance expectations are more positively related to satisfaction in
>
> cross-sectional surveys than are performance expectations in longitudinal surveys and
>
> experiments.

Moderators of the disconfirmation-satisfaction relationship.

Disconfirmation type. The definition of disconfirmation as the cognitive comparison

between preconsumption expectations and perceived performance (Yi, 1990) implies that,

analogously to expectation types, there should be corresponding *disconfirmation types*. Yet, this

notion has rarely been considered in the disconfirmation literature. However, studies that

differentiated disconfirmation types found that models including both predictive and normative

disconfirmation superseded models with only one disconfirmation type, but provided only mixed

evidence regarding the question whether predictive or normative disconfirmation is more

positively related to satisfaction (Khalifa & Liu, 2002, 2003; Myers, 1991; Prakash &

Lounsbury, 1984; Spreng et al., 1996; Spreng & Mackoy, 1996; Spreng & Olshavsky, 1993; Tse

& Wilton, 1988; Wirtz & Bateson, 1999a; Wirtz & Mattila, 2001a). In theory, disconfirmation

of predictive expectations is assumed to influence satisfaction mediated by pleasant or

unpleasant surprise (Westbrook, 1987; Westbrook & Oliver, 1991), disconfirmation of normative

expectations indicates that products and services either exceed or fail to satisfy consumers' needs

and desires (Spreng & Olshavsky, 1993). As the fulfillment of needs and desires is conceptually

close to the definition of satisfaction (Oliver, 2010), the disconfirmation of normative

expectations seems more directly related to satisfaction than the disconfirmation of predictive

expectations. Thus, we expect normative disconfirmation to be more positively related to

satisfaction than is predictive disconfirmation.

Hypothesis 11: Normative disconfirmation is more positively related to satisfaction than

is predictive disconfirmation.

Disconfirmation operationalization. Another possible source of variability of the

disconfirmation-satisfaction relationship is the operationalization of disconfirmation. The two

most common operationalizations of disconfirmation are difference scores and direct

measurement. Disconfirmation operationalized with difference scores is determined by

subtracting expectations from perceived performance, whereas direct measurement of

disconfirmation means that consumers report their discrepancy perception (i.e. if performance

was *better than expected* or *worse than expected* Oliver (1977, 1980)). Since its introduction by

Oliver (1977), directly measured "perceived disconfirmation" has become the most popular

operationalization of disconfirmation and was considered the better predictor of satisfaction,

compared to difference scores (Yi, 1990). Indeed, we identified two potential explanations for

why directly measured disconfirmation should be more closely related to satisfaction than

disconfirmation operationalized with difference scores. First, when asked about their

disconfirmation perceptions post-consumption, consumers cannot access their initial

expectations, but only recollections of initial expectations, termed recalled expectations (Swan &

Trawick, 1981; Yi, 1990). In comparison to initial expectations, these recalled expectations could have already been affected by the very assimilation effects that disconfirmation theory aims to study (see the discussion in Chapter 3). Thus, if assimilation effects, (which are assumed to counter disconfirmation effects (Oliver, 2010)), do not affect the disconfirmation-satisfaction relationship in the case of direct measurement of disconfirmation, direct disconfirmation measures should be more positively related to satisfaction than other operationalizations of disconfirmation. Second, as directly measured perceived disconfirmation and satisfaction both are measured at the same time and with the same method, they should be particularly vulnerable to response biases and halo effects inflating the interrelationship of the two variables (Cooper, 1981). Thus, we predict that directly measured disconfirmation is more positively related to satisfaction than is disconfirmation operationalized with difference scores.

> *Hypothesis 12:* Directly measured disconfirmation is more positively related to
>
> satisfaction than is disconfirmation operationalized with difference scores.

4.4 Method

4.4.1 Literature Research and Study Selection

Literature search. To identify relevant studies on expectancy-disconfirmation, we employed several search strategies until 03-10-2018. First, we searched the databases EconLit, Business Source Complete, PsychInfo, Proquest and Dissonline for sources including the terms "satisfaction", "disconfirmation" or "expectation*" and any one of "consumer", "product", "service" or "marketing". The search obtained 4969 records. Titles were screened for relevance. Second, we screened the reference sections of Yi (1990), Szymanski and Henard (2001) and Oliver (2010) for relevant titles. Third, we screened issues of highly relevant journals (Journal of Marketing, Journal of Marketing Research, Journal of Consumer Research, Journal of

Consumer Behaviour,Journal of the Academy of Marketing Science) for relevant titles. The screening of titles yielded 601 potentially relevant records. Next, we read the abstracts of these records, excluding 149 records as irrelevant.

Study inclusion. We then assessed the full texts of the remaining 452 records according to our inclusion criteria:

1. The study measured consumer satisfaction regarding a product or service.

2. The study measured or manipulated performance expectations and/or disconfirmation regarding the product or service.

3. The study was conducted on the individual level.

4. The record was available in English or German language.

We excluded 135 records that did not meet our inclusion criteria. Of the remaining 317 records, 106 reported all effect sizes of interest exhaustively, 13 reported some, but not all effect sizes exhaustively, and 198 reported no effect size of interest exhaustively. We tried to contact the authors of the 211 records with incomplete reporting.[13] For dissertations, we also tried to contact the advisors. For 11 previously excluded records the authors provided relevant effect sizes. Thus, we conducted our meta-analysis with 130 records that could be at least partially coded. See Figure 4.2 for an overview of the study selection process. See Appendix D for an overview of all included records, with coded effect sizes and moderators.

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[13] For 19 records, we could not find any contact information. For 3 records, all authors were deceased. Thus, we reached out to the authors of 188 records and requested the missing data.
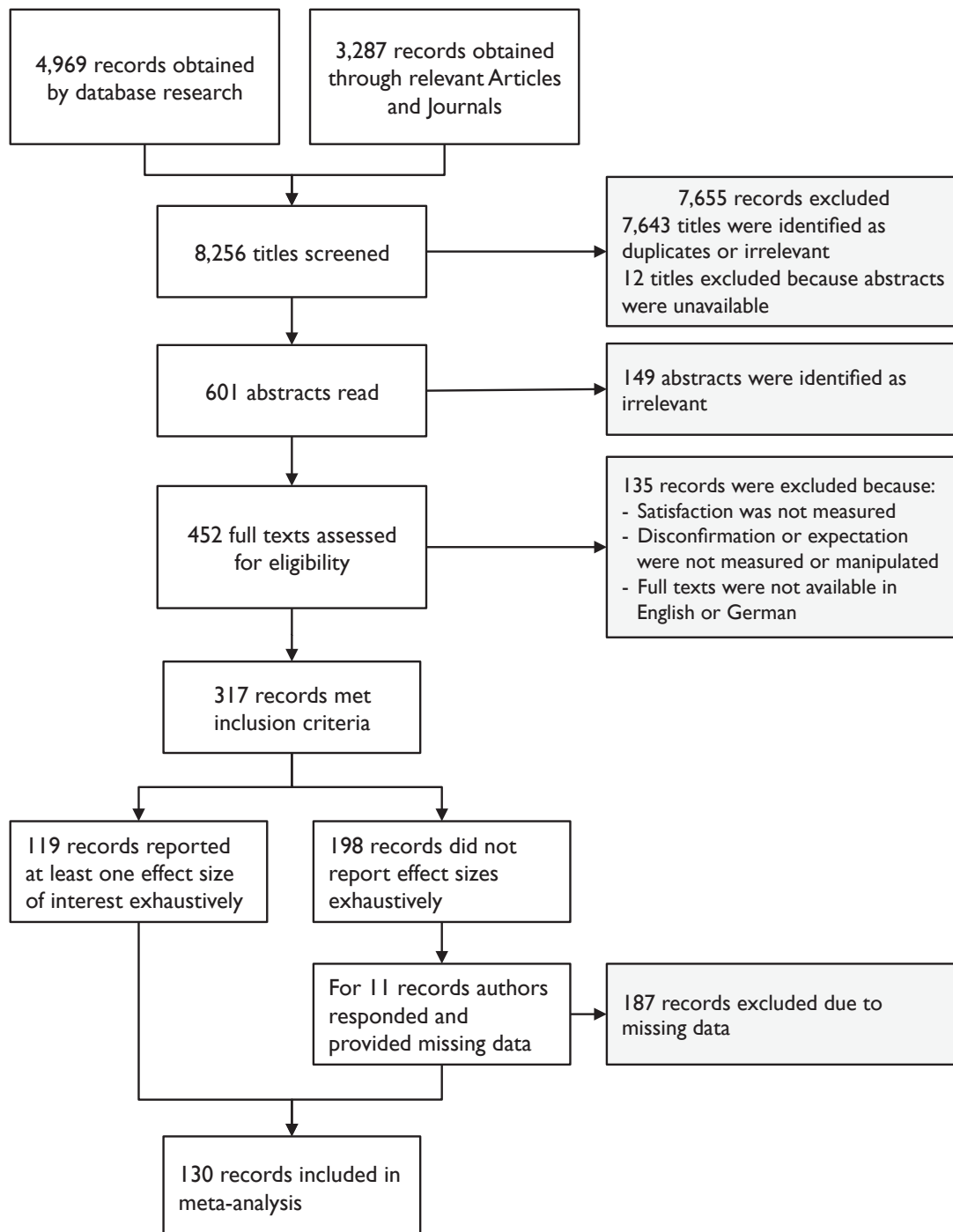
Figure 4.2. Overview of the Literature Search and Selection Process

4.4.2 Coding

Two coders coded all included records, an author of the meta-analysis and a research assistant. Both coders discussed cases in which the coding of the effect sizes seemed ambiguous for at least one coder. For all these cases both coders agreed on explicit coding rules and applied these rules to all similar cases.

Moderator coding. To assess the *expectation type*, we first checked if the authors of a record explicitly stated which expectation type(s) was (were) measured and coded the expectation type(s) accordingly. Second, in cases in which the wording of the expectation items was reported, we checked the respective items for key terms such as "will be" and "what is likely" for predictive expectations and "should", "want" and "ideal" for normative expectations. All cases without a clear indication which expectation type was measured were coded as *ambiguous*. If the coding based on the authors statements and the coding based on the wording of the item conflicted, we coded the expectation type based on the wording of the items.

Regarding the *study design*, we coded all studies that measured all variables at one post-consumption time point as *cross-sectional* surveys. Studies that measured expectations at a preconsumption time point, and satisfaction, disconfirmation and/or perceived performance post-consumption, were coded as *longitudinal* surveys. Studies that experimentally manipulated performance and/or preconsumption expectations were coded as *experiments*.

For *study setting*, we coded studies in which the consumption experience involved real-world products or services and took place in the usual setting (e.g., consuming food in a restaurant) as *field* studies. If the setting was artificial (e.g. orange juice tasting in a laboratory), or when scenarios were used, we coded the study as a *laboratory* study.

For most records the authors provided a clear indication of whether a product or service was the *study target*. However, we also inspected the wording of the questionnaire items, if available, to confirm if the stated target matches the target mentioned in the survey. We coded all tangible objects (e.g., cars, clothing) as products as well as all electronic and virtual objects for which the viewing of the content could be considered the consumption (e.g. e-textbooks or internet blogs). All instances in which people either directly (e.g., travel agents) or indirectly (e.g., though an online shopping website) served customers were coded as services.

We coded the *disconfirmation type* analogously to the coding of the expectation types. If the authors explicitly stated the disconfirmation type(s), we coded the type(s) accordingly. If the wording of the disconfirmation item(s) was reported, we checked the respective items for key terms such as "than I thought it would be" for predictive disconfirmation and "desired", "needed", "ideal" for normative disconfirmation. All cases without a clear indication of which disconfirmation type was measured were coded as *ambiguous*. If the coding based on the authors statements and the coding based on the wording of the item(s) conflicted, we coded the disconfirmation type based on the wording of the item(s).

To assess the *disconfirmation operationalization*, we coded all cases in which disconfirmation was computed or "inferred" by subtracting performance expectations from perceived performance as *difference scores.* All cases in which one or multiple questionnaire items were used to measure perceived disconfirmation, that is the perceived difference between perceived performance and the performance expectation, were coded as *direct measurement*.

4.4.3 Meta-Analytical Procedures

For meta-analytical calculations, we used the computer program Comprehensive Meta-Analysis (2011) and followed the method suggested by Borenstein, Hedges, Higgins, and

Rothstein (2011). As the correlation coefficient is the most common effect size reported in consumer research, we chose to convert all effect sizes into correlation coefficients. Due to the heterogeneity of the expectation and the disconfirmation concept, as well as the study contexts, we assumed variation between effect sizes. Therefore, we used a random effects model to compute the mean correlation coefficients and report the respective confidence intervals (CI).

To assess the heterogeneity between studies and for moderator analyses, we report the Q-statistic, which is the sum of the squared deviations from the estimated model. A significant Q-value indicates variance that cannot be attributed to random sampling error. For moderator analyses, the $Q_{between}$ and Q_{within} statistics can be interpreted analogously to an analysis of variance. Thus, a significant $Q_{between}$ statistic indicates a real difference between moderator groups and thus a significant moderation.

4.5 Results

4.5.1 Overall Effects

The mean intercorrelations of performance expectations, perceived performance, disconfirmation and satisfaction are displayed in the meta-analytic correlation matrix (see Table 4.1). In support of the direct effect Hypotheses 1 and 2, we found that expectation (r = .29; CI .24, .33) and perceived performance (r = .65; CI .59, .70) were positively related to satisfaction. Additionally, in support of Hypothesis 3, we found that perceived performance and performance expectations were positively interrelated (r = .34; CI .26, .42). Probing the relations of disconfirmation to its assumed antecedents, we found mixed evidence. The results show no support for Hypothesis 4, as performance expectations were not negatively, but positively related to disconfirmation (r = .12; CI .01, .23). Hypothesis 5 was supported, because perceived performance and disconfirmation were positively related (r = .60; CI .53, .65). As predicted in

Hypothesis 6, we found disconfirmation to be positively related to satisfaction (r = .60; CI .56, .63).

Table 4.1

Meta-Analytic Correlation Matrix

Construct	1	2	3
1. Performance Expectations			
2. Perceived Performance	.34 **		
95% CI	[.26, .42]		
k total samples	55		
n total sample size	13,301		
3. Disconfirmation	.12 *	.60 **	
95% CI	[.01, .23]	[.53, .65]	
k total samples	47	50	
n total sample size	12,236	13,461	
4. Consumer Satisfaction	.29 **	.65 **	.60 **
95% CI	[.24, .33]	[.59, .70]	[.56, .63]
k total samples	82	76	113
n total sample size	19,102	20,044	32,249

Note. *p<.05. **p<.001. CI = Confidence interval.

4.5.2 Publication Bias

We conducted publication bias analyses for both the expectation-satisfaction and the disconfirmation-satisfaction relationship. The funnel plots for both relationships (see Figure 4.3 and Figure 4.4) are somewhat asymmetrical with 48% of the expectation-satisfaction effect sizes and 35% of the disconfirmation-satisfaction effect sizes within the 95% CI. In the absence of publication bias, the funnel plot should be symmetrical with 95 % of effect sizes located within the 95% CI (Borenstein et al., 2011). However, Egger's test of the intercept revealed no significant asymmetry for the expectation-satisfaction relationship (intercept = -1.22, SE = 0.82,

CI: -2.85, 0.41, t(80) = 1.48, 2-tailed p = .14) nor for the disconfirmation-satisfaction relationship (intercept = -0.94, SE = 1.20, CI: -3.32, 1.44, t(111) = 0.78, 2-tailed p = .44). Duval and Tweedie's (2000a, 2000b) trim and fill tests yielded no missing effect sizes left to the mean and 13 missing effect sizes right to the mean for the expectation-satisfaction relationship and 12 missing effect sizes right to the mean for the disconfirmation-satisfaction relationship. Thus, according to Duval and Tweedie (2000a, 2000b), to correct for publication bias, the overall expectation-satisfaction effect should be adjusted to r = .35 CI: .34, .36 and the overall disconfirmation-satisfaction effect should be adjusted to r = .63 CI: .60, .66. It is commonly assumed that small, insignificant effect sizes are less likely to get published and thus most likely to be missing in a meta-analysis summary, yielding an upward publication bias (Borenstein et al., 2011). Remarkably, the present analyses suggest the opposite pattern, indicating that some very large effect sizes might be missing in the study set and that the mean expectation-satisfaction and disconfirmation-satisfaction correlations might be biased *downwards*.
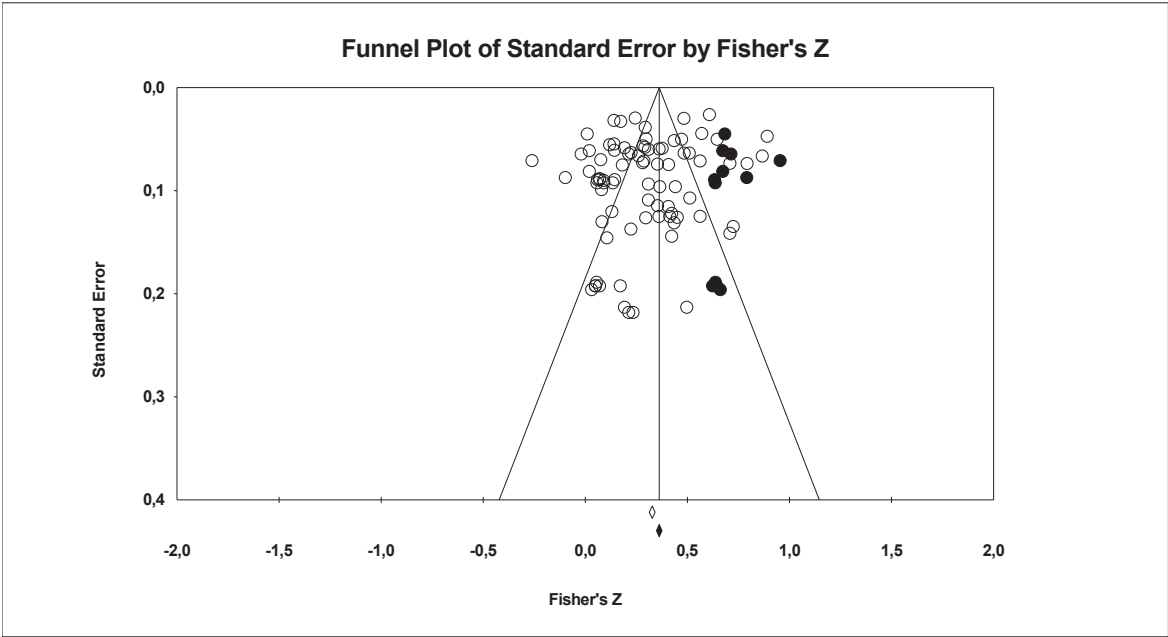
Note. Black dots indicate imputed effect sizes.

Figure 4.3. Funnel Plot of Standard Error for Expectation-Satisfaction Effect Sizes
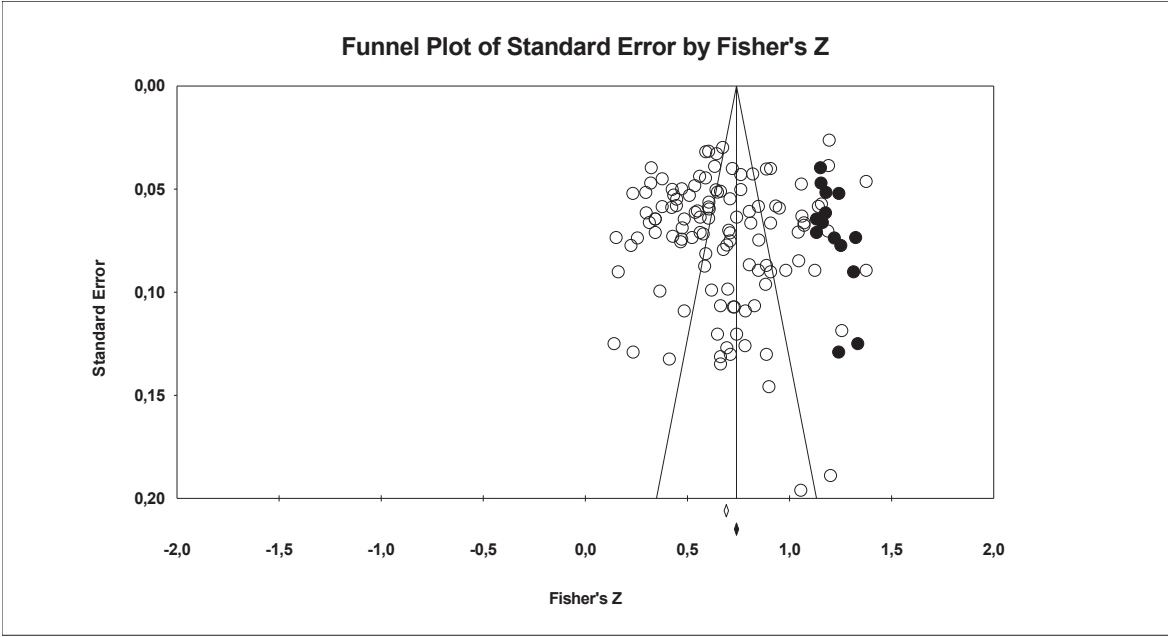
Note. Black dots indicate imputed effect sizes.

Figure 4.4. Funnel Plot of Standard Error for Disconfirmation-Satisfaction Effect Sizes

4.5.3 Moderator Analyses

Moderators of the expectation-satisfaction relationship. Based on our review of expectation types, we differentiated predictive ("will be") and normative ("should be") expectations. In Hypothesis 7 we predicted stronger assimilation effects for predictive expectation than for normative expectation. Although the expectation-satisfaction relationship for predictive expectations was more positive (by trend) than for normative expectations, a mixed-effect moderator analysis did not support Hypothesis 7 - $Q_{between}(1) = 3.81$, p = .051. Further moderator analyses showed that the positive expectations-satisfaction effect was more pronounced for satisfaction with services when compared to satisfaction with products - $Q_{between}(1) = 5.10$, p = .024 (as predicted in Hypothesis 8), in field studies when compared to laboratory studies - $Q_{between}(1) = 13.61$, p < .001 (as predicted in Hypothesis 9), and in cross-sectional surveys when compared to both longitudinal surveys and experiments - $Q_{between}(1) = 9.12$, p = .003 (as predicted in Hypothesis 10), see Table 4.2.

Moderators of the disconfirmation-satisfaction relationship. As with the expectation types, we differentiated predictive disconfirmation and normative disconfirmation. Because normative disconfirmation is conceptually closer to the satisfaction concept than predictive disconfirmation, we predicted in Hypothesis 11 that normative disconfirmation is more positively related to satisfaction than is predictive disconfirmation. However, the results of a moderator analysis did not support Hypothesis 11 - $Q_{between}(1) = 0.24$, p = .621. Furthermore, we probed the notion that the strength of the disconfirmation-satisfaction relationship might depend on the operationalization of disconfirmation, differentiating directly measured (perceived) disconfirmation and disconfirmation operationalized with difference scores. We predicted in Hypothesis 12 that directly measured perceived disconfirmation is more positively related to

satisfaction than is disconfirmation operationalized with difference scores. In support of

Hypothesis 12, a moderator analysis showed that directly measured disconfirmation is more

positively related to satisfaction than is disconfirmation operationalized with difference scores –

$Q_{between}(1) = 9.67$, p = .002 (see Table 4.3).

Table 4.2

Overall Meta-Analytical Effect of Performance Expectations on Customer Satisfaction with Moderator Effects

			95% CI		Heterogeneity				Moderator analysis	
	k	n	r	LL	UL	Q (df)	I^2	T^2	SE	$Q_{between}$ (df)	Q_{within} (df)
Overall effect	82	19,102	.29***	.24	.33	979.08(81)***	91.73	0.05	0.01		
Categorical moderators											
Expectation Type[a][b]										4.12(2)	994.67(87)***
Ambiguous	34	8,393	.30***	.21	.38	524.06(33)***	93.70	0.07	0.03		
Predictive	45	9,872	.29***	.24	.35	371.79(44)***	88.17	0.04	0.01		
Normative	11	2,280	.15***	.02	.28	98.82(10)***	89.88	0.04	0.02		
Study design [c]										15.86(2)***	811.07(79)***
Cross-sectional	22	7,078	.40***	.31	.48	360.95(21)***	94.18	0.05	0.02		
Longitudinal	34	9,355	.27***	.20	.33	397.60(33)***	91.70	0.04	0.02		
Experiment	26	2,669	.18***	.13	.24	52.53(25)**	52.40	0.01	0.01		
Study Setting										13.61(1)***	891.15(80)***
Laboratory	30	3,754	.19***	.14	.24	64.26(29)***	54.87	0.01	0.01		
Field	52	15,348	.34***	.28	.39	826.89(51)***	93.83	0.05	0.02		
Study Target										5.10(1)*	896.40(80)***
Product	36	6,985	.23***	.16	.29	225.82(35)***	84.50	0.03	0.01		
Service	46	12,117	.33***	.27	.39	670.57(45)***	93.29	0.06	0.02		

Note. *p<.05. **p<.01. ***p<.001. k = number of effect sizes included in analyses. CI = 95% confidence interval; LL = lower level; UL = upper level. SE = standard error. [a] If a study measured multiple expectation types, we entered the respective effect sizes separately for the moderator analysis of expectation types. Therefore, the total number of effect sizes k for the moderator analysis of expectation types exceeds the number of effect sizes k of the overall analysis. As effect sizes of the same sample are entered in different groups, unaccounted dependencies would reduce the heterogeneity between groups and thus make the moderator analysis more conservative. [b] Contrasting only predictive and normative expectations yielded no significant result - Q(1) = 3.81, p = .051. [c] Contrasting cross-sectional surveys versus a group comprising both longitudinal surveys and experiments also yielded a significant result - $Q_{between}$(1) = 9.12, p = .003.

Table 4.3

Overall Meta-Analytical Effect of Disconfirmation on Customer Satisfaction with Moderator Effects

				95% CI		Heterogeneity				Moderator analysis	
	k	n	r	LL	UL	Q (df)	I^2	T^2	SE	$Q_{between}$ (df)	Q_{within} (df)
Overall effect	113	32,249	.60***	.56	.63	2,446.39(112)***	95.42	0.07	0.01		
Categorical moderators											
Disconfirmation Type [a][b]										0.77(2)	2,614.48(122)***
Ambiguous	88	25,618	.59***	.55	.63	1,883.88(87)***	95.38	0.07	0.02		
Predictive	19	3,839	.60***	.48	.69	484.28(18)***	96.28	0.13	0.06		
Normative	18	4,708	.63***	.55	.69	246.32(17)***	93.10	0.06	0.03		
Operationalization DIS										9.67(1)**	2,360.70(112)***
Direct measurement	102	29,690	.60***	.57	.64	2,293.59(101)***	95.60	0.08	0.01		
Difference score	12	2,717	.48***	.39	.55	67.11(11)***	83.61	0.02	0.08		
Study design										1.79(2)	2327.19(110)***
Cross-sectional	75	24,068	.61***	.57	.65	1,806.35(74)***	95.90	0.07	0.02		
Longitudinal	30	6,862	.57***	.50	.63	418.14(29)***	93.06	0.06	0.02		
Experiment	8	1,319	.55***	.39	.68	102.71***	93.18	0.09	0.06		
Study Setting										0.64(1)	2,445.03(111)***
Laboratory	16	2,874	.63***	.54	.70	183.55(15)***	91.83	0.07	0.03		
Field	97	29,375	.59***	.55	.63	2,261.48(96)***	95.76	0.08	0.02		
Study Target										4.13(2)	2,305.84(110)***
Product	37	10,882	.55***	.49	.60	552.78(36)***	93.49	0.05	0.02		
Service	74	20,769	.62***	.57	.66	1722.78***	95.76	0.08	0.02		
Mixed	2	598	.72***	.21	.92	30.28(1)***	96.70	0.24	0.34		

Table 4.3. (continued)

Note. *p<.05. **p<.01. ***p<.001. *k* = number of effect sizes included in analyses. CI = 95% confidence interval; LL = lower level; UL = upper level. SE = standard error. DIS = disconfirmation. [a] If a study measured multiple disconfirmation types or disconfirmation operationalizations, we entered the respective effect sizes separately for the moderator analysis of disconfirmation types and disconfirmation operationalization. Therefore, the total numbers of effect sizes *k* for the moderator analyses of disconfirmation types and disconfirmation operationalization exceed the number of effect sizes *k* of the overall analysis. As effect sizes of the same sample are entered in different groups, unaccounted dependencies would reduce the heterogeneity between groups and thus make the moderator analysis more conservative. [b] Contrasting only predictive and normative disconfirmation types yielded no significant result - Q(1) = 0.24, p = .621.

4.6 Discussion

In the current meta-analysis, we set out to test hypotheses developed around two streams of expectancy-disconfirmation research: theories of direct expectation and perceived performance effects on satisfaction and disconfirmation theory. As displayed in Figure 5.1, we tested hypotheses regarding the interrelationships of performance expectations, perceived performance, disconfirmation and satisfaction and hypotheses regarding potential moderators of expectation and disconfirmation effects on satisfaction. The present results show that all interrelationships are significantly positive, a pattern that supports all main effect hypotheses (H1-H3, H5, H6), except the relationship of disconfirmation to its antecedent performance expectation that was predicted to be negative (H4). The moderator analyses of expectation and disconfirmation effects on satisfaction yielded mixed results. We found support for the moderating role of study target (H8), study setting (H9), study design (H10) and disconfirmation operationalization (H12), but no support for the moderating role of performance expectation types and disconfirmation types (H7, H11). We will now discuss the implications of these results for theories of direct expectation effects (assimilation and contrast theories) and for disconfirmation theory.

4.6.1 Implication for Assimilation and Contrast Theories

Our meta-analysis addressed a central question of expectancy-disconfirmation research: Are satisfaction ratings assimilated toward or contrasted away from initial expectations? The positive relationship between performance expectations and consumer satisfaction (Hypothesis 1) clearly supports the prediction of assimilation theories (Anderson, 1973; Deighton, 1984; Hoch & Ha, 1986; Olshavsky & Miller, 1972) and runs counter to the prediction of contrast theory (Anderson, 1973; Cardozo, 1965; Hovland et al., 1957). This finding from the current meta-analysis replicates the positive expectation-satisfaction effect that Szymanski and Henard

found in their 2001 meta-analysis, with a considerably larger body of research. While Szymanski and Henard included eight studies in their analysis of the expecation-satisfaction relationship, we were able to base our estimation on 82 studies. Furthermore, the current meta-analysis found a larger mean correlation of r = .29 (not reliability-adjusted), compared to Szymanski and Henard's estimation of $\rho = $ .19 (not reliability-adjusted). To probe the robustness of the assimilation effect, we inspected the subgroup of experimental studies. For the 26 experiments, we also found a significant positive expectation-satisfaction relationship (r = .18; CI .13, .24) for the subgroup of the 26 experimental studies. Lastly, it is important to note that our results cannot unequivocally prove that contrast effects do not exist. As assimilation and contrast are opposing effects, it is possible that both affect satisfaction in parallel, but relatively stronger assimilation effects cancel out relatively weaker contrast effects. However, the robust assimilation patterns of the expectation-satisfaction relationship speak against a substantial role of contrast in the formation of satisfaction.

The current meta-analysis also addresses the question of whether moderating conditions can explain the variability of the positive performance expectation-satisfaction relationship, respectively the variability of the assimilation effect. The results revealed three significant moderator effects of the expectation-satisfaction relationship: study target (products vs. services), study setting (field vs. laboratory) and study design (cross-sectional surveys vs. longitudinal surveys vs. experiments). As we deduced hypotheses regarding these moderators based on theoretical assumptions about confidence in performance expectations, performance ambiguity, and hindsight bias, the current results suggest that these moderating conditions are not only theoretically but also empirically relevant for assimilation effects and should therefore be integrated into assimilation theories. More specifically, the finding that the performance

expectation-satisfaction relationship was stronger for services than it was for products indicates that the strength of assimilation effects might depend on performance ambiguity. The theoretical argument is that the evaluation of service performance is considered more complex and hence more ambiguous than the evaluation of product performance (Parasuraman et al., 1985). Thus, the relatively higher ambiguity of service performance should make the evaluation of service performance more prone to assimilation processes by augmenting hypothesis-guided top-down perception (Nyer, 1996; Yi, 1993). Furthermore, regarding the moderator study design, we offer a combination of two explanations for our finding that the performance expectation-satisfaction correlation was larger in field studies than in laboratory studies. First, expectations formed in the field are usually based on previous experience and should therefore be held with higher confidence than expectations created in laboratory settings. Second, because consumers should be reluctant to acknowledge that perceived performance deviates from expectations held with high confidence, expectations held with high confidence should yield stronger assimilation effects than expectation held with low confidence (Spreng & Page, 2001; Yi & La, 2003). Considered together, both performance ambiguity and confidence in expectations relate to the consumer's certainty in specific sources of evidence. Performance ambiguity should negatively relate to the subjective certainty that perceived performance is valid evidence of true performance, confidence in expectations should positively relate to the subjective certainty that initial expectations are valid indicators of true performance. Therefore, a promising approach to further advance assimilation theory may be to integrate both performance ambiguity and confidence in expectations into a satisfaction formation model which outlines how consumers weigh different sources of evidence against each other according to the subjective certainty associated with these sources. In other terms, it would be interesting to explore if and how

consumers consider the performance ambiguity and their confidence in expectations in relation to each other.

The third moderator of the positive performance expectation-satisfaction relationship identified in the current meta-analysis was study design. Assimilation effects were stronger in cross-sectional surveys than in longitudinal surveys and in experiments. We predicted this pattern because the hindsight bias and halo effects should in particular affect recalled expectation measured in cross-sectional designs, and thus inflate the expectation-satisfaction relationship (Cooper, 1981; Zwick et al., 1995). Our above-described finding supports the recurring argument that recalled expectations should be differentiated from initial expectations, both methodically and theoretically (Westbrook & Reilly, 1983; Yi, 1990). For the research on performance expectation-satisfaction effects, this notion further implies that cross-sectional studies may be unsuitable to obtain valid estimates of the magnitude of assimilation effects.

Implications for disconfirmation theory. Disconfirmation theory proposes that disconfirmation, defined as the cognitive comparison of perceived performance and expectation, is a central antecedent to consumer satisfaction. In accordance to that proposition, we found a strong positive correlation between disconfirmation and satisfaction. Compared to the results of Szymanski and Henard (2001), we found a considerably larger effect size (r = .60, compared to ρ = .39) based on a larger body of research (113 studies, compared to 30 studies). The disconfirmation-satisfaction correlation seems robust, as effect sizes in all studies were positive and 110 out of 113 studies found significant effects in the same direction.

Does this strong and robust relationship imply that disconfirmation, and perceived disconfirmation in particular, is a superior predictor for consumer satisfaction, as suggested by Yi (1990) and Oliver (2010)? We advise caution with this interpretation for two reasons. First,

the very high relationship may be "too good" to be realistic for a theoretically distinct predictor of satisfaction. With the mean r = .60, there were 29 individual studies with disconfirmation-satisfaction correlations ≥ .70 and 11 studies with disconfirmation-satisfaction correlations ≥ .80. Correlations that high fall in a range that is commonly expected for reliability coefficients of psychological constructs. Thus, at least in a subgroup of studies, disconfirmation appeared to be hardly distinguishable from satisfaction. Additionally, the publication bias analysis indicated that the true disconfirmation-satisfaction relationship might be *under*estimated due to the omission of very high effect sizes. This is a highly unusual result for a publication bias analysis, as one would normally expect that mostly studies reporting small and insignificant effect sizes would remain unpublished and thus small effect sizes should be missing in the meta-analysis (Borenstein et al., 2011). We can only speculate about what factors might have contributed to the omission of too-high effect sizes. One possible explanation is that some researchers measured disconfirmation as an outcome variable among other outcomes, such as satisfaction, but then selectively omitted results involving disconfirmation because of very high disconfirmation-satisfaction correlations indicating that the two variables were empirically indistinguishable. Second, it was pointed out in Chapter 3 that if directly measured perceived disconfirmation lacks the negative relationship to its antecedent performance expectations, it is unclear if perceived disconfirmation adds any *predictive* value over and above perceived performance effects. The present finding that perceived disconfirmation was not negatively related to performance expectations, as is implied by the very definition of disconfirmation, but instead was significantly *positively* related to performance expectations, supports this notion. Therefore, even though disconfirmation is very closely related to satisfaction, based on our meta-

analytical findings, we question if disconfirmation is a predictor of satisfaction, a covariate of satisfaction or overlapping with the satisfaction construct.

4.6.2 Limitations

It is important to consider the scope and limitations of the present meta-analysis. These limitations concern the body of research and the limitations of the primary studies. First, although we were able to identify and include a substantially larger body of research than the previous meta-analysis by Szymanski and Henard (2001), there were a high number of studies that had to be excluded due to incomplete reporting. Despite our efforts to contact the authors and obtain the missing data, only a few authors were able to provide the necessary information. Therefore, a significant body of empirical disconfirmation research could not be included in the meta-analysis.

Second, our moderator analysis of performance expectation and disconfirmation types relied on the clarity and precision with which the primary studies differentiated these types. However, for numerous studies, a clear assessment of the expectation and disconfirmation types was not possible, because either the measurement items were ambiguously worded or no wording was reported. In these cases, we coded performance expectation or disconfirmation types as "ambiguous". In particular, due to the high number of disconfirmation measures categorized as ambiguous ($k = 88$), the results of the disconfirmation type moderator analysis should be interpreted with caution.

Third, although the current meta-analysis revealed significant moderators of both the performance expectation-satisfaction and the disconfirmation-satisfaction relationship, the larger part of the heterogeneity could not be accounted for. Thus, we were not able to capture all relevant moderating conditions of the expectancy-disconfirmation relationships.

Fourth, the theories we presented as the theoretical foundation of expectation effects make partly similar predictions. Dissonance theory and hypothesis testing theory both predict assimilation effects. As the primary studies rarely probed the processes underlying theses explanation or tested competing hypotheses derived from these theories, we were not able to test these theories in direct competition.

4.6.3 Future Expectancy-Disconfirmation Research

The large amount of unaccounted for heterogeneity of the primary studies underscores the need for research of both moderating conditions and underlying processes. As the core issues of performance expectancy-disconfirmation research concern the effects of expectation on consumer satisfaction and the role of (perceived) disconfirmation for satisfaction formation, we make suggestions for future research for each of those two areas.

Based on the notion that both dissonance theory and hypothesis testing theory predict assimilation effects for predictive expectations, but only dissonance theory predicts assimilation effects for normative expectations, we hypothesized stronger assimilation effects for predictive expectations than for normative expectations. However, although the current meta-analysis showed descriptively that predictive expectations were more positively related to satisfaction than were normative expectations, this pattern was not statistically significant. There are several possible explanations for this negative result that could be addressed in future research. First, it is possible that the current moderator analysis lacked the necessary statistical power to uncover a small moderation effect in the hypothesized direction. In particular, more studies on the effect of normative expectations on satisfaction could make the estimation of the true effect size more precise. Second, by coding the expectation type based on the type indicated in the records and based on keywords in the wording of the measurement items, we might not have been able to

overcome measurement limitations of the primary studies. In expectancy-disconfirmation research, a clear consensus about how to precisely measure expectations and different expectation types is missing, and there is little research on the question how consumers actually interpret differently worded expectation items (Spreng, Mackoy, & Dröge, 1998). Future research needs to probe the validity of commonly used expectation items for measuring different expectation concepts, in particular because the word "expectation" has multiple predictive and normative meanings, and the interpretation might depend on minor differences in the wording and context of the question. Third, the processes underlying the assimilation effects for predictive and normative expectations could be more complex than we proposed in the current meta-analysis. As predictive and normative expectations are assumed to be independent constructs (Santos & Boote, 2003), multiple configurations of these variables, and hence interaction effects, are possible (e.g., a consumer could hold high predictive, but low normative expectations). In this case, a medium performance would *negatively* disconfirm predictive expectations, but *positively* disconfirm normative expectations. Do such patterns imply that assimilation processes due to both predictive and normative expectations compete with one another? It is the task of future research to elaborate and probe such complex questions.

Future research is also needed to clarify the role of perceived disconfirmation. We found very high interrelationships between perceived disconfirmation, perceived performance and satisfaction, suggesting that these constructs might conceptually overlap. Moreover, in contrast to the very definition of disconfirmation, performance expectations were not negatively related to perceived disconfirmation, which raises the question whether or not there is a meaningful antecedent to perceived disconfirmation beyond performance? One possible interpretation of these high correlations is that perceived performance, perceived disconfirmation and satisfaction

are not independent constructs, but rather they are subcomponents of a global attitude construct toward the product or service. Following this interpretation, perceived disconfirmation should be conceptually integrated into attitude theory. However, studies that found unique positive effects of perceived disconfirmation over and above perceived performance (e.g., Churchill & Surprenant, 1982; Oliver, 1980) suggest that there may be other systematic sources of variance beyond perceived performance. In either case, future research is needed to clarify the nomological position of perceived disconfirmation.

4.6.4 Managerial Implications

The current meta-analysis has multiple practical implications for the management of product and service marketing. Businesses striving to satisfy their customers need to consider the effects of expectations and their disconfirmation on satisfaction, as well the moderating conditions that apply.

A key strategic question for marketers is: Should marketing communication overstate the product or service performance, depict the performance accurately or understate the performance in order to foster customer satisfaction? The results our meta-analysis suggest that by overstating product or service performance, businesses can profit from the assimilation effect; that is, customers' evaluations of the product and satisfaction with the product will be substantially shifted toward the high expectation induced by overstatement. The effect size of the expectation-satisfaction relationship ($r = .29$) indicates that roughly 8% of the variance of consumer satisfaction can be explained by performance expectations. Looking at the subgroup of 26 experimental studies for a more conservative estimate, the assimilation effect is smaller ($r = .18$), but still accounts for roughly 3 % of the variation of consumer satisfaction. Despite considerable heterogeneity of the expectations-satisfaction relationship, contrast effects seem to

be extremely scarce. In fact, out of 82 studies, only a single study found a significantly negative expectation-satisfaction relationship (Hill, 2006). Thus, the common advice to be careful with a "high expectation" promotional strategy (e.g., by Oliver, 1977), because such a strategy might backfire in the presence of contrast effects, is not supported by the summary of available evidence. Furthermore, a moderator analysis showed that the assimilation effect was stronger for services compared to products, implying that the above-described guidance is particularly relevant for the marketing of services. We expected stronger assimilation effects based on the assumption that service performance is more ambiguous than product performance. Following this interpretation, not only marketers for services, but also marketers for products that are difficult to evaluate could profit from a high expectation-inducing promotional strategy.[14]

It is important to note that the positive assimilation effects apply ceteris paribus and businesses need to also consider the performance of their products and services. We found a particularly strong and stable perceived performance-satisfaction relationship ($r = .65$) that underscores the importance of product and service performance. Thus, although creating high expectations should have a positive effect on customer satisfaction, expectations cannot compensate for a lack in performance. Assimilation effects could be exploited, but businesses should always allocate resources in a way that ensures the best possible product and service performance.

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[14] Reversing this notion, if it is known that customers have low expectations of a product or service, businesses could aim to reduce detrimental assimilations effects by reducing the performance ambiguity of their product and services.

Our results further show that the consumers' perception that a product or service exceeds expectations is closely related to consumer satisfaction. Thus, businesses can use perceived disconfirmation as an indicator, besides performance evaluations and direct satisfaction measures, that the products or services please their customers. However, as perceived performance lacks a meaningful relationship to initial expectation, marketers should not rely on perceived disconfirmation to infer what customers had initially expected or to what extent customers' initial expectations were disconfirmed.

4.7 Conclusion

In this meta-analysis, we summarized the empirical research on expectancy-disconfirmation theory. We conclude that consumers assimilate consumer satisfaction ratings toward their expectations and that perceived disconfirmation and satisfaction are closely related concepts. We further found that the positive relationship between performance expectations and satisfaction was stronger for services than for products and that directly measured disconfirmation is more closely related to satisfaction than is disconfirmation operationalized with difference scores. Although future research is needed to further clarify the role of performance expectations and their disconfirmation for consumer satisfaction, our results suggest that marketers can profit from the assimilation effect by overstating the performance of their products and services

Chapter 5: General Discussion

The starting point of the present research program was to develop and test a comprehensive model of intra-individual Word-of-Mouth (WOM) transmission by integrating theories of social influence, consumer satisfaction and WOM sending. During the course of the initial experimental research three interrelated issues became apparent: First, the formation of consumer satisfaction, as conceptualized by expectancy-disconfirmation theory, is a key element of the originally assumed intra-individual WOM transmission process. Second, conceptual inconsistencies and methodological shortcomings of expectancy-disconfirmation theory limit the conclusiveness of expectancy-disconfirmation research and have to be addressed in a systematic way. Third, a current and comprehensive summary of the evidence regarding expectancy-disconfirmation effects on consumer satisfaction is missing. Thus, a conceptual and empirical integration of expectancy-disconfirmation theory is necessary for explaining the role of consumer satisfaction in the WOM transmission process.

5.1 Summary of the Research

The research objectives of the above-described research program are structured into four research questions, for which the key findings are summarized in Figure 5.1. *Research Question 1* addresses the lack of a well-founded psychological model of intra-individual WOM transmission. Such a model is necessary, because in order to explain the spread of WOM in markets, both the inter-individual transmission of WOM between consumers and the intra-individual transmission of WOM (from the reception of WOM to the sending of WOM) have to be theoretically addressed. To address this gap, a three-step model of intra-individual WOM transmission was proposed. In step 1, based on theories of social influence (Cialdini & Goldstein, 2004; Cohen & Golden, 1972), the model posits that received WOM affects

performance expectations. In step 2, based on expectancy-disconfirmation theory, the model

posits that performance expectations and perceived performance affect consumer satisfaction. In

step 3, based on WOM theory (Alexandrov et al., 2013; De Matos & Rossi, 2008), the model

posits that consumer satisfaction affects the sending of WOM. Taken together, the three-step

model of intra-individual WOM transmission proposes a causal path from the reception of WOM

to the sending of WOM.

Research Question 2 addresses the key role of the expectancy-disconfirmation process for

the intra-individual transmission of WOM. Expectancy-disconfirmation theory posits that

consumers evaluate experienced performance of products and services in relation to prior

performance expectations, and that these performance expectations affect consumer satisfaction

(Anderson, 1973; Oliver, 1980, 2010). Because received WOM is assumed to affect

performance expectations, the expectancy-disconfirmation process bridges the conceptual gap

between received WOM and consumer satisfaction. However, although the results of the

experiment reported in *Chapter 2* supported the hypothesized effects of received WOM on

performance expectations (step 1) and of consumer satisfaction on the sending of WOM (step 3),

in contradiction to expectancy-disconfirmation theory, there was no effect of performance

expectations on consumer satisfaction (step 2). Thus, the results of the experiment imply that the

transmission of WOM "becomes stuck" at the stage of expectancy-disconfirmation.

Given the significance of expectancy-disconfirmation theory in the consumer satisfaction

literature and considering the vast amount of studies that report significant expectancy-

disconfirmation effects (e.g., Cardozo, 1965; Choi & Mattila, 2008; Churchill & Surprenant,

1982; Halstead, Hartman, & Schmidt, 1994; Morgeson, 2013; Olshavsky & Miller, 1972; Olson

& Dover, 1979; Tse & Wilton, 1988), the absence of any performance expectations-satisfaction

effect in my experimental study is a puzzling result. Yet, the implications of this result for

expectancy-disconfirmation and WOM transmission theory are hard to gauge, because

expectancy-disconfirmation theory in itself lacks theoretical and empirical integration. Despite

conceptual ambiguities and a vast body of research providing heterogeneous evidence, there was

neither a comprehensive review available nor a current meta-analysis of expectancy-

disconfirmation research, which could help explaining the negative results of my experimental

study. Thus, research questions 3 and 4, which address these two gaps in the literature, were

formulated.

Research Question 3 addressed the theoretical inconsistencies and methodological

shortcomings of expectancy-disconfirmation research. In a critical review, presented in Chapter

3, the role of the perceived disconfirmation paradigm as the "silver bullet" of disconfirmation

research was challenged. According to the perceived disconfirmation paradigm, disconfirmation

is considered as a standalone psychological construct and, as such, is measured directly by

asking if a product or service was *better then expecte*d or *worse than expected* (Oliver, 1980).

Perceived disconfirmation is further assumed to be potentially unrelated to initial expectations

(Oliver, 1977). However, it is argued that the perceived disconfirmation paradigm (a) is in

contradiction to the definition of disconfirmation as a cognitive comparison of perceived

performance and initial expectations, (b) does not address the question whether there are any

antecedents to perceived disconfirmation over and above perceived performance, and (c)

confounds initial expectations with recalled expectations. Regarding the methodology of

disconfirmation research, the common practices of directly measuring the perceived

disconfirmation and conducting linear path analyses are both methodologically flawed

approaches to the study of disconfirmation processes (Edwards, 2001). To resolve these

conceptual and methodological issues, polynomial regression and response surface analysis are proposed as more suitable methods to the study of discrepancy-based phenomena (Edwards & Parry, 1993) such as disconfirmation. Furthermore, a disconfirmation model that differentiates four types of disconfirmation, based on different pre- and post-consumption discrepancies, is proposed. According to the here newly presented disconfirmation model, perceived disconfirmation is one possible method, among others, to operationalize disconfirmation of recalled expectations. Yet, for most research questions in expectancy-disconfirmation research, it is necessary to probe other types of disconfirmation, in particular the objectively measured discrepancy between perceived performance and initial performance expectations.

Research Questions 4 addresses the lack of integration of the empirical evidence regarding the relation of performance expectations to satisfaction and disconfirmation to satisfaction. The meta-analysis presented in Chapter 4 shows a positive mean correlation between performance expectations and consumer satisfaction (r = .29; CI .24, .33), supporting the notion that consumers assimilate their satisfaction ratings toward their performance expectations, as predicted by dissonance theory and hypothesis testing theory (Anderson, 1973; Deighton, 1984; Hoch & Ha, 1986; Olshavsky & Miller, 1972). The meta-analysis also shows a very strong positive correlation between disconfirmation and satisfaction (r = .60). Such a high correlation may be "to good" to be realistic for a theoretically distinct predictor of satisfaction and therefore suggests that the disconfirmation and the satisfaction construct overlap conceptually. Furthermore, the correlation between disconfirmation and satisfaction was more positive for perceived disconfirmation than for disconfirmation operationalized with difference scores (r = .60 vs. r = .48), suggesting that the issue of conceptual overlap is specific to the perceived disconfirmation construct.

RQ1: How can intra-individual WOM transmission be modeled?

- A three-step model of intra-individual WOM transmission was proposed in Chapter 2.
- Step 1: Received WOM affects performance expectations.
- Step 2: Performance expectations and perceived performance affect consumer satisfaction.
- Step 3: Consumer satisfaction affects the sending of WOM.

RQ2: Can expectancy-disconfirmation theory explain how received WOM affects consumer satisfaction?

- In contradiction to expectancy-disconfirmation theory, the results of the experiment presented in Chapter 2 revealed no expectation effect on consumer satisfaction.
- The intra-individual transmission of WOM seems to "become stuck" at the step of expectancy-disconfirmation.

RQ3: What are the theoretical inconsistencies and methodological shortcomings of expectancy-disconfirmation research, and how could these issues be resolved?

- The perceived disconfirmation paradigm is unclear about the antecedents of disconfirmation, confounds initial expectations with recalled expectations and implies the flawed methodological approaches of direct measurement and linear path analysis.
- In Chapter 3, a comprehensive disconfirmation model is proposed, differentiating disconfirmation of initial expectations and disconfirmation of recalled expectations.
- Polynomial regression and response surface analysis are proposed as more suitable methods to the study of disconfirmation phenomena.

RQ4: What is the available evidence regarding the effects predicted by expectancy-disconfirmation theory?

- Performance expectations are positively related to consumer satisfaction ($r = .29$; CI: .24, .33), supporting assimilation theories.
- Disconfirmation is very closely related to satisfaction ($r = .60$; CI: .57, .62), suggesting that the two constructs might conceptually overlap.
- The correlation between disconfirmation and satisfaction is more positive for perceived disconfirmation than for disconfirmation operationalized with difference scores ($r = .60$ vs. $r = .48$), suggesting that the issue of conceptual overlap is specific to perceived disconfirmation.

Figure 5.1. Summary of Key Findings

5.2 Theoretical Implications

While the implications of the individual studies presented in this thesis are discussed in the respective chapters, I will now offer a general view of the overall research program and its relevance for both expectancy-disconfirmation and WOM theory. Because the implications regarding expectancy-disconfirmation theory are relevant for the discussion of WOM theory, the implications of the review and meta-analysis of expectancy-disconfirmation research are presented first, before widening the focus to discuss WOM theory development.

5.2.1 Implications for Expectancy-Disconfirmation Theory

The disconfirmation concept, and specifically the perceived disconfirmation concept that conceptualizes disconfirmation by directly asking consumers if a product or service was *better then expecte*d or *worse than expected,* needs to be clarified. This is the core implication of both the qualitative review and the meta-analysis of expectancy-disconfirmation research. I will now recapitulate the crucial issues regarding the perceived disconfirmation concept, before drawing a conclusion and making suggestions for further expectancy-disconfirmation theory development.

The state of the perceived disconfirmation paradigm. As described in Chapter 3, there are at least three interrelated conceptual issues regarding the perceived disconfirmation paradigm. First, the conceptualization of perceived disconfirmation is in contradiction to the definition of disconfirmation. The definition of disconfirmation as the cognitive comparison of perceived performance and initial expectations (Oliver, 1980) implies that performance expectations should be negatively related to disconfirmation. Yet, according to the perceived disconfirmation paradigm, disconfirmation should be *unrelated* to initial expectations, because an axiomatic negative relationship of disconfirmation and expectations would lead to the overspecification of statistical path models (Oliver, 1977). Second, the perceived

disconfirmation paradigm does not provide any *theoretical* argument why perceived disconfirmation should be unrelated to its purported antecedent initial expectations. Third, it is doubtful that consumers can access their initial expectations regarding a product or service when responding to perceived disconfirmation items, because consumers can only compare expectations and perceived performance after the consumption experience, when expectations have to be recalled (Westbrook & Reilly, 1983; Yi, 1990).

In addition to the three above-described conceptual issues of the perceived disconfirmation paradigm, the meta-analysis described in Chapter 4 indicates two further empirical issues of the perceived disconfirmation construct. First, perceived disconfirmation seems to be empirically hardly distinguishable from its purported outcome consumer satisfaction, suggesting a conceptual overlap between perceived disconfirmation and consumer satisfaction. Second, the meta-analysis indicates a small positive correlation between performance expectations and perceived disconfirmation - a result that is in contradiction to the above-described definition of disconfirmation.

Considering these intertwined theoretical and empirical shortcomings of the perceived disconfirmation paradigm – how should expectancy-disconfirmation theory development proceed from here on? Given that the definition of perceived disconfirmation, the relation of perceived disconfirmation to its key antecedent initial expectations, and the distinctness of perceived disconfirmation from its assumed outcome consumer satisfaction are unclear, these problems appear to be so fundamental that it might be advisable to abandon the perceived disconfirmation paradigm in favor of more clearly defined and empirically tested concepts in consumer satisfaction research.

A viable alternative approach to the flawed perceived disconfirmation paradigm could be to abandon the assumption that disconfirmation should be conceptualized as *psychological construct* altogether, and to instead conceptualize *disconfirmation as a psychological process*. This approach would pick up basic ideas of early expectancy-disconfirmation research that implicitly referred to disconfirmation as the psychological process by which different configurations of performance expectations and perceived performance translate into satisfaction ratings (e.g., Anderson, 1973; Cardozo, 1965; Olshavsky & Miller, 1972; Olson & Dover, 1976). To illustrate the possible advantages of the conceptualization of disconfirmation as a psychological process over the conceptualization of disconfirmation as a psychological construct, I will now discuss the future development of disconfirmation process theory.

Disconfirmation as a psychological process. The conceptualization of disconfirmation as a psychological process requires a specification of how this process unfolds and which variables are involved. Yet, there has been little research dedicated to theoretically model and empirically test specified mechanisms by which certain configurations of performance expectations and perceived performance affect satisfaction. At least two factors discussed in the review could have contributed to this lack of theory-developing research. First, by defining disconfirmation as a psychological construct that can be easily assessed with questionnaire items, the perceived disconfirmation paradigm has distracted from the need to specify the underlying processes. Second, the common definition of disconfirmation as the subjective cognitive "comparison" of expectation and perceived performance (Oliver, 1980) and the original operationalization with difference scores (subtracting performance expectations from perceived performance) could have constrained the theoretical thinking into only considering subtraction-like cognitive processes. Although it cannot be ruled out that consumers process performance expectations and perceived

performance alike a subtraction, numerous other processes are conceivable, such as threshold models (MacCoun, 2012; Saklani, Purohit, & Badoni, 2000) or even more complex interactions. Therefore, in the absence of conclusive evidence about the underlying psychological processes, it seems not advisable to unnecessarily restrict the theoretical reasoning to subtraction-like cognitive processes. Taken together, as the process of disconfirmation is potentially complex, researchers should not solely rely on the results of perceived disconfirmation scales to understand disconfirmation, but need to develop a deeper theoretical understanding of the disconfirmation process. Based on the results of the review and the meta-analysis, I will now make suggestions for possible starting points of such theory development.

First, a disconfirmation process theory can help clarifying the role of cognitive dissonance reduction as a possible explanation of assimilation effects. Although many researchers *referred to* dissonance reduction as the process underlying direct expectation effects on satisfaction (e.g., S. A. Brown et al., 2011; Cohen & Goldberg, 1970; Hoch & Ha, 1986; Mormer, 2014; Olshavsky & Miller, 1972; Tse & Wilton, 1988), there has been little effort to specify and probe the psychological process of dissonance reduction. This gap in the understanding of the disconfirmation process needs to be addressed. In doing so, it could prove to be helpful to exploit the vast amount of research on cognitive dissonance that has been largely ignored by disconfirmation research. For an example, cognitive dissonance has been linked to selective information seeking and information avoidance behavior (Ehrlich, Guttman, Schönbach, & Mills, 1957; Frey, 1982) that could be relevant in the process of product and service evaluation. However, in order to model the effects of selective information seeking in product evaluation, it is necessary to conceptualize disconfirmation as a dynamic process: A disappointing "first impression" of a product or service could yield cognitive dissonance that triggers the selective

seeking of information in favor of the product or service at hand. This selective seeking of positive information could then lead to more positive satisfaction ratings.

Second, disconfirmation process theory should not be restricted to models of linear assimilation and contrast effects. As described in the review in Chapter 3, most studies that were designed to test non-linear effects, such as assimilation-contrast or generalized negativity effects, found such non-linear effects (e.g., Anderson, 1973; S. A. Brown et al., 2011; S. A. Brown et al., 2014; Venkatesh & Goyal, 2010). Thus, in future research, it needs to be considered that the interaction of expectations and perceived performance might yield complex non-linear effects on consumer satisfaction. In doing so, the methods of polynomial regression and response surface analysis, that were discussed in Chapter 3, could not only provide a suitable analysis method, which can identify linear and non-linear effects, but could also help to structure the theoretical reasoning. In contrast to the prediction of a "simple" linear main effect, deriving predictions regarding the shape of a three-dimensional response surface requires the researcher to explicitly consider and formulate the psychological processes by which different configurations of performance expectations and perceived performance yield consumer satisfaction. Figure 5.2 offers a visualization of the possible configurations performance expectations and perceived performance. For an example, if one considers the range of values of performance expectations and perceived performance, it becomes apparent that the case of zero disconfirmation, commonly labeled as "confirmation", actually resembles a variety of cases, from the confirmation of low expectations to the confirmation of high expectations. In Figure 5.2, the dashed line illustrates the "confirmation line" that represents all cases in which the perceived performance meets the performance expectations. Researchers have to consider that different values on this confirmation line could map to different levels of satisfaction.
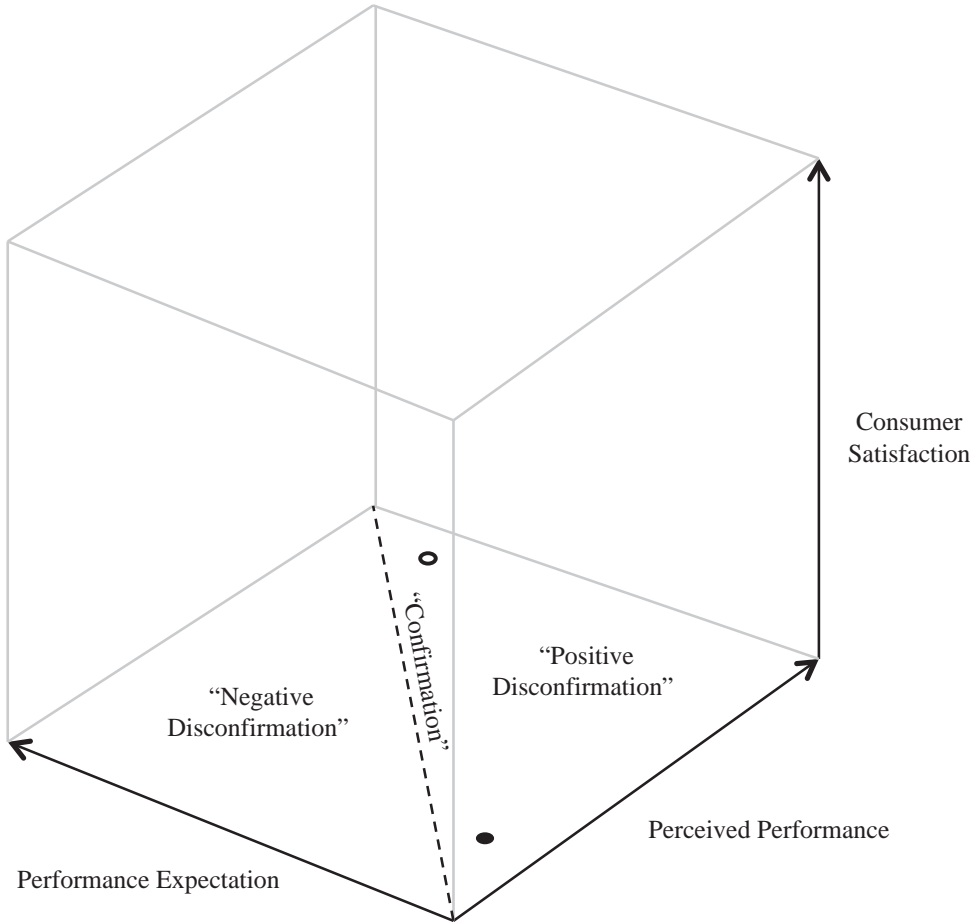
Note. The black dot and the black circle indicate different configurations of performance expectations and

perceived performance that correspond to the same value of "positive disconfirmation".

Figure 5.2. Idealized Response Surface of Expectancy-Disconfirmation

Likewise, Figure 5.2 illustrates that there are numerous different configurations of

performance expectations and perceived performance imaginable that are normally conflated to

the terms "positive disconfirmation" and "negative disconfirmation". For example, both the case

of very low performance expectations and low perceived performance (indicated by the black dot

in Figure 5.2) and the case of high performance expectations and very high perceived

performance (indicated by the black circle in Figure 5.2) correspond to the same value of

"positive disconfirmation" (in both cases the perceived performance slightly exceeds the performance expectations). Yet, it seems intuitively very implausible that low perceived performance should yield the same satisfaction level as very high perceived performance.

The above-described examples illustrate that the terms "confirmation", "positive disconfirmation" and "negative disconfirmation" oversimplify the possible configurations of performance expectations and perceived performance a researcher has to consider in the study of disconfirmation processes. In the light the potential downsides of such an oversimplification of expectancy-disconfirmation, it might be even advisable to abstain from the use of the terms "positive disconfirmation", "negative disconfirmation" and "confirmation" entirely in disconfirmation research. Instead, different configurations of performance expectations and perceived performance should be specified explicitly in the theoretical reasoning and tested with polynomial regression and response surface analyses.

5.1.2 Implications for WOM Theory

One major aim of the present thesis was to probe the role of expectancy-disconfirmation effects for intra-individual WOM transmission. In Chapter 2, a three-step model of intraindividual WOM transmission was developed, positing that received WOM affects performance expectations, performance expectations affect consumer satisfaction and consumer satisfaction affects the sending of WOM. Because an experimental test of this model revealed no overall effect of performance expectations on satisfaction, it was concluded that the intra-individual WOM transmission "becomes stuck" at the very stage of expectancy-disconfirmation, and that only service and product performance "counts". Considering the results of the meta-analysis presented in Chapter 4, this conclusion has to be amended. The meta-analysis revealed that, in general, performance expectations are positively related to satisfaction, contradicting the

result of the initial experiment. Thus, the meta-analytical results suggest that the intra-individual WOM transmission does *not* "become stuck" at the stage of expectancy-disconfirmation, and that there is a continuous causal chain from received WOM to the sending of WOM. For example, positive WOM messages should yield high performance expectations regarding a product or service (step 1), the satisfaction with the product or service should be assimilated toward these high expectations (step 2), and high satisfaction should trigger the sending of positive WOM (step 3). Analogously, negative WOM messages should yield low performance expectations regarding a product or service (step 1), the satisfaction with the product or service should be assimilated toward these low expectations (step 2), and low satisfaction should trigger the sending of negative WOM (step 3).

In the discussion of the possible intra-individual WOM transmission, it is important to consider that the strength of the overall transmission effects depends on strength of the causal effects at all three steps of the transmission model. It would be highly speculative to gauge the effect of received WOM on performance expectations (step 1) and of consumer satisfaction on the sending of WOM (step 3) based on the results of the single laboratory experiment reported in this thesis. Yet, regarding step 2 of the transmission model, study 3 provides a meta-analytical estimate of a medium effect of performance expectations on consumer satisfaction ($r = .29$). In comparison, the meta-analysis revealed a very large relationship between perceived performance and consumer satisfaction ($r = .65$). Thus, the meta-analytical results imply that perceived performance is the major antecedent of consumer satisfaction and WOM sending, but that expectations also matter, even though to as lesser extent. In summary, the bottom line of the Chapter 2 remains valid: product and service performance counts. However, taking the meta-

analysis presented in Chapter 4 into account, this conclusion should be amended: product and service performance counts - but so do performance expectations.

5.2 Limitations and Future Research

The present thesis addressed the lack of theoretical integration in WOM research by developing and experimentally testing a psychological model of intra-individual WOM transmission. The conclusions about the intraindividual WOM transmission process are limited by the fact that only a single empirical study was conducted. However, the single study's results made it necessary to critically review and meta-analyze the expectancy-disconfirmation literature, thereby unearthing several crucial theoretical inconsistencies and methodological shortcomings in construct definitions and respective operationalizations. These theoretical inconsistencies and methodological shortcomings could be resolved to at least some extend, so that an integration and reformulation of expectancy-disconfirmation research appears possible. For an integrated view of expectancy-disconfirmation and WOM phenomena, there are numerous open questions to ask that require future primary research.

5.2.1 Future Expectancy-Disconfirmation Research

The review presented in Chapter 3 offers a roadmap for future expectancy-disconfirmation research, highlighting the need to derive and test hypotheses based on clear concepts of disconfirmation and the need to use suitable methodology, such as polynomial regression and response surface analysis. While the roadmap presented in Chapter 3 provides universal guidelines, I will now make more concrete suggestions for future expectancy-disconfirmation research.

First, future research needs to clarify the role of the two assimilation sub-theories, dissonance theory and hypothesis testing theory. As both dissonance theory and hypothesis

testing theory predict a positive main effect of performance expectations on satisfaction, the

meta-analysis was not designed to test these theories in competition to each other. Thus, it could

not be determined if assimilation effects are the result of dissonance reduction, hypothesis

testing, or a combination of both processes. One possible approach to this issue could be to test

assumptions of dissonance theory and hypothesis testing theory regarding mediators of the

assimilation process. More specifically, dissonance theory posits that negative disconfirmation

causes *aversive* cognitive dissonance, implying that, at least at one time point during the

disconfirmation process, consumers should experience the aversive quality of the dissonance,

and that this aversive quality drives the need to assimilate (Anderson, 1973; Festinger, 1957).

Therefore, according to dissonance theory, the strength of the aversive sensation should be

related to the magnitude of the assimilation effect. In contrast, hypothesis testing theory does not

predict any aversive sensation during the disconfirmation process (Deighton, 1984; Hoch & Ha,

1986; Yi, 1990). Thus, by probing the relationship of the aversive dimension of dissonance

during product experience with the degree of assimilation after product experience, it could be

possible to test competing predictions of dissonance theory and hypothesis testing theory.[15]

Second, the meta-analysis could not address all potentially relevant moderators of the

performance expectations-satisfaction and disconfirmation-satisfaction relationship. For

example, studies that could not be included in the meta-analysis due to missing data suggest that

product involvement is a moderator of assimilation and contrast effects yielding consumer

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[15] A possible measurement instrument to gauge the degree of aversive sensation during

product experience could be the "emotional dissonance" subscale of the three-dimensional

cognitive dissonance scale proposed by Sweeney, Hausknecht, and Soutar (2000).

satisfaction. Indeed, some researchers found support for the proposition that contrast is the default expectancy-disconfirmation process if product involvement is low, whereas assimilation due to high levels of cognitive dissonance only comes into effect, if product involvement is high (Cardozo, 1965; Korgaonkar & Moschis, 1982). On the contrary, Babin, Griffin, and Babin (1994) found support for the proposition that contrast effects are *stronger* for high product involvement, because the contrast process requires more cognitive effort than the assimilation process and that consumers should only be willing to expend this effort if they are highly involved. Given the contradiction of theoretical positions and empirical evidence, future primary research can shed light on moderating conditions of assimilation and contrast effect on consumer satisfaction by exploring the role of product involvement for expectancy-disconfirmation processes with a systematic, theory-driven approach. A possible starting point for such a research program could be to exploit the available multi-dimensional models and measurement instruments of the involvement literature (e.g., Bloch & Richins, 1983; Zaichkowsky, 1985; Zaichkowsky, 1986) that have not been taken into account by previous expectancy-disconfirmation research.

5.2.2 Future WOM Research

In *Chapter 2* of the present thesis, a three-step model of intraindividual WOM transmission was proposed. Taking the positive meta-analytic performance expectations-consumer satisfaction correlation into account, this model predicts a positive relationship between the WOM a consumer receives and the WOM a consumer sends. For an example, positive received WOM should yield high performance expectations, consumer satisfaction ratings should be assimilated toward theses high expectations, and high consumer satisfaction should yield the sending of positive WOM. As the assimilation of satisfaction ratings toward performance

expectations is a crucial step of the intra-individual WOM transmission, the strength of this "transmission effect" depends on the strength of the assimilation effect: The stronger the assimilation effect, ceteris paribus, the stronger the effect of received WOM on the sending of WOM should be.

While the above-described process of intra-individual WOM transmission is plausible in the light of the present meta-analytical results, it needs to be validated by future research. In particular, the assumed transmission of WOM by performance expectations needs to be empirically tested, especially because the results of the study presented in Chapter 2 do not support such a transmission process. However, in the study presented in Chapter 2, WOM transmission was studied in a laboratory experiment involving products with highly unambiguous performance (the participants received definite numeric feedback about the performance of the products). Therefore, considering the meta-analytic moderator analyses reported in Chapter 4, the design of the study testing intra-individual WOM transmission inadvertently matched the configuration of moderating conditions for which assimilation effects should be minimal (product, experiment, laboratory). Thus, while experimental control should be retained as far as possible, future research on the three-step transmission model should not just replicate the study reported in this thesis, but also consider field settings involving services and products with more ambiguous performances.

Another topic for future WOM research is the study of the aggregation of individual level WOM behavior to market level effects, such as the success of a product or service. To study the aggregation of behavior in markets, it is necessary to model both the aggregation processes and the individual-level psychological processes (Hedstrom, 2006). Yet, although there are numerous formalized models of innovation diffusion and WOM spread in markets (e.g.,

Bikhchandani, Hirshleifer, & Welch, 1992; Campbell, 2013; Centola, 2010), these approaches operate with highly simplistic assumptions about individual human behavior and lack a well grounded psychological model of the intra-individual processes. The three-step model of WOM transmission can contribute to fill this gap, as the model is both well grounded in psychological theory and frugal enough to be incorporated into formalized models of aggregate behavior in markets.

5.3 Implication for Marketing Practice

The results of all three studies presented in this thesis imply one basic managerial advice: Make sure to offer high performing products and services. Consumers that perceive a product or service as high performing will most likely be satisfied with this product or service. This notion supports approaches such as "total quality management" (TQM) that aim to align all business practices toward the optimization of product and service performance (Dean Jr & Bowen, 1994; Powell, 1995).

Yet, performance expectations also matter. The meta-analytical results indicate that high performance expectations positively affect consumer satisfaction. Therefore, marketers can exploit this assimilation effect by overstating the performance of their products and services in their marketing efforts. Moreover, worries about a potential backlash of this overstatement due to contrast effects seem unwarranted. Although there might be instances with no performance expectations-satisfaction effect at all, contrast effects seem to be a very rare and elusive phenomenon.

That being said, marketers should keep in mind that despite a high expectations marketing strategy, it is still possible that dissatisfied consumers, when asked for their disconfirmation perceptions, report disappointment or that the product or service fell short of their expectations.

However, because initial performance expectations and perceived disconfirmation are not negatively related, there is no reason to conclude that (too) high initial expectations have caused negative perceived disconfirmation. Instead, it is more likely that it was low perceived performance that yielded both dissatisfaction and negative perceived disconfirmation. In other words, negative perceived disconfirmation does generally *not* indicate that initial performance expectations were too high, but rather that the perceived performance was too low.

The present results also provide guidance for WOM marketing efforts. While WOM marketing *can* arguably be a highly efficient form of promotion, one should not assume that a spread of WOM is easy to achieve by corporate marketing efforts. After all, consumers will most likely recommend products and services they are highly satisfied with, and consumers will most likely be satisfied with products that perform well. Thus, the most effective way to facilitate the spread of positive WOM is to provide high performing products. For those products and services that perform well, the additional effect of positive WOM transmission due to assimilation effects could be considered a welcome amplification of consumers' positive reactions to the high performing products and services.

5.4 Conclusion

The present thesis has contributed to theory development in consumer satisfaction research. Based on both a qualitative review and a meta-analysis, I challenged the role of the perceived disconfirmation paradigm as the silver bullet to the study of consumer satisfaction and made suggestions for more suitable conceptual and methodological approaches. Considering the numerous theoretical and empirical issues of the perceived disconfirmation paradigm, it might be even advisable to forego the elusive concept of perceived disconfirmation entirely in favor of the conceptualization of disconfirmation as a psychological process.

My research has also contributed to the understanding of consumer satisfaction and Word-of-Mouth as interrelated phenomena. Based on the conducted research, I conclude that received WOM can affect consumer satisfaction, mediated by performance expectations, and that consumer satisfaction affects the sending of WOM. Yet, product and service performance was consistently revealed to be the prime antecedent to consumer satisfaction. Therefore, WOM marketing efforts could augment the positive reactions to of high performing product and services, but it is very unlikely that positive WOM can compensate for a lack in product or service performance.

In the introduction of my thesis, I described that there are accounts of "superstars" emerging due to positive WOM, but also that such success stories seem to be very rare. The company Zappos is considered as such a rare success story (Kopelman, Chiou, Lipani, & Zhu, 2012). In 2010, Tony Hsieh, CEO of Zappos at that time, stated:

> *"Our philosophy has been that most of the money we might ordinarily have spent on advertising should be invested in customer service, so that our customers will do the marketing for us through word of mouth."*

In the light of the results of the present thesis, it is highly plausible that Tony Hsieh's approach to facilitate WOM by prioritizing service performance has contributed to the success of Zappos.

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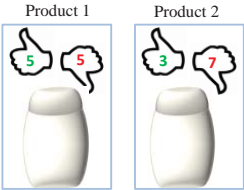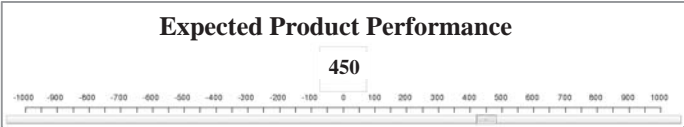
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Appendix A: Visualization of One Experimental Trial

Procedure of one Trial

Experimental Function(s)	Exemplary Display (translated from German, simplified for display)
▪ Display of WOM ▪ Choice between two products	
▪ Measurement of product expectations	
▪ Feedback of actual product performance	Your branch has made a profit of *550* monetary units with this product.
▪ Measurement of WOM intentions (7-Point Likert Scale)	To other store managers I would… (1) … certainly disadvise this product (4) … neither recommend nor disadvise this product (7) … certainly recommend this product
▪ Sending of WOM	
▪ Measurement of product satisfaction (7-Point Likert Scale)	I am... (1) ... very dissatisfied with this product (4) neither nor (7) … very satisfied with this product

Appendix B: Additional Items

Additional Items (Translated from German)

Cooperation

1. Predominantly, I gave my ratings to serve the good of the whole drug store chain.

2. It was important for me to contribute to other store managers' success with my ratings.

3. It was important for me to help other store managers.

Credibility (adapted from Lewis, 2003)

1. I was comfortable accepting suggestions regarding product choice from other store managers.

2. I trusted that other store managers' knowledge about the products was credible.

3. I was confident relying on the information of other store managers.

4. When other store managers gave information, I wanted to double-check it for myself. (reversed)

5. I did not have much faith in other store managers' "expertise." (reversed)

Suggestibility (adapted from Kotov, Bellmann, & Watson, 2004)

1. I am easily influenced by other people's opinions .

2. I often follow current trends .

3. After someone I know tries a new product, I will usually try it too.

Experience with rating systems

1. How much experience do you have with rating systems, such as on Amazon, Youtube, Facebook?

2. How often, on average, do you consult others' ratings in rating systems, such as on Amazon, Youtube, Facebook?

3. How often, on average, do you give ratings in rating systems, such as on Amazon, Youtube, Facebook?

4. How reliable were other peoples' ratings for you in the past?

Note. Items on Cooperation, Credibility and Suggestibility used a 7-point agree-disagree format with 1 = *strongly disagree* and 7 = *strongly agree*. The first item on experience with rating systems used a 5-point scale ranging from 1 = *no experience at all* to 5 = *a lot of experience*. The second and third item on experience with rating systems used a 5-point scale ranging from 1 = *never* to 5 = *several times a week*. The fourth item on experience with rating systems used a 5-point scale ranging from 1 = *not reliable at all* to 5 = *very reliable*.

Appendix C: Results From Complete and Filtered Sample

Analysis	Filtered Sample		Complete Sample	
	Test statistic	p	Test statistic	p
Reception of WOM Messages				
Levene´s test for equality of variances	$F(4, 265) = .95$	.438	$F(4, 412) = 2.07$	.084
Oneway ANOVA	$F(4, 265) = 78.67$	<.001	$F(4, 412) = 85.29$	<.001
ANOVA Effect size	$\eta_p^2 = .54$		$\eta_p^2 = .45$	
Kendalls Tau	.62	<.01	.58	<.01
Spearmans Rho	.74	<.01	.70	<.01
Customer Experience				
Polynomial Regression Predictor Effects				
Intercept (b_0)	3.440	<.001	3.202	<.001
Experienced PQ (b1)	.781	<.001	.361	<.001
Expected PQ (b2)	.069	.098	.076	.120
Experienced PQ2 (b3)	.149	<.001	.087	.058
Experienced PQ x Expected PQ (b4)	-.028	.475	.004	.934
Expected PQ2 (b5)	-.038	.358	-.005	.914
Response Surface Analysis				
Confirmation line slope (b1 + b2)	.850	<.001	.437	<.001
Confirmation line curvature (b3 + b4 + b5)	.083	.794	.086	.494
Disconfirmation line (b1 - b2)	.712	<.001	.240	<.001
Disconfirmation line curvature (b3 - b4 + b5)	.139	.614	.088	.562
R^2	.616		.142	
Adjusted R^2	.609		.131	
Sending of WOM				
Multiple Regression				
b1 (linear effect)	-.109	.043	.041	.670
b2 (squared effect)	.535	<.001	.019	.843
Nominal logistic regression	$\chi^2_{12} = 385.60$	<.001	$\chi^2_{21} = 538.15$	<.001
McFadden	.76		.63	
Nagelkerke	.89		.83	
Mediation through Satisfaction				
Direct Effect	.0001	.344	.0009	<.001
Indirect Effect	.0011	LLCI = .0009 ULCI = .0012	.0001	LLCI = .0000 ULCI = .0011
Standardized Indirect Effect	.655	LLCI = .555 ULCI = .749	.065	LLCI = .006 ULCI = .639
Ratio of Indirect to Total Effect	.939	LLCI = .789 ULCI =1.086	.102	LLCI = .008 ULCI = 1.002

Note. Filtered sample n=269. Complete sample n=417.

Appendix D: Summary of Studies Included in the Meta-Analysis

	Intercorrelations							Moderators					
Study	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Alford, 1998								*n/a*	Ambiguous	Direct	Experiment	Lab.	Service
Complete Sample			.21		.33		298						
Subsample 1	.59						161						
Subsample 2	.67						136						
Ali et al., 2015		.71	-.53				450	Ambiguous	*n/a*	*n/a*	Cross-sec.	Field	Service
Amba-Rao , 1991	.85						74	*n/a*	Predictive	Direct	Cross-sec.	Field	Mixed
Ashraf & Sulaiman, 2016	.62		.64		.66		626	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Askariazad & Babakhani, 2015		.47	.79			.46	90	Ambiguous	*n/a*	*n/a*	Cross-sec.	Field	Service
Athiyaman, 1997	.36	.01	.71	.00		-.02	496	Ambiguous	Ambiguous	Direct	Longitudinal	Field	Service
Baker-Eveleth & Stone, 2015	.31		-.16		.19			*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Bearden & Teel, 1983								Predictive	Ambiguous	Direct	Longitudinal	Field	Service
Sample 1	.15	.61		.28			188						
Sample 2	.25	.66		.19			187						
Becker , 2013	.62						90	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Chea & Lou, 2005	.60		.51		.69		106	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Chen-Yu et al., 1999		.09	.74			.00	120	Predictive	*n/a*	*n/a*	Experiment	Lab.	Product
Chen-Yu et al., 2001		.13	.72			.00	120	Predictive	*n/a*	*n/a*	Experiment	Lab.	Product
Chen-Yu & Keum-Hee, 2002		.06	.71			.00	120	Predictive	*n/a*	*n/a*	Experiment	Lab.	Product
Chen-Yu & Kincade, 2001		.30	.74			.08	117	Predictive	*n/a*	*n/a*	Experiment	Lab.	Product

Appendix D (continued)

	Intercorrelations							Moderators					
Study	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Cheng, 2014	.29						378	*n/a*	Normative	Direct	Cross-sec.	Field	Product
Choi & Mattila, 2008								Predictive	*n/a*	*n/a*	Experiment	Lab.	Service
Sample 1		.29					60						
Sample 2		.35					60						
Sample 3		.39					59						
Chong , 2012	.44	.29	.47	.90	.76	.46	405	Ambiguous	Ambiguous	Direct	Cross-sec.	Field	Service
Churchill & Surprenant, 1982								Predictive	Predictive	Direct	Experiment	Lab.	Product
Study 1	.16	.09	.23	.20	.41	.33	126						
Study 2	.61	.18	.45	-.19	.66	.37	180						
Coursaris et al., 2012	.66		.47		.61		87	*n/a*	Ambiguous	Direct	Cross-sec.	Lab.	Product
Cronin Jr. & Taylor, 1992	.56						660	*n/a*	Normative	Diff.-Score	Cross-sec.	Field	Service
Dabholkar et al., 2000	.57		.85		.67		397	*n/a*	Ambiguous	Diff.-Score	Longitudinal	Field	Service
Danaher & Haddrell, 1996	.60		.77		.64		171	Predictive	*n/a*	Direct	Cross-sec.	Field	Service
De Rojas & Camarero, 2008	.54	.35	.73	.12	.25	.36	284	Predictive	Ambiguous	Direct	Longitudinal	Field	Service
De Ruyter et al., 1997	.40	.36	.56	.34	.48	.72	291	Predictive	Ambiguous	Direct	Cross-sec.	Field	Service
Dion et al., 1998[b]	.16	.	.			.	267	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Duhaime & Comerciales, 1986	.57	.41					380	Ambiguous	Ambiguous	Direct	Cross-sec.	Field	Service
Finn et al., 2009								*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Sample 1	.68						552						
Sample 2	.59						1125						

Appendix D (continued)

| Study | Intercorrelations | | | | | | | Moderators | | | | | |
	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Fitzgerald & Bias, 2016	.47	41					358	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Ford, 2003								Ambiguous	*n/a*	*n/a*	Cross-sec.	Field	Service
Study 1		.61	.85			.57	53						
Study 2		.40	.70			.63	51						
Study 3		.34	.70			.85	79						
Study 4		.40	.74			.87	70						
Geva & Goldmann, 1991		.34	.39			.04	184	Predictive	*n/a*	*n/a*	Longitudinal	Field	Service
Herrnson et al., 2013		.45	.27			.31	1117	Ambiguous	*n/a*	*n/a*	Longitudinal	Field	Service
Gillison, 2012	.42						335	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Goode, 2002		.44	.75			.83	400	Ambiguous	*n/a*	*n/a*	Cross-sec.	Field	Product
Ha, 2006	.72	.70	.77	.68	.88	.63	229	Predictive	Ambiguous	Direct	Cross-sec.	Field	Service
Ha & Janda , 2008	.58						386	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Habel et al., 2016		.12	.80			.22	327	Predictive	*n/a*	*n/a*	Longitudinal	Field	Product
Halilovic & Cicic, 2013	.48		.51		.54		188	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Hill, 2006	.78	-.26	.63	-.18	.72	-.24	202	Ambiguous	Ambiguous	Direct	Longitudinal	Field	Service
Hill & Nanere, 2006	.72	.11	.54	-.00	.57	.15	50	Ambiguous	Ambiguous	Direct	Longitudinal	Field	Service
Hsieh et al., 2010	.53	.52	.61	.21	.31	.66	506	Predictive	Ambiguous	Direct	Longitudinal	Field	Service
Hsu et al., 2015	.54						246	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Hsu et al., 2006	.33						201	*n/a*	Ambiguous	Direct	Longitudinal	Field	Service
Jack & Powers, 2013	.82						308	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service

Appendix D (continued)

| Study | Intercorrelations | | | | | | | Moderators | | | | | |
	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Johns et al., 2004	.61	.14	.80	-.60	-.07	.84	337	Normative	Normative	Diff.-Score	Cross-sec.	Field	Service
Joo et al., 2016	.79		.55		.50			*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Kennedy & Thirkell, 1998	.53	.14			-.05		985	Ambiguous	Ambiguous	Direct	Longitudinal	Field	Product
Khalifa & Liu, 2002	.80	.07	.70	.13	.67	.08	131	Predictive Normative	Predictive Normative	Direct	Longitudinal	Lab.	Service
Khalifa & Liu, 2003	.80		.73		.73		107	*n/a*	Predictive Normative	Direct	Cross-sec.	Field	Service
Kim, 2012	.69	.39	.56	.47	.63	.53	182	Ambiguous	Ambiguous	Direct	Longitudinal	Lab.	Service
Kim, 2003	.51						201	*n/a*	Normative	Direct	Cross-sec.	Field	Service
Kritz, 1997	.23						371	*n/a*	Ambiguous	Direct	Experiment	Lab.	Product
Lankton & McKnight, 2012	.69	.19	.59	.19	.83	.25	296	Predictive	Ambiguous	Direct	Longitudinal	Lab.	Product
Lankton & Wilson, 2007		.35	.80			.48	111	Predictive	*n/a*	*n/a*	Longitudinal	Field	Service
Lee et al., 2014	.71						135	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Liao et al., 2007	.88		.66		.62		469	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Liao et al., 2011	.79						445	*n/a*	Predictive	Direct	Cross-sec.	Field	Service
Liao et al., 2009	.72						626	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Liljander & Strandvik, 1997	.78						142	*n/a*	Normative	Direct	Cross-sec.	Field	Service
Lin & Fan, 2011	.79						230	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Lin et al., 2015	.82						296	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Lin et al., 2014	.83						205	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service

Appendix D (continued)

Study	Intercorrelations							Moderators					
	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Martínez-Tur et al., 2006								*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Study 1	.50		.58		.37		275						
Study 2	.54		.78		.50		293						
Mattila & Wirtz, 2006	.44						178	*n/a*	Normative	Direct	Cross-sec.	Lab.	Service
Morgeson, 2013	.83	.54	.86	.54	.77	.52	1,450	Ambiguous	Ambiguous	Direct	Cross-sec.	Field	Service
Myers, 1991	.22						170	*n/a*	Predictive Normative	Diff.-score	Cross-sec.	Field	Service
Ogungbure , 2013	.79	.22					254	Ambiguous	Ambiguous	Direct	Cross-sec.	Field	Service
Oliver, 1994	.60		.53		.30		65	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Oliver & Bearden, 1985	.63						91	*n/a*	Normative	Direct / Diff.-score	Cross-sec.	Field	Product
Oliver & Burke, 1999		.39		.09		.44	78	Predictive	Ambiguous	Direct	Experiment	Field	Service
Oliver & Linda, 1981								Normative	Ambiguous	Direct	Longitudinal	Field	Product
Male Subsample	.51		.45		.13		250						
Female Subsample	.63		.47		.25		250						
Oliver & Swan, 1989	.44		.41		.78		184	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Oliver & Rust, 1997								*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Study 1	.62						90						
Study 2	.35						104						
Park et al, 2012	.64						544	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Park et al., 2015	.40	.27	.54	.18	.28	.39	191	Predictive	Ambiguous	Direct	Longitudinal	Field	Service
Patterson, 1993a	.69	.06	.80	.08	.74	.21	128	Predictive	Ambiguous	Direct	Longitudinal	Field	Service

Appendix D (continued)

	Intercorrelations							Moderators					
Study	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Patterson, 1993b	.63	.13	.64	-.25	.28	.39	72	Predictive	Predictive	Diff.-score	Longitudinal	Field	Product
Patterson, 2000	.81		.84		.73		128	*n/a*	Ambiguous	Direct	Longitudinal	Field	Service
Patterson et al., 1997	.88	.07	.87	.00	.79	.15	128	Predictive	Ambiguous	Direct	Longitudinal	Field	Service
Poister & Thomas, 2011	.54		.49				1,001	*n/a*	Normative	Direct	Cross-sec.	Field	Service
Prakash & Lounsbury, 1984								Predictive Normative	Predictive Normative	Diff.-score	Longitudinal	Field	Product
Study 1	.42	.28	.66	-.17	.51	.52	300						
Study 2	.30	.26	.59	-.37	.50	.49	231						
Musa et al., 2005	.40		.56		.54		400	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Rufin et al., 2012	.64	.57		.56			399	Ambiguous	Ambiguous	Direct	Cross-sec.	Field	Product
Ryu & Han, 2011	.73						298	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Ryu & Zhong, 2012	.36						295	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Study 1 of the Present Thesis		.02					269	Ambiguous	*n/a*	*n/a*	Experiment	Lab.	Product
Shaffer & Sherrell, 1997								Predictive	Ambiguous	Direct	Longitudinal	Field	Service
High Involvement Condition	.58	.62	.80	.60	.76	.60	58						
Low Involvement Condition	.58	.41	.72	.60	.71	.45	61						
Shi et al., 2004	.55		.08		.01		105	Predictive	Ambiguous	Direct	Longitudinal	Field	Service
Shiau & Luo, 2013	.49						430	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Product
Siu et al., 2014		.30						Ambiguous	*n/a*	*n/a*	Longitudinal	Lab.	Service
Spreng & Mackoy, 1996	.67	.14	.73	.11	.53	.28	273	Predictive Normative	Predictive Normative	Direct	Longitudinal	Lab.	Service
Spreng & Olshavsky, 1993	.75	.14	.77	-.09	.67	.09	128	Predictive Normative	Predictive Normative	Direct	Experiment	Lab.	Product

Appendix D (continued)

Study	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Spreng et al., 1996	.61	.08	.58	-.02	.65	.22	207	Predictive Normative	Predictive Normative	Direct	Experiment	Lab.	Product
Sun, 1994	.44						214	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Swan, 1988	.33	-.02	.55	.11	.48	.13	243	Predictive	Ambiguous	Direct	Longitudinal	Field	Product
Swan & Martin, 1981	.14		.51		-.43		67	Predictive	Predictive	Diff.-score	Longitudinal	Field	Product
Swan & Oliver, 1985	.67						229	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Swan & Trawick, 1981	.45	.21		-.12			243	Ambiguous	Ambiguous	Direct / Diff.-score	Longitudinal	Field	Product
Tang et al., 2014	.54						318	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Taylor, 1997								Ambiguous	Ambiguous	Direct		Field	Product
Study 1	.83	.06		.09			31				Cross-sec.		
Study 2	.78	.03	.93	-.10	.70	.66	29				Longitudinal		
Thirkell, 1980	.57	.17		-.01			929	Predictive	Ambiguous	Direct	Cross-sec.	Field	Product
Trudel et al., 2012								Ambiguous	*n/a*	*n/a*	Experiment	Lab.	Product
Study 1, Condition 1		.46					25						
Study 1 Condition 2		.19					25						
Study 1 Condition 3		.23					24						
Study 1 Condition 4		.21					24						
Study 2, Condition 1		.05					30						
Study 2 Condition 2		.07					30						

Appendix D (continued)

Study	Intercorrelations							Moderators					
	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Trudel et al., 2012								Ambiguous	*n/a*	*n/a*	Experiment	Lab.	Product
Study 2 Condition 3		.17					30						
Study 2 Condition 4		.05					30						
Study 1, Condition 1 & 2			.88			.11	50						
Study 1, Condition 3 & 4			.69			-.15	48						
Study 2, Condition 1 & 2			.68			-.20	60						
Study 2, Condition 3 & 4			.29			.02	60						
Tsai et al., 2016	.51						524	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Mixed
Tse & Wilton, 1988	.64	.08	.81	-.27	.80	.03	62	Predictive Normative	Ambiguous Predictive Normative	Direct Diff.-score	Experiment	Lab.	Product
Varela-Neira et al., 2008	.52							*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Varela-Neira et al., 2010	.83	.29	.86	.10	.80	.23	673	Predictive	Predictive	Direct	Cross-sec.	Field	Service
Venkatesh & Goyal, 2010		.24	.28			.41	1143	Predictive	*n/a*	*n/a*	Longitudinal	Field	Service
Voss et al. 1998		.28	.70			-.15	200	Predictive	*n/a*	*n/a*	Experiment	Lab.	Service
Walton & Hume, 2012		.28					300	Predictive	*n/a*	*n/a*	Experiment	Lab.	Service
Wang & Olsen, 2002	.72						126	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service

Appendix D (continued)

Study	Intercorrelations							Moderators					
	DIS-SAT	EXP-SAT	PER-SAT	EXP-DIS	PER-DIS	EXP-PER	N	EXP Type[a]	DIS Type[a]	DIS Operationalization[a]	Study Design	Setting	Target
Westbrook, 1980								*n/a*	Ambiguous	Direct	Cross-sec.	Field	
Study 1	.23						63						Product
Study 2	.57						72						Service
Study 3	.39						60						Product
Westbrook, 1983	.65	.42		.08			66	Ambiguous	Ambiguous	Direct	Cross-sec.	Field	Product
Westbrook, 1987								Predictive	Ambiguous	Direct	Cross-sec.	Field	
Study 1	.61	.51		.26			200						Product
Study 2	.53	.02		-.23			154						Service
Wirtz & Bateson, 1999a	.53	-.10	.26	-.40	.39	.00	134	Predictive	Predictive Ambiguous	Direct	Experiment	Lab.	Service
Wirtz & Bateson, 1999b	.36		-.19	.48	-.47		134	Predictive	Ambiguous	Direct	Experiment	Lab.	Service
Wirtz & Mattila, 2001a	.71	.42	.44	.41	.36	-..06	111	Predictive Normative	Ambiguous Normative	Direct	Experiment	Lab.	Service
Wirtz & Mattila, 2001b	.74						288	*n/a*	Predictive	Direct	Cross-sec.	Lab.	Service
Wu & Huang, 2015	.31		.30		.22		454	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Wu & Padgett, 2004												Field	Service
Study 1		.22	.80			.23	56	Ambiguous	*n/a*	*n/a*	Longitudinal		
Study 2	.45	.30	.75				87	Ambiguous	Ambiguous	Diff.-score	Cross-sec.		
Yen & Lu, 2008	.71						619	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Yim et al., 2007	.41						360	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service
Zhou, 2011	.49		.45		.41		269	*n/a*	Ambiguous	Direct	Cross-sec.	Field	Service

Appendix D (continued)

Note. DIS = Disconfirmation. SAT = Satisfaction. EXP = Expectation. PER = performance. Direct = Direct measurement of disconfirmation with questionnaire items. Diff.-score = Operationalization of disconfirmation with a computed difference score (perceived performance minus performance expectations). Cross-sec. = Cross-sectional survey study. Longitudinal = Longitudinal survey study. Lab. = Laboratory study. Mixed = Mix of services and products. n/a = not applicable.

[a] If a study measured multiple types of expectations and/or disconfirmation, we report the mean correlation. However, we also coded the expectation/disconfirmation types separately for moderator analysis. [b] Dion et al. (1998) also measured "perceived service", "desired service", "predicted service" and "calculated disconfirmation". However, the wording of the items measuring theses variables indicates that "perceived service" actually measured past service experience, whereas "desired" and "predicted service" measured future expectations. As target satisfaction was related to the *current* service, "perceived service", "desired service", "predicted service" and consequentially "calculated disconfirmation" did not refer to the same target as satisfaction and were excluded from the analysis.