ONLINE HERDING BEHAVIOR AND THE EFFECT OF POSITIVE VERSUS NEGATIVE REVIEWS ON CONSUMER CHOICE

ABSTRACT

Consumers use reviews in their decision making process to get an indication whether or not to buy a product. This type of herding behavior, where decisions depend upon choices made by others, is examined whereby this research answers the question how the ratio of positive versus negative reviews affect consumers' purchase intention. Quantitative online research with multiple treatment groups shows that consumers' likelihood to buy a product is positively and negatively influenced when the cluster of reviews is, on the whole, either positive or negative, respectively. In these two situations, herding behavior is observed. No significant effect on intentional buying behavior has been found in situations of an equal number of positive and negative reviews. Lastly, this study finds no difference in consumers' purchase intention between displaying positive reviews with or without profile information of the review writer. Results imply that webshops don't have to take the most serious account as soon as a negative review is posted. Additionally, webshops are not in need to display personal information from their reviewers.

Keywords: herding behavior, eWOM, review sentiment, review credibility.

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DATE: 27 APRIL 2017
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Summary

Decision making might seem a rational process but research shows we behave fairly irrational (Ariely, 2008). Moreover, we are being influenced by others while making decisions (Banerjee, 1992; Leibenstein, 1950). To make the decision strategy easier, we make use of heuristics, i.e. simple and efficient rules (Ariely, 2008). If the decision to be made is about whether or not to buy a product online, potential consumers often make use of reviews to get an indication of what previous consumers recommend. Depending a decision upon choices previously made by others is referred to as 'herding behavior' (Banerjee, 1992).

Several studies show that product reviews play an important role in shaping consumers' attitudes and purchase behavior (Cheung, Sia, & Kuan, 2012; Harrison-Walker, 2001; Hennig-Thurau & Walsh, 2003; Laing & Royle, 2013), whereby the sentiment (e.g. positively or negatively framed) of reviews are used as clues for herding behavior (Chen & Huang, 2006).

The aim of this study is to provide understanding of the overall sentiment of a cluster of reviews by answering the following research question: how is consumer purchase intention affected by the ratio of positive versus negative reviews? In addition, this study looks into the effect of providing profile information on review credibility and if this, in turn, influences consumers purchase intention.

This study uses three different categories to mark a review cluster. Each category depends on the proportion of positive and negative reviews in the cluster. A condition with predominantly positive reviews (all 6, 5 out of 6 or 4 out of 6 reviews are positive), is categorized as having a positive review ratio, whereas a cluster of reviews with predominantly negative reviews (5 out of 6 or 4 out of 6 reviews are negative) is marked as having a negative review ratio. In addition, two conditions are labeled as an equal review ratio (50/50 deviation of positive and negative reviews). Here, a distinction is made between anonymous and non-anonymous (providing name, age and residence) positive reviews.

This research concludes that herding behavior is observed when a cluster of reviews is, on the whole, either positive or negative and thereby influencing consumers' purchase intention positively and negatively, respectively. Moreover, no significant effect on buying intention has been found in cases where the cluster of reviews consisted of an equal number of positive and negative reviews. Furthermore, findings of this study suggest that, in case the sentiment of the review is positive, potential buyers are not influenced by reading an anonymous or non-anonymous review. Based on these results, webshops should not be offset with a single negative review, as long as the cluster of reviews remains predominantly positive. Moreover, retailers can visualize positive reviews either with or without profile information, as this does not affect the tendency towards buying the product.

Chapter 1 | Introduction

In traditional economics, theory describes how humans are considered to decide rationally. In a situation where people have to decide between multiple alternatives, they are expected to choose the option that maximizes their utility. However, as people often do not have all the information available, a prerequisite condition for rational decision making, we use different heuristics to make our decision strategy easier (Ariely, 2008). According to Tversky & Kahneman (1974) a bias is the consequence of a heuristic leading to systematic errors. Heuristics, in turn, are (multiple) rules we use to "reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations" (Tversky & Kahneman, 1974, p.1124) and thereby solving the problem. Thus, humans are not always acting rational. In many cases people even act fairly irrational (Ariely, 2008).

The decision making process is often influenced by several external factors (Cialdini, 2006; Tversky & Kahneman, 1974). In the process of making a purchase, consumers use heuristics to simplify their decision. Multiple studies show that, in doing so, people are influenced by others (Banerjee, 1992; Leibenstein, 1950). One common bias is known as 'herd behavior'. This bias describes behavior where the decision maker uses information from others who made (a) similar decision(s). Where rational decision making is assumed not to depend upon others, herd behavior clearly indicates that decision making is influenced by human biases' (Banerjee, 1992).

The use of information from others to simplify purchase decisions is not something new. Though, in today's world with the advent of online shopping, the way this information is collected has changed, as online purchase decisions need different information dimensions than those used for in-store purchases. Moreover, online shopping entails risk (Chang & Chen, 2008; Kim, Ferrin, & Rao, 2008; Masoud, 2013). For example, where in-store consumers can physically touch and feel the product, in an online webshop product information is limitedly available (Kim et al., 2008). So, a decision dimension that has gained more importance with the advent of online shopping is the interest in product experience, recommendations, usage characteristics or opinions of previous consumers. This information is often available from online reviews (D.-H. Park, Lee, & Han, 2007) also referred to as electronic word-of mouth (eWOM) (Cantallops & Salvi, 2014).

A reason to explore reviews, is to learn from the decision behavior of others to avoid risk (Y.-F. Chen, 2008; Hennig-Thurau & Walsh, 2003; Yi Liu & Sutanto, 2012). This causes people to follow the herd by doing or deciding what other people have done or chosen before (Banerjee, 1992). The sentiment (e.g. positively or negatively framed) of reviews expresses a recommendation or discouragement for purchase (D.-H. Park et al., 2007). As human beings dislike losses more than they like gains, consumers put more weight on negative reviews as this indicates a risky choice, a potential 'loss'. More attention is drawn to the negative information to prevent potential losses (Fiske, 1980; Kahneman & Tversky, 1979).

Besides the effect of review sentiment, review credibility is also of importance in the decision making process. Even without knowing the reviewers personally, consumers find confirmation by looking into the preferences of others like themselves (Chen & Huang, 2006). Anonymity is a component that contributes to the difficulty to judge the credibility of a review (King, Racherla, & Bush, 2014); a large degree of trust is required (Y.-F. Chen, 2008; Fan, Miao, Fang, & Lin, 2013; Reichelt, Sievert, & Jacob, 2014). In general, positive reviews are more easily perceived as less credible than negative reviews, as the former arouse suspicion. Consumers suspect the vendor of writing the positive reviews to increase sales (Peng, Cui, Zhuang, & Li, 2014; Reichelt et al., 2014). Only reviews perceived as credible are taken into consideration in the decision making process (Bataineh, 2015; Y.-F. Chen, 2008; Jiménez & Mendoza, 2013).

The effect of review sentiment on purchase intention has been extensively studied (Amblee, 2016; Y.-F. Chen, 2008; Y. Chen, Fay, & Wang, 2011; Duan, Gu, & Whinston, 2008; D.-H. Park et al., 2007; Tsao, Hsieh, Shih, & Lin, 2015). But research has not yet focused on the effect of the proportion of negative reviews relative to positive reviews on consumers' intention to buy a product online, also referred to as 'Online Purchase Intention' or OPI. The proportion of negative versus positive reviews in a cluster of reviews is described as the 'review ratio'. When the majority of reviews in a cluster has a positive sentiment (for example 5 out of 6 reviews are positive), the cluster is featured as having a positive review ratio. In the opposite situation, where a cluster of reviews contains more negative than positive reviews, the cluster is marked as having a negative review ratio. When the cluster consist of a 50/50 proportion of positive and negative reviews (for example 3 reviews have a positive sentiment and the other 3 have a negative sentiment) the cluster is labelled as an equal review ratio.

This research will look into the effect of the different review ratios on online purchase intention (OPI) and thus test whether different sentiments of reviews are weighted equally or differently in the decision making process. In this research, I aim to answer the following research question: *how is consumer purchase intention affected by the ratio of positive versus negative reviews?* I want to examine the herding effect in relation to the ratio of reviews (positive versus negative), hereby using the concept of proportion (5/6, 4/6, 3/6) to determine the overall sentiment of a cluster of reviews. A positive review ratio could signal potential consumers to follow the herd to buy the product, whereas a negative review ratio is hypothesized to signal the opposite.

Because consumers attach different weigh to positive and negative reviews, this study hypothesizes that the overall sentiment of a cluster, the indicator to follow the herd, affects the tendency for customers to buy certain goods online.

In addition, this study examines the effect of providing profile information for positive reviews on consumers review credibility rating. Positive reviews providing name, age and place of residence are

hypothesized to be more credible than anonymous positive reviews. Moreover, this study examines if the intention to buy a product changes when consumers are shown 3 anonymous positive reviews and 3 non-anonymous negative reviews compared to a cluster of reviews that contain the same 3 positive and 3 negative reviews though this equal review ratio cluster also provides profile information for the positive reviews.

The goal of this study is to provide understanding of the effect of equal, positive and negative review ratios on online purchase intentions. Answering this research question will provide further understanding about herd behavior. Firms and brands can use this information to adapt the way eWOM about products are displayed in their online shop.

Chapter 2 | Literature review

E-commerce

E-commerce is a growing market and almost everything can be bought online. Already in 2000, Phau & Poon (2000) predicted that consumers will buy more and more products online as confidence grows with the familiarity of electronic commerce and secure online transactions. In the Netherlands, 73,3% of the population aged 12 years and over ordered goods or services for private use over the Internet in 2016 (Eurostat Press Office, 2015). Besides the increase in online consumers (e-buyers), the number of Dutch webshops has more than doubled in the past 5 years (CBS, 2016). Research by GfK showed that, in 2016, the Dutch made 22% of total purchases online (GfK, 2017). Clothing and sport items represent almost 50% of all e-commerce, but also cosmetics, books, furniture, household goods and appliances and medicines are bought online (CBS, 2016).

While traditional (offline) shopping provides opportunities to touch, feel and taste products, consumers in an online shopping environment base their purchase decisions on limited information as presented on the website (Kim et al., 2008). Moreover, traditional shopping creates an easy accessible atmosphere for asking questions about the product to the retailer. To gain insight in the usage, quality or functioning of a product or service in an online shopping environment, consumers share evaluations (i.e. reviews). Prior buyers who provide information about the product or service give indirect experiences of products or services to potential buyers, serving as a helping hand in their decision making process (Cantallops & Salvi, 2014).

Word-of-mouth

Word-of-mouth (WOM) communication, such as recommendations and product reviews, play an important role in shaping consumers' attitudes and behavior (Harrison-Walker, 2001). Several studies show that product reviews do influence consumers and their purchasing behavior (Cheung, Sia, & Kuan, 2012; Hennig-Thurau & Walsh, 2003; Laing & Royle, 2013). WOM is one of the factors in the consumer decision-making process that influences, to a greater or lesser degree, consumers in choosing products and services (Cantallops & Salvi, 2014). WOM describes the process of passing on information about the product, brand, business or service from one to another, whereby the message is received from a noncommercial (i.e. unpaid) communicator (Harrison-Walker, 2001). Because of the latter, WOM is also described as consumer-to-consumer. Reviews give current consumers the opportunity to provide information, through word-of-mouth, about the product, often in case when they are satisfied or unsatisfied with a product/service (Arshad, Zafar, Fatima, & Khan, 2015; Hsiao, Chuan, Wang, Lu, & Yu, 2010; Masoud, 2013).

eWOM

The emergence of the Internet brought changes to traditional WOM. Nowadays, consumers are able to share and exchange opinions with anyone in the world, while WOM results from face-to-face

relationships. Sharing reviews, recommendations, experiences or opinions about the usage or characteristics of products, brands, services or business through the online environment is referred to as electronic word-of-mouth (eWOM) (Cantallops & Salvi, 2014). eWOM has no specific format which makes every review unique in length, content, quality and sentiment (negative of positively framed) and can be either subjective or objective (Park, Lee, & Han, 2007).

Park, Lee, & Han (2007) explain two functions of eWOM: providing information and recommending/discouraging the product to other online shoppers. Shen, Zhang, & Zhao (2015) examine how online product reviews (eWOM) influences decision makers product purchase. Previous empirical research shows that respondents taking note of product reviews choose twice as much the recommended products compared to respondents who did not go through product reviews (Senecal & Nantel, 2004). Though consumers do not read all available product information when looking for a product online, the few reviews that are read affect purchase intention (Chatterjee, 2001).

Differences between WOM and eWOM

Traditional WOM differs a lot from eWOM. First, WOM is limitedly spread, only within consumers' social networks or among strong ties, whereas the Internet makes eWOM accessible for everyone. Secondly, whereas vendors do not have control over what type of WOM consumers hear, eWOM is controllable (Park & Kim, 2008). Online vendors who are in control of their own online webshops and can decide whether to allow consumer reviews to be shown or not, how much reviews are listed and what type of reviews are shown. Thirdly, websites can guide consumers to post their opinions in the way they want. Specific formats can be chosen to influence which reviews are shown on top of the page. eWOM can be used as a strategic marketing tool in contrast to WOM (Park & Kim, 2008). Cantallops & Salvi (2014) also point out that eWOM is more influential than WOM because of the easiness of accessibility (e.g. time saving as information on the Internet is available independent of time and place), the reach of reviews' impact and the speed of interaction as a result of the Internet. eWOM is also different from WOM in terms of face-to-face interaction. In contrast to WOM, eWOM has the ability to be measurable, as comments and ratings can be counted (Park & Kim, 2008). The last difference concerns the reviewer writing the post. Whereas with WOM the sender is often someone familiar, on the Internet the author is often unknown when online reviews are consulted (Park et al., 2007).

Although the above characteristics are be predominantly positive, the characteristics of eWOM can also backfire. Research shows that authors of online reviews are not a representative sample. Extremely satisfied and extremely dissatisfied customers are more likely to communicate reviews (Zhu & Zhang, 2010). Dellarocas, Gao, & Narayan (2010) compare the number of reviews and the type of individuals that write reviews among different product categories. Results show that less successful products receive reviews more often and that consumers are more likely to write a review

when the products already have many reviews from prior buyers. Moreover, as reviews are seen as an influential marketing tool (Park & Kim, 2008), vendors can adapt online reviews to increase sales (Zhu & Zhang, 2010), removing the characteristic of the noncommercial intention of a review. As a result, potential buyers may heavily discount online reviews by questioning the credibility (Park et al., 2007; Zhu & Zhang, 2010).

Effect of eWOM on purchase intention and/or sales

The effect of eWOM on purchase intention has been researched among multiple product categories and industries (Y.-F. Chen & Huang, 2006; Hennig-Thurau & Walsh, 2003; Laing & Royle, 2013). Rosario, Sotgiu, Valck De, & Bijmolt (2016) performed a meta-analysis across 96 studies covering 40 platforms and 26 product categories. Overall, results show a significant positive relationship between eWOM and sales. Though this is consistently positive, effectiveness of eWOM on sales differs across platform, product, and metric factors. eWOM is considered to have two distinct effects on buying behavior. First, research mentions the effect of eWOM volume, the number of eWOM that is spread. This is mainly measured in absolute numbers (i.e. the total number of reviews shown below a product). Secondly, the sentiment of eWOM i.e. the recommendation or discouragement to buy the product as described in eWOM, is considered. The latter is often measured by the way a review is framed (i.e. positive, negative or neutral) or with ratings, for example using a five point scale to which buyers can assign stars. The more stars, the better (i.e. positive attitude) the product is rated (Duan et al., 2008).

Thus, multiple prior studies show the effect of eWOM volume on purchase intention and/or actual sales. For example for the leisure industry, Tsao, Hsieh, Shih, & Lin (2015) confirm these findings and show that an increasing number of reviews intensifies the effect of hotel booking intentions. Similar conclusions are found for restaurant bookings (Zhang, Ye, Law, & Li, 2010), travel insurance sales (Amblee, 2016), movie theater visits (Yong Liu, 2006), video and electronics sales (P.-Y. Chen, Wu, & Yoon, 2004) and book sales (Y.-F. Chen, 2008).

Prior research also focuses on review sentiment and shows that this significantly affects product sales or purchase intention, although the size of the effect is conflicting among and within industries and product types. Often, online reviews are framed either positively or negatively, as the review functions as a recommendation or a discouragement for potential buyers. Accordingly, reviews offer positive arguments in support of the product or negative opinions against it (Sen & Lerman, 2007). The way reviews are framed, negatively or positively, determines a large part of the effect on product sales (Chen, Fay, & Wang, 2011).

Some prior studies find that consumers perceive positive messages, in general, to be more persuasive than negative ones (Gershoff, Mukherjee, & Mukhopadhyay, 2003). For example, Tsao, Hsieh, Shih,

& Lin (2015) find that positive reviews influence booking intentions more than negative reviews. Gershoff, Mukherjee, & Mukhopadhyay (2003) examine the effect of extremely positive and negative reviews and find that positive eWOM is more influential. Positive information turns out to be more impactful compared to negative ones when it comes to intentional buying decisions (Peng et al., 2014). Though, positive reviews are also easy to be considered suspicious, especially when the product has too many positive reviews. Research of Peng et al. (2014) shows that consumers question the credibility of the review and suspect the vendor of writing positive reviews in order to increase sales.

On the other hand, many earlier studies find the opposite and confirm the negativity bias. Early research looking into offline consumer behavior found that consumers pay more attention to negative product information than to positive information (Ito, Larsen, Smith, & Cacioppo, 1998), mostly because negative framed information is processed more carefully by individuals. In general, people tend to place greater emphasis on negative information as it is shown to be more 'alerting' than positive information. Negative information possibly triggers a cautious attitude. Automatically, more attention is assigned to these type of reviews (Fiske, 1980) as potential consumers want to know more about the negative message to ensure they will not make the wrong decision. In sum, negative reviews could create a more powerful message than positive reviews, giving that the former has a higher persuasive power not to buy a specific product or service (Peng et al., 2014).

For example, a study that rated products as either favorable or unfavorable shows that unfavorable product ratings tended to have a greater impact on purchase intention of consumers than did favorable product ratings (Weinberger & Willon, 1980). Chen et al. (2011) also found that negative word of mouth has a greater impact on product sales than positive word of mouth. Moreover, negative reviews are perceived as more accurate, informative, sensitive and useful compared to positive reviews (Peng et al., 2014; Sen & Lerman, 2007). On the whole results are contradicting and research shows two different opinions: positive reviews are most persuasive though negative reviews intuitively gain more attention because of the humans' negativity bias.

The weight of review sentiment

Rosario et al. (2016), focusing on a range of tangible goods (e.g. products that can be seen or touched), state that positive eWOM has a stronger effect on sales than negative eWOM. In contrast to tangible goods, Sparks & Browning (2011) examine the effect of reviews on hotel bookings. Their research argues that negatively framed reviews have a bigger negative effect on booking intentions than the positive effect generated by positive information. Park & Lee (2009) also found that the effect of negative reviews is larger than positive reviews. They argue in addition that this effect is moderated by product types. Park & Lee (2009) find that the effect is greater for experience good than for search goods. Senecal & Nantel (2004) show that the strength of the influential effect generated by recommendations is higher for experience products (researchers used wine) than for search products

(researchers used a calculator). Cui, Lui, & Guo (2012) show that negative reviews on Amazon.com have a relatively larger effect than positive reviews for electronics and video games. Similarly, research looking into the effect of eWOM on video game sales show that the impact of negative ratings is larger than positive ratings and that this effect is more influential for less popular games than for more popular games (Zhu & Zhang, 2006). Similar to the latter Chen et al. (2004) examine the effect of reviews on online book purchases and find that reviews are more influential for less popular books.

As it takes more time to search for less popular goods on the Internet, consumers are relying more on the relatively low number of reviews available for those products (Zhu & Zhang, 2010). Similar to the previous, online reviews can significantly affect niche product sales, mostly because information about these products is scarce which makes consumers rely on any review they can find (Dellarocas et al., 2010). Moreover, negatively framed reviews have a large negative impact on consumer purchase intention, whereas superior reviews lead to sales more easily (Zhu & Zhang, 2010). Dellarocas, Gao, & Narayan (2010) show that consumers are more likely to review niche products than contributing a review about products easily available in the market.

Sen & Lerman (2007) confirm that product type moderates the usefulness of negative and positive reviews. They look into the effect of how useful negative and positive reviews are for purchasing utilitarian versus hedonic products (consumed for luxury purposes). Results show that potential buyers receive the usefulness of reviews differently among product types. Negative reviews about hedonic products are received as less useful (compared to positive reviews) when review content is about internal or non-product features. Negative reviews about utilitarian products are perceived as more useful (than positive reviews) when the reviewer expands about external or product related motivations.

Risk behavior

Despite the growth of online shopping, because of the expanding range of products and the user increase, online shopping brings along at least some degree of risk or uncertainty in consumers' purchasing decisions (Kim et al., 2008; Masoud, 2013). When in a store, consumers have tangible indications about the quality of the product when touching, tasting and feeling it. In an online environment, greater risk and less trust are expected as consumers are depending on pictures and a limited amount of product information. This makes it harder for consumers to accurately evaluate the quality before buying the product, as done in physical stores (Kim et al., 2008; Laroche, Yang, Mcdougall, & Bergeron, 2005).

Online shopping in general involves more product risk than traditional shopping (Kim et al., 2008). The first physical moment when the consumer is able to evaluate the product fully, is after the product

is received and, in most cases, already paid for (Arshad et al., 2015). Consumers look for clues to reduce the risk involved with online shopping (Chang & Chen, 2008). Among other things like sales volume (Chen, 2008), website reputation (Park, Lee, & Han, 2007), website certifications (Sparks, Perkins, & Buckley, 2013), reviews are a tool to make online purchase decisions easier (Hennig-Thurau & Walsh, 2003).

When consumers have made up their mind and have the intention to buy a product online, other hurdles such as security and privacy issues arise during the payment process (Laroche et al., 2005). Consumers have to fill in personal information like address details and financial transaction details such as a credit card number. When the transaction is concluded, the consumer has to wait until the product is received (Arshad et al., 2015). In the meantime, consumers are fully reliant on the online vendor which makes them sensitive to risk (Kim et al., 2008).

Placing a greater weight on negative information than positive information is also seen in risk avoiding behavior. People try to avoid risk when losses are able to turn out larger than potential gains (Ito et al., 1998). As people are loss averse (e.g. they feel losses more than gains), in general, they behave in such as way as to avoid potential losses (Kahneman & Tversky, 1979). A negative review about a product assumes that the product was perceived negatively by a former buyer. By 'listening' to negative reviews (e.g. deciding not to buy), consumers can choose to avoid a potential loss. Positive reviews, on the other hand, create the assumption of optimizing sure gains when deciding in favor of the review. A higher sensitivity for negative information represents a negativity bias (Ito et al., 1998).

The review ratio is expected to affect consumer behavior, in this study measured as online purchase intention. Based on the literature above, the following hypothesis can be formulated: the negativity bias in combination with the overall willingness of people to avoid risk causes a 50/50 proportion of positive and negative reviews (an equal review ratio) not to be weighted equally in the decision making process. In a situation with an equal review ratio, the overall tendency towards online purchase intention is hypothesized to be negative because of the larger weight consumers are expected to attach to the negative reviews. In other words, this study hypothesizes that a positive review ratio (a cluster of reviews containing more positive than negative reviews) positively encourages consumers in the decision making process to intentionally purchase the product. Both an equal review ratio and a negative review ratio are expected to negatively influence consumer purchase intention. I will be testing the following null hypotheses:

H1: OPI is not different for situations where a positive review ratio is shown compared to situations where a negative review ratio is shown.

H2: OPI is not different for situations where a negative review ratio is shown compared to situations where an equal review ratio is shown.

H3: OPI is not different for situations where a positive review ratio is shown compared to situations where an equal review ratio is shown.

With the use of an experimental analysis, I expect to reject these 3 null hypotheses and find an effect/difference instead.

Credibility

Many studies confirm the finding that credible reviews are of greater value during the decision making process and positively affect the intention to purchase a product (Bataineh, 2015; Y.-F. Chen, 2008; Jiménez & Mendoza, 2013). Different studies, however, identify different factors which render a review credible, referred to as the attitude dimensions. A credible review is accepted by the reader, as one perceives the information and judgments as believable (Bataineh, 2015; Cheung et al., 2012; Fan et al., 2013). Readers will therefore discount non-credible reviews and use the information from credible reviews during purchase decisions (Bataineh, 2015).

In general, positive reviews will be more rapidly perceived as non-credible compared to negative reviews as they cause suspicion, especially when a product has a large volume of positive reviews (Peng et al., 2014; Reichelt et al., 2014). Consumer suspicion about positive eWOM has been affected by companies who placed emphasize on positive eWOM to stimulate their business (Reichelt et al., 2014). This behavior leads consumers to suspect that any vendor may have written a positive review on the goods on offer or may have manipulated part of existing reviews in order to increase their own sales (Peng et al., 2014). Subsequently, negative reviews have the tendency to naturally be more credible.

Nevertheless, most vendors know about these suspicions and want to create an optimal online retail environment where consumers are able to make better purchase decisions (Cheung et al., 2012). Some online retailers make use of a system to provide useful reviews and help current consumers identify if anonymous information in a review is correct or incorrect (King et al., 2014). Others try to identify possibilities to signal credibility (Reichelt et al., 2014) supported by attitude dimensions that make a review credible.

Trust, source credibility, expertise, communicator similarity are four main attitude dimensions that support eWOM credibility. The most common attitude dimension is trust (Y.-F. Chen, 2008; Fan et al., 2013; Reichelt et al., 2014). This is related to the afore mentioned anonymity online. As pointed out by Fan et al. (2013), the belief that the information written in a review by someone anonymous is true, is based on trust. Thus, trust can be seen one of the dimensions that support credibility. Trust is very personal but can be positively influenced by focusing on surface characteristics (Fan et al., 2013). Online retailers, for instance, can invest in a visually attractive online environment to contribute to the establishment of trust. A good first impression adds to consumers first phase of unconsciously gaining

trust (Fan et al., 2013). To draw attention to nicely presented reviews, appearance and presentation — by means of a well-designed and organized layout — is important (Reichelt et al., 2014).

Besides the presentation of reviews, another key attribute to review credibility is source reliability (Fan et al., 2013; Gefen & Straub, 2004; Reichelt et al., 2014). Also this generates a positive effect on purchase intention of the decision maker (Shen et al., 2015).

The Internet allows for the omitting of identity and/or message purpose (Park et al., 2007). Moreover, in order for a potential buyer to be able to decide whether the sender can be marked as credible, an online environment has to provide clues that are very different from the ones used during face-to-face interaction or throughout personal interactions over time (Cheung et al., 2012) (Reichelt et al., 2014). The source of online reviews may therefore be perceived as less credible than direct messages from friends and family (Park et al., 2007).

Expertise (gained with knowledge and experience with the topic/product/service) is a third attitude dimension that generates credibility (Y.-F. Chen, 2008; Gefen & Straub, 2004; Reichelt et al., 2014). However, research shows that reviews written by consumers are trusted more often and more easily as compared to expert reviews (Y.-F. Chen, 2008). Reichelt et al. (2014) explains that this has to do with communicator similarity, a fourth attitude dimension contributing to credibility. Similarity in this case highlights the homogeneous characteristics of receivers and senders of eWOM. Though an external expert has outstanding knowledge on the topic and is able to give the fairest arguments, the average consumer is considered more similar to the receiver of eWOM in terms of opinion. Therefore, evaluations and reviews are more applicable to his or her own situation (Reichelt et al., 2014). To increase credibility via communicator similarity, online vendors could provide more profile information about the eWOM sender which in turn also provides another trust base for the receiver. Lastly two other factors that affect the level of review credibility are message content and message quality (Cheung et al., 2012; Fan et al., 2013; Shen et al., 2015). Typos, unfamiliar language, slang and difficult to understand language diminish credibility (Y.-F. Chen, 2008; Metzger, 2007; Reichelt et al., 2014) and consumers' willingness to trust the information (Fan et al., 2013).

A consolidation of the above leads to the following hypothesis: positive reviews for which source information is available are expected to be deemed more credible, and hence to be taken more seriously in the decision making process, compared to reviews for which no source information is provided. I expect that review credibility ratings will differ between non-anonymous and anonymous reviews. Therefore, the following null hypothesis will be tested:

H4: There is no difference in level of credibility for positive reviews providing profile information about the writer and positive reviews without provided profile information.

Elaborating on hypothesis 4, I expect that an equal review ratio of positive and negative reviews is perceived different, if positive reviews are perceived as credible compared to an equal review ratio with non-credible positive reviews (i.e. anonymous reviews). Non-credible reviews are expected to be considered to a lesser extent during the buying decision making process compared to credible reviews. In other words: the former are expected to weigh less in the decision making process than the latter. Therefore, despite the equal ratio, consumers are expected to adopt an equal review ratio with non-credible positive reviews as unequal because of the different weight attached to credible and non-credible positive reviews. When the number of positive and negative reviews is equal, but less weight is attached to non-credible positive reviews, this cluster of reviews will actually become unbalanced for the potential customer. The cluster is now expected to be perceived as predominantly negative instead. Specifically, displaying the positive reviews without profile information is expected to affect the intention to buy the product.

I therefore expect that the tendency to buy a product online differs for consumers with equal review ratio containing credible positive reviews compared to an equal review ratio containing non-credible positive reviews. The following null hypothesis will be tested:

H5: There is no difference in online purchase intention between an equal review ratio of which the positive reviews are perceived as credible and an equal review ratio of which the positive reviews are perceived as non-credible.

With the use of an experimental analysis, I expect to reject these 2 null hypotheses and find an effect/difference instead.

Chapter 3 | Methodology

Set up

The product that is used in this study is a travel guide. This product has been chosen because it is already used in many other studies (Chang & Chen, 2008; Y.-F. Chen, 2008; Y.-F. Chen & Huang, 2006; Chevalier & Mayzlin, 2006; Jiménez & Mendoza, 2013; Laing & Royle, 2013), so results can be generalized more easily, providing a good basis for the assumptions made (e.g. positive reviews have a positive effect on purchase intention, negative reviews have a negative effect on purchase intention). Moreover, the product is not an experience good/service or hedonic product, as these reviews meet different requirements. In most cases these reviews describe personal experiences and hence are highly subjective and not generally applicable to all consumers (Sen & Lerman, 2007). A travel book is a product with a clear goal and commonly known matter of use. In addition, this is a product with a low financial risk. This makes it easier for respondents to imagine being in a situation to buy such a product compared to products that are expensive and carry high financial risk (Bhatnagar, Misra, & Rao, 2000).

In addition, this study focusses on only one product type, as review credibility can differ among product types. Jiménez & Mendoza (2013) examine the influence of online reviews on purchase intentions for two different product types: search goods and experience goods. Results show that review credibility is different between the two types. Where search product reviews should exist of detailed information to be perceived as credible, the credibility of reviews about experience goods are determined by the level or reviewer agreement with a review (e.g. the degree of perceived agreement among reviewers regarding the evaluation of a product) (Jiménez & Mendoza, 2013).

Two steps are taken to collect the data: a manipulation check and the study itself. Dutch members of Opinionbar.com, a consumer panel from a market research agency named MetrixLab, participated in both studies through an online questionnaire. An online survey can save time and overcome geographical constraints (Chang & Chen, 2008). The reason to select OpinionBar for this study is because it has a large member base. To create a natural environment, respondents can answer the questionnaire on their phone, tablet of desktop computer in their own time. With the technology of a multi-screen approach, the survey is device responsive. For both the manipulation check and the study, participants receive €0,50 when they finish the survey and €0,10 when they are screened out because of pre-appointed restrictions. Payments are made to make them incentive compatible and are based on Metrixlab standards set by the time it takes to complete a survey. Both surveys take about 5 minutes. No participants participated in more than one treatment study and respondents who participate in the manipulation check were excluded from the study.

Procedure manipulation check

Based on Chen & Huang (2006), I use a manipulation check to see whether the reviews, as independent variable, are perceived as positive or negative. The goal of the manipulation check is also to choose reviews for the study that are rated similarly on review properties (credibility, trustworthiness, persuasiveness and quality), review sentiment (sentiment and sentiment consistency) and source properties (credibility and sincerity). This will keep the external validity as equal as possible and will therefore limit the influences of these factors on the final results.

I collect 32 reviews from the Dutch online store www.bol.com, 16 marked as positive and 16 marked as negative. The reviews are slightly adjusted when needed, so they fit the test product: a travel book about Portugal. Adjustment examples are: changing book title, topic, destination or country name to fit the test product. This makes the reviews more related to the product shown in the test environment. I choose real reviews with limited adjustments in content to keep them realistic. Half of the tested reviews has a negative sentiment; the other half has a positive sentiment. Product description, availability, price and delivery details are kept equal for all treatment groups.

Each individual rates 4 reviews on three levels: review properties, review sentiment and writer properties. Questions about the earlier mentioned review characteristics are asked as a statement and answers can be given on a 5 point scale. For example, respondents rate review sentiment on a 5 points scale from very negative (1) to very positive (5). Sentiment consistency means whether or not the review mentions only positive or only negative aspects and is thus not inconsistent by highlighting both negative and positive aspects. For the whole questionnaire, I refer to Appendix 1.

Participants of the manipulation check

253 respondents take part in the manipulation test, 56.4% males and 43,6% females, with an average age of 52 years (ranging from 18 to 76). Based on the study of Chen (2008), I choose to show six reviews below the product as this has been pointed out as the number of reviews that are commonly red. Taking into account the combinations of review ratios in the treatment groups, 6 positive reviews and 5 negative reviews are selected from the manipulation check. Ordinal data of the questions about review trustworthiness, credibility, quality, persuasiveness and sentiment as well as source sincerity and is transferred from a 5 point scale into percentages to compare the review ratings. The percentage is a top two score or respondents who rated the review with a 4 or 5 on the 5 point scale. For example, a score of 4 indicates the review as trustworthy and a score of 5 indicates the review as very trustworthy, form the basis of the percentage for the analysis of review trustworthiness. Sentiment consistency is measured as a percentage indicating the number of respondents stating the review is consistent.

Positive reviews numbered as 3,4,7,9,10 and 14 in the manipulation were chosen for the study as they gained the highest percentage scores for the 4 review properties (above 70% for all 4 properties).

Moreover, at least 71% stated that these 6 positive reviews mentioned only positive aspects of the product. As source properties for review 12 were among the top 5 highest scores. As review 14 scored below average on source properties, source properties are swopped. The source of review 12 is placed above the content of review 14. This creates the optimal review on content and source properties.

Negative reviews numbered as 8, 13, 14, 15 and 16 in the manipulation check were rated highest amongst at least 2 out of 4 review properties. Variances for review quality of the negative reviews were low and therefore ignored in this analysis. Source property scores of review 11, 5 and 1 were amongst the highest scores and thus in the top 5. Therefore, these sources were used for reviews 16, 13 and 15 respectively in the study as their own corresponding source properties did not achieve top 5 scores. At least 73% of the respondents indicated that the chosen negative reviews mentioned only negative aspects of the product.

Lastly, a Wilcoxon signed-rank test showed that anonymity in a positive review did elicit a statistically significant change in review credibility (Z = -3.541, p = 0.000; Z= -4.155, p= 0.000; Z= -4.007, p= 0.000) and in review trustworthiness (Z = -4.523, p = 0.000; Z= -4.221, p= 0.000; Z= -4.055, p= 0.000). This indicates that positive reviews with profile information were more credible and more trustworthy than the exact same positive reviews without profile information.

Hereafter, 6 positive reviews, 3 anonymous positive reviews and 5 negative reviews are selected to use in the study. Appendix 2 shows an example of a positive and negative review. With multiple combinations of reviews, 6 hypothetical online webshop pages are created to use in the study. This will contain 1 control group (containing a webpage with 6 positive reviews) and 6 treatment groups. The treatment conditions are based on the ratios of positive and negative reviews as visualized below the travel book. All treatments, except 2, have a condition whereby either positive or negative reviews dominate. Treatment 3 and 6 test whether negativity dominates positivity, the loss aversion theory, and if a balanced ratio but with anonymity of source affects online purchase intention. Table 1 visualizes the conditions and the corresponding review ratio.

Table 1
Condition overview

Condition	Number of reviews	Review ratio
Control group	6 positive	Positive
Treatment group 1	1 positive, 5 negative	Negative
Treatment group 2	2 positive, 4 negative	Negative
Treatment group 3	3 positive, 3 negative	Equal
Treatment group 4	4 positive, 2 negative	Positive
Treatment group 5	5 positive, 1 negative	Positive
Treatment group 6	3 (anonymous) positive, 3 negative	Equal

Data description

Data is collected about respondents' age, gender, online shopping familiarity (how often, how recent and what kind of products), familiarity with reviews (reading behavior and quantity of reviews used when shopping online), familiarity of looking for travel guides in an online environment and familiarity of buying travel guides online.

Table 2 as shown below gives an overview of all variables used for the analyses. Some variables are generated from the original data.

Table 2
Variable overview

Name of variable	Definition	Values method	Scale
Gender		1= male	Nominal
		2= female	
Age		Numeric	Ordinal
Treatmentgroups	Respondents' assigned condition	1= control group	Nominal
		2= treatment group 1	
		3= treatment group 2	
		4= treatment group 3	
		5= treatment group 4	
		6= treatment group 5	
		7= treatment group 6	
OPI_original	Online Purchase Intention: original answer from respondents	1= I would definitely buy the product	Nominal
		2= I would probably buy the product	
		3= I don't know if I would buy the product	
		4= I would probably not buy the product	
		5= I would definitely not buy the product	
OPI	Online Purchase Intention, reverse values of OPI_original	1= I would definitely not buy the product	Nominal
		2= I would probably not buy the product	
		3= I don't know if I would buy the product	
		4= I would probably buy the product	
		5= I would definitely buy the product	
T_neg	Cluster of reviews with overall negative sentiment	0= condition has no negative review ratio	Nominal
		1= condition exist of negative review ratio	
T_pos	Cluster of reviews has an overall positive sentiment	0= condition has no positive review ratio	Nominal
		1= condition exist of positive review ratio	
First_review	The sentiment of the top review from the review cluster	0= negative	Nominal
		1= positive	
Familiarwithbol	Indicator of familiarity with www.bol.com	0= unfamiliar with www.bol.com	Nominal
		1= familiar with www.bol.com	

Online_purchase	Online purchase behavior	1= I never buy something online	Nominal
		2= I almost never buy something online	
		3= I occasionally buy something online	
		4= I often buy something online	
Online_purchase_4wk	Online purchase behavior of last 4 weeks	1= Bought something online in the past four weeks	Nominal
		2= Did not buy something online in the past four weeks	
		3= Doesn't know if something was bought online in the past four weeks	
		4= Don't want to tell if something was bought online in the past four weeks	
Purchase_4wk	Indicator of shopping online in the past four weeks	0= No online purchase	Nominal
		(Generated with Online_purchase_4wk=2 or 3 or 4)	
		1= Online purchase	
		(Generated with Online_purchase_4wk=1)	
Fam_review	Indicator of familiarity with reading reviews before buying a product online	1= never	Nominal
		2= almost never	
		3= sometimes	
		4= often	
		5= always	
Fam_buy_books	Indicator of familiarity of buying (e)books online	1= not familiar at all	Nominal
		2= Somewhat unfamiliar	
		3= Nor familiar nor unfamiliar	
		4= Somewhat familiar	
		5= very familiar	
Review_quantity	Amount of reviews read before an online purchase	Numeric	Ordinal

Design of the study and participants

944 individuals responded to the email invitation to participate in the study. 179 respondents were deleted from the sample because of incomplete surveys due to early drop out. I retain a sample of 765 individuals for the data analysis. The control group consisted of 106 participants; each treatment group has between the 97 and 123 participants. The total sample consists of 48.2 percent female and 51.8 percent male with a mean age of 51 years, ranging from 18 to 76. According to participants' self-reports 39.0 percent is a frequent online shopper and 48.1 percent is an occasional buyer. 12.9 percent indicated they never or rarely buy something online. The majority of the sample, 70.9 percent, bought a product online in the past four weeks.

The dependent variable measures the online purchase intention (OPI) of a travel book. The study looks into intentional purchase behavior as sales data is not available. The dependent variable OPI is studied in several previous studies. For example, Brown, Pope, & Voges (2003) find that consumers who are highly likely to buy a product online, also show high rates concerning their actual product buying behavior after a period of time. Though intention doesn't measure real behavior, OPI has shown to be

a good "stand-in" (Brown et al., 2003). To operationalize OPI, participants are asked to indicate (on a 5 point scale) how likely it is that they will buy the travel book after reading the product information and available reviews. 1 indicates the highest purchase intention whereas answering the question with 5 does indicate having no purchase intention.

The reviews of the product that is chosen are indicators to measure if people follow the herd. The review ratio, an independent variable, is operationalized by the ratio of positive relative to negative framed reviews. A positive ratio infers a product as "good", while a "bad" product is indicated by a negative ratio (Chen & Huang, 2006). These are cues for eliciting herding behaviors in this study. Positive reviews signal a decision to follow whereas a negative review signals not to follow. I choose to keep the number of reviews constant as the number of reviews is positively correlated with the perception that a product is popular (Park et al., 2007). The more reviews are shown, the more a consumer sees this as an indication that the product is bought more often in the past compared to a similar product with less reviews (Duan et al., 2008).

Procedure

OpinionBar randomly invites respondents via email to participate in the study. Participants who respondent to the invitation are randomly assigned into different treatment conditions. This design prevents learning effects. After filling in information about age and gender, the questionnaire starts with 6 webshop pages from different webshops showing different product types with reviews below the product. This is to check whether respondents already familiar with multiple webshops, including Bol.com the webshop used for this study. The questions as asked to the respondents can be found in Appendix 3.

Respondents are then hypothetically being put in a situation where they are going to Portugal on the short term. This assumption makes it easier for respondents to imagine what they would do in a real situation regarding their purchase decision (Kühberger, Schulte-Mecklenbeck, & Perner, 2002; Wiseman & Levin, 1996). The travel guide about Portugal is shown in an online shopping environment as if they are shopping on www.bol.com. This creates an environment similar to an unforced shopping experience. All online assets are kept equal, such as delivery time, availability, brand and list price. Moreover no additional delivery fees apply. An example of the visualization of a hypothetical webshop can be found Appendix 4.

After reading the available information and reviews, participants are asked to indicate their purchase intention by answering the following question: *After you read the information regarding the travel book, how likely is it that you will buy the book after reading the product information and available reviews?* Respondents then complete the questionnaire and answer control questions regarding reviews and online shopping behavior.

Chapter 4 | Results

Statistical analysis

The first three hypotheses test the review ratio effect on online purchase intention. The fourth hypothesis tests the effect of anonymity on review credibility of positive reviews. Lastly, the fifth hypothesis tests whether OPI differs between an equal review ratio with credible positive reviews and an equal review ratio with non-credible positive reviews. An overview of the descriptive statistics and of the statistical output for each test done in the below section can be found in Appendix 5.

Except for testing hypothesis 4, this study uses independent samples (i.e. independence of observations) as there is no relationship between respondents in each sample, subjects can only be assigned to one treatment group and respondents cannot influence other respondents. Only respondents who are part of treatment group 6 (exposed to an equal review ratio with anonymous positive reviews) were asked to rate review credibility at the end of the questionnaire. Therefore, hypothesis 4 will be tested with a dependent sample paired t-test. The dependent variable of this study, online purchase intention, is an ordinal variable as it is measured on a 5 point scale. In the questionnaire, 1 indicates a high purchase intention and 5 indicates no purchase intention. The numbers are encoded reversely in the dataset so the results are immediately easy to understand.

Seven analyses are conducted to make comparisons of OPI between groups. Two non-parametric tests (Kruskal Wallis test and Mann-Whitney U test) and two parametric tests (One-way ANOVA and paired samples t-test) are used to conduct the analyses.

A Kruskal Wallis test is used to examine the difference in online purchase intention between treatments. The assumption that there is interdependence of observations for the treatments is met as mentioned in the data description earlier. Besides, the Levene's test for equality of variances was found to be satisfied for the present analysis, $F(6,758) = 1.162$, $p = .33$. The null hypothesis of equal variances is not rejected (p>0.05) indicating no difference between the variances in the population. This means the second assumption, homogeneity of variances, is also met. Group sizes are similar, but not exactly equal. Type 1 error (probability of rejecting a null hypothesis by mistake) levels are not guaranteed.

Figure 1 shows the mean level OPI of the control group and all treatment groups. High average score for OPI indicate high online purchase intention.

Mean levels of OPI per treatmentgroup
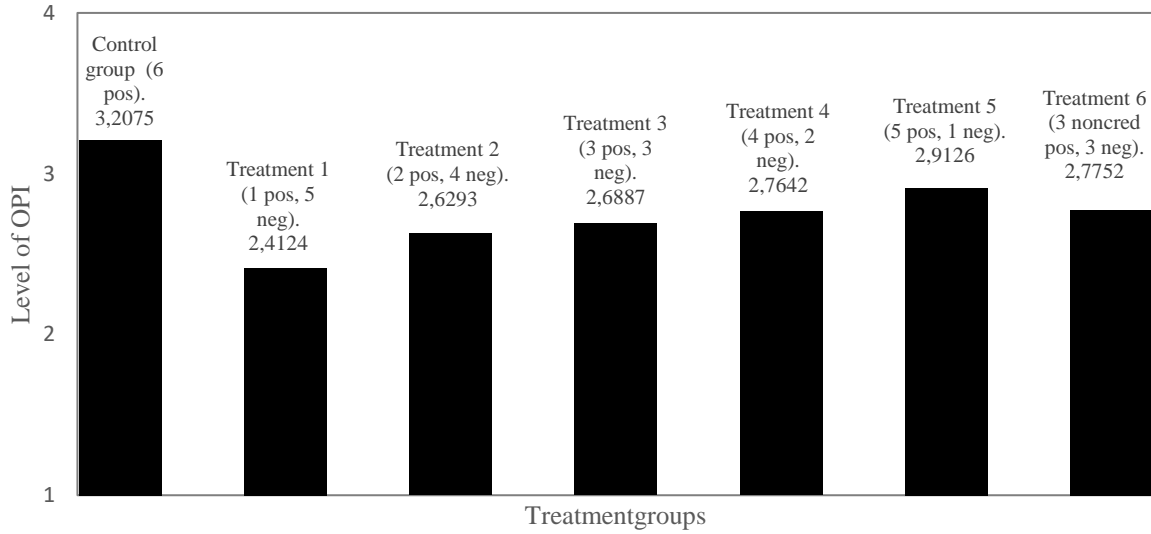### Condition (review ratio). mean OPI

Figure 1*: Mean levels of OPI per treatment group*

To test if these results are significantly different from each other, the following hypothesis is tested with a Kruskal Wallis test:

H0: The median of online purchase intention is equal among the seven conditions
$$(\theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7)$$

H1: At least one of the medians of online purchase intention is not equal among the seven conditions
$$(NOT: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7).$$

Result 1: median OPI scores are significantly different among treatment groups.

Support for result 1: A Kruskal-Wallis test was conducted to evaluate differences among the seven conditions with different ratios of positive and negative reviews (6 positive reviews, 1 pos vs 5 neg, 2 pos vs 4 neg, 3 (credible) pos vs 3 negative, 4 pos vs 2 neg, 5 pos vs 1 neg, 3 non-credible pos vs 3 negative) on median change in online purchase intention. This test does not assume a normal distribution, but does assume distributions are equal (homogeneity of variances). The test, which was corrected for tied ranks, was significant $\chi^2(6, N = 765) = 25.76$, $p = .00$. The proportion of variability in the ranked dependent variable accounted for by the review ratio treatment variable was .03, indicating a weak relationship between review ratio treatment and the change in OPI.

Because the Kruskal-Wallis test is significant, and hence at least one review ratio condition does influence online purchase intention, pairwise comparisons among the seven groups is completed. The pairwise comparisons will be conducted using the Mann-Whitney U test, which yields identical results with the Kruskal-Wallis test for two independent samples. Follow-up tests are conducted to evaluate pairwise differences among the seven conditions, controlling for Type I error across tests by using the

Bonferroni approach. A higher mean rank score is associated with a higher purchase intention because of the 5 point scale where 1 indicates no/a very low online purchase intention and 5 a high online purchase intention.

Result 2: People showed the product with only positive reviews (control group) show highest OPI. Average OPI scores of the control group significantly differ from each treatment group individually.

Support for result 2: Table 3 shows the U values and significance values of all individual Mann Whitney U tests. Results show a significant difference between the median of the control group and each treatment group.

Table 3

Mann-Withney U test scores. Comparisons of control group N_1 with each treatment group N_n.

	Control group (6 positive reviews) N_1=106
Treatment 1 (1 positive, 5 negative) N2=97	(U=3336.5, p=0.000)
Treatment 2 (2 positive, 4 negative) N2=116	(U=4487.5, p=0.000)
Treatment 3 (3 positive, 3 negative) N2=106	(U=4206,0 p=0.001)
Treatment 4 (4 positive, 2 negative) N2=123	(U=5230.5, p=0.007)
Treatment 5 (5 positive, 1 negative) N2=103	(U=4641.5, p=0.051)
Treatment 6 (3 anonymous positive, 3 negative) N2=114	(U=4832.5, p=0.008)

Hypothesis testing

The first 3 hypotheses test the review ratio effect on online purchase intention. Depending on the treatment, respondents have a positive, negative of equal review ratio. Treatment groups 1 and 2 contain more negative than positive reviews and therefore are defined as having a negative ratio. Data points of these two treatment groups are combined to create a negative review ratio variable. On the contrary, treatment groups 4 and 5 contain a positive review ratio as these groups were shown more positive than negative reviews.

To test hypothesis 1, OPI levels are compared between the combined groups: positive review ratio versus negative review ratio

H0: The mean rank of online purchase intention for the conditions positive review ratio and negative review ratio are equal (OPI$_{Positive}$=OPI$_{Negative}$)

H1: The mean rank of online purchase intention for the conditions positive review ratio and negative review ratio are not equal (NOT: OPI$_{Positive}$=OPI$_{Negative}$).

Result 3: OPI is significantly higher for groups shown a positive ratio compared to groups shown a negative ratio. Therefore, hypothesis 1 is rejected.

Support for 3: A Mann-Whitney U test was conducted to compare the effect of review ratio on OPI for a positive ratio (N=226) and a negative ratio (N=213). From this data, it can be concluded that OPI for the positive review ratio group (M = 2.83, SD =1.20) is statistically significantly higher than OPI for the negative review ratio group(M = 2.53, SD = 1.22) (*U = 20706, p = .009*).

To test the second hypothesis, the combined group shown a negative ratio is compared to treatment group 4 with an equal proportion of negative and positive reviews (shown 3 positive reviews and 3 negative reviews) to check whether this influences OPI.

H0: The mean rank of online purchase intention for the conditions positive review ratio and negative review ratio are equal (OPI$_{Equal}$=OPI$_{Negative}$)

H1: The mean rank of online purchase intention for the conditions positive review ratio and negative review ratio are not equal (NOT: OPI$_{Equal}$=OPI$_{Negative}$).

Result 4: OPI is not significantly different for an equal proportion of positive and negative reviews compared to a negative review ratio. Therefore, hypothesis 2 cannot be rejected.

Support for result 4: A Mann-Whitney U test was conducted to compare the effect of review ratio on OPI for an equal ratio (N=106) and a negative ratio (N=213). From this data, it can be concluded that OPI for the equal review ratio group (M = 2.69, SD =1.116)) is not significantly different from OPI for the negative review ratio group (M = 2.53, SD = 1.223) (*U = 10372.5, p = .223*).

To test the third hypothesis, the group which has shown a positive ratio is compared to treatment group 4 with an equal proportion of negative and positive reviews (shown 3 positive reviews and 3 negative reviews) to check whether there is a difference in OPI.

H0: The mean rank of online purchase intention for the conditions positive review ratio and negative review ratio are equal (OPI$_{Equal}$=OPI$_{Positive}$)

H1: The mean rank of online purchase intention for the conditions positive review ratio and negative review ratio are not equal (NOT: OPI$_{Equal}$=OPI$_{Positive}$).

Result 5: OPI is not significantly different for an equal proportion of positive and negative reviews compared to a positive review ratio. Therefore, hypothesis 3 cannot be rejected.

Support for result 5: A Mann-Whitney U test was conducted to compare the effect of review ratio on OPI for an equal ratio (N=106) and a positive ratio (N=226). From this data, it can be concluded that OPI for the equal review ratio group (M = 2.69, SD =1.116) is not significantly different from OPI for the positive review ratio group (M = 2.83, SD = 1.203) (*U* = 11159*, p = .229).

In summary, results of hypotheses 1 -3 show that a positive review ratio generates a higher online purchase intention compared to a negative review ratio. However, online purchase intention is not different in case the cluster of reviews contains a negative review ratio or an equal review ratio. The expectation that an equal review ratio has a negative impact on OPI is not met, even as the expectation that a negative review ratio negatively affects OPI.

As results differ from research expectations, additional analysis is carried out on the available data to look for other explanatory factors. Results show that the sentiment of the first review (the top one in the cluster of 6) affects online purchase intention. In all treatment groups, the way the cluster of reviews is shown to respondents is randomized. Some respondents got a negative review as the first review in the cluster of 6, while others got to see a positive review on top of the six reviews.

H0: The medians of online purchase intention for a cluster of reviews starting with a positive review and starting with a negative review are equal ($\mu OPI_{First\_Positive} = \mu OPI_{First\_Negative}$)

H1: The medians of online purchase intention for a cluster of reviews starting with a positive review and starting with a negative review are not equal (NOT: $\mu OPI_{First\_Positive} = \mu OPI_{First\_Negative}$).

Result 6: A cluster of reviews starting with a positive review compared to starting with a negative review positively affects OPI.

Support for result 6: A One-way between subjects ANOVA was conducted to compare the effect of the first review being positive review ratio (N=468) and the first review being negative (N=297) in a cluster of 6 reviews. There was a significant effect of the sentiment of the first review on OPI at the p<0.05 for the two conditions [$F_{(1,763)}$ =1.437), p = 0.001]. The mean score for the first review being positive (M = 2.89, SD =1.173) was significantly different from the first review being negative (M = 2.60, SD = 1.203).

Respondents were also asked to rate their familiarity with buying books online on a 5 point scale. 1 indicates no familiarity at all while 5 indicates being highly familiar.

H0: The medians of online purchase intention when people are familiar with buying books online and when people are not familiar with buying books online are equal

$(\mu OPI_{Purchase\_familiarity} = \mu OPI_{Purchase\_unfamiliarity})$

H1: The medians of online purchase intention when people are familiar with buying books online and when people are not familiar with buying books online are not equal

$(\mu OPI_{Purchase\_familiarity} = \mu OPI_{Purchase\_unfamiliarity})$

Result 7: Being familiar with buying books online positively affects OPI.

Support for result 7: To be able to identify an association between two ordinal variables, a Spearman's rank-order correlation was run. This test determines the relationship between online purchase intention and familiarity with buying books online. There was a weak but positive correlation between online book purchase familiarity and online purchase intention, which was statistically significant (rs(763) = .251, p = .000).

To test hypothesis 4 (whether reviews are more credible when profile information is provided compared to an anonymous review), credibility ratings of 3 anonymous reviews are combined. The same is done for 3 non-anonymous reviews. As subjects rated two observations, an anonymous review and a non-anonymous review, the observations become related or also pointed out as a test with a dependent sample. To test whether the credibility ratings differ from one another a paired (samples) t-test is used. The paired t-test will thus check if the difference between the two credibility ratings means is zero.

H0: There is no difference in mean credibility rating for anonymous and non-anonymous positive reviews ($\mu Credibility_{Non-anonymous} - \mu Credibility_{Non-anonymous} = 0$)

H1: The mean differs of credibility ratings differ for anonymous and non-anonymous positive reviews (NOT: $\mu Credibility_{Non-anonymous} - \mu Credibility_{Non-anonymous} = 0$)

Result 8: a review that does not provide profile information is less credible compared to the same review with profile information. Therefore, hypothesis 4 is rejected.

Support for result 8: A paired samples t-test was conducted to compare credibility ratings of reviews providing profile information and reviews without profile information of the author. There was a significant difference in the scores for reviews providing profile information (M = 4.2193, SD = 1.689) and reviews not providing profile information (M = 3.4649, SD = 1.509); t(113)=-5.239, p=0.000.

To test hypothesis 5, OPI levels of treatment group 4 and treatment group 7 are compared. Both groups have an equal review ratio and show the same reviews, but the first treatment group receives profile information about the author of the positive and negative reviews whereas treatment group 7 is provided with positive reviews without profile information. Negative reviews still have profile information.

H0: The mean rank of online purchase intention for the conditions equal review ratio with anonymous positive reviews and equal review ratio with non-anonymous positive reviews are equal

$$(OPI_{Equal\_anonymous}=OPI_{Equal\_non-anonymous})$$

H1: The mean rank of online purchase intention for the conditions equal review ratio with anonymous positive reviews and equal review ratio with non-anonymous positive reviews are not equal

$$(OPI_{Equal\_anonymous}=OPI_{Equal\_non-anonymous})$$

Result 9: OPI is not significantly different for an equal proportion of positive and negative reviews with non-credible positive reviews compared to an equal proportion of positive and negative reviews with credible positive reviews. Therefore, hypothesis 5 cannot be rejected.

Support for result 9: A Mann-Whitney U test was conducted to compare the effect of review ratio on OPI for an equal ratio with credible positive reviews (N=106) and a non-credible positive reviews (N=114). From this data, it can be concluded that OPI for the equal review ratio group with credible positive reviews (M = 2.69, SD =1.116) is not significantly different from OPI for the equal ratio review condition with non-credible positive reviews (M = 2.80, SD = 1.191) $(U = 5786, p = .576)$.

Chapter 5 | Discussion and limitations

Review ratio

Findings show that consumers' intention to buy a product online is higher when the majority of reviews shown below a product convey a positive sentiment, as compared to when the majority of reviews has convey a negative sentiment (H1). This means that people are inclined to refrain from purchase, when the majority of reviews is negative and that people are more likely to buy a product online when the majority of reviews is positive. In other words, this validates the interest of webshops to display mostly positive reviews. Though findings show that displaying a few negative reviews in a predominantly positive cluster of reviews does not affect consumers' buying intention, webshops should be careful with displaying too much discrepancy in the sentiment of reviews. Once the majority is negative, this has a negative impact on the intention to purchase the product, which means that fewer quantities of the product will be sold. This outcome may also point at the worrisome likelihood that webshops have an interest in the manipulation of reviews to stimulate sales. However, the webshop of the retailer is often not the only source of information that is used to base a purchase decision on. The Internet provides many other places where product reviews can be posted. Potential consumers can also get their information from independent review websites. In case retailers manipulate their cluster of reviews, consequences are limited to their own product page.

In addition, this study shows that consumers' intention to buy a product in situations where the majority of reviews is either negative (H2) or positive (H3) is not different from situations in which the number of positive and negative reviews are equal. No support is therefore found for the hypothesis that negative reviews outweigh positive reviews in the decision making process to buy a product in the situation where an equal number of positive and negative reviews is shown to a potential buyer. An equal review ratio does therefore not provide any or enough direction from the herd to influence potential consumers purchase decision. This indicates that when being in a situation of equally divided opinions (half positive, half negative) and having no explicit direction what purchase decision is recommended, refraining from purchase or buying the product does not impact the tendency towards buying a product online. For webshops, this thus implies that a strong division of opinions amongst the product does not necessarily influence potential buyers.

The unexpected finding that negative reviews do not outweigh positive reviews could be explained by some limitations of the study. The literature has shown, it is clear that there are a number of studies with contradiction findings. The point of view from this study, which is in favor of research supporting the negativity bias, seems not to have been the right support for this hypothesis. Theory that shows how people automatically assign more attention to negative information (Fiske, 1980) in combination with the results of Chen et al. (2011) (i.e. negative word-of-mouth has a greater impact on product sales than positive WOM) could be incorrectly used as an assumption that similar results are found for this study. Besides, Peng et al., (2014) mentions that positive reviews are reduced in value and that

this effect is bigger, when the number of positive reviews increases or is perceived as 'too much'. However, based on the research set up of Chen (2008), this research uses a constant number of reviews, namely 6, to display the conditions. Therefore, no variance or discrepancy can be made between the volume of review clusters. Future research could examine if attitude towards the proportion of negative and positive reviews changes depending on the volume of the review cluster.

Another limitation that could have led to the inability to reject the second and third hypothesis is the possible shift in interpretation of the equal review ratio. Although previous research by Chen (2008) showed that people read around six reviews, the assumption in this study that assumes respondents read all 6 reviews might be incorrect. When respondents were asked to indicate the number of reviews they normally read when buying a product online, the average was 5.48. Implicitly this means that part of the respondents mentioned to read less than six reviews in daily life. In case, as assumed, respondents behave similarly in the research set up regarding review reading, some respondents did not read all the reviews. As soon as the respondent skips reading at least one review, the proportion of reviews for that particular respondent changes. While this study then draws conclusions based on the assumption the respondent is exposed to an equal review ratio, this could be wrongly interpreted. For example: the situation where a respondent is assigned to the condition of a hypothetical webshop that shows three positive and three negative reviews (i.e. the equal review ratio) of which the last review has a negative sentiment. When the last review is not read, the proportion of reviews turns from an equal review ratio into a positive review ratio (i.e. the respondent read.

Three positive and two negative reviews which indicates that the majority of reviews read is positive). The scope of this study is limited to information on the number of reviews normally read during an online shopping experience, but questions are not asked about the number of reviews (and with what sentiment) the respondent has read during the study. A potential solution to deal with this problem is to control the amount of reviews a respondent read afterwards. Researchers could ask respondents afterwards how many reviews he/she has read and what the overall attitude (i.e. positive or negative) is of the cluster of reviews. This could lead to insightful findings and is therefore to be recommended for future research.

Review credibility

Looking at the effect of source information on the credibility ratings of a review, it is clear that potential consumers attributed more credibility to a positive review when more information about the writer of the review was provided. These results are similar to previous findings (Fan et al., 2013; Gefen & Straub, 2004; Shen et al., 2015; Reichelt et al., 2014). Unexpectedly though interesting, no support was found for hypothesis 5, which posits that credibility attribution also affects consumers' purchase intention. Although anonymous positive reviews are, as expected, perceived as less credible, in situations where the cluster of reviews consists of an equal number of positive and negative reviews, displaying the positive reviews with or without writers' profile information does not affect

consumers' buying intention. For webshops, the distinction between positive reviews with profile information and those without is hence proven to be irrelevant. Webshops may even want to prefer to use the option to let customers leave a review anonymous. This could lower the threshold to leave a review after buying a product, as Morey, Forbath, & Schoop (2015) indicates that buyers do not always want to leave a review, because of privacy issues, when asked to fill in personal information. In case webshops work with rules how to display reviews (either with profile information or not), further research could examine the effect of different review ratios, whereby both positive as well as negative reviews are displayed anonymously. Moreover, research could examine the effect of inconsistency in displaying source information (i.e. some reviews, independent of the sentiment, are displayed with profile information while others are displayed anonymously) affects consumers' purchase intention.

The fact that this study is unable to reject hypothesis 5 could be explained by some limitations of this research. Whereas previous research mentioned many different attitude dimensions that contribute to a highly credible review, for example message content, message quality (i.e. typos, unfamiliar language, slang), content credibility and writers expertise (Y.-F. Chen, 2008; Cheung et al., 2012; Fan et al., 2013; Metzger, 2007; Reichelt et al., 2014), this research examines only a portion of the above mentioned dimensions. Further research could study the importance of each of the attitude dimensions towards review credibility. Results from follow-up research might give a better understanding of how the difference of credibility rating of positive and negative reviews affect the tendency towards willingness to buy a product when a cluster with an equal number of positive and negative reviews is presented.

Additional findings

This paper also provided some additional insights into the determinants of online purchase intention. Results that OPI levels significantly differ depending on the sentiment of the first review shown to the respondents, the top one of the cluster of reviews. Findings show that reviews with a positive sentiment positively influences OPI. A positive review thus contributes to the tendency to buy the product. Notably, analysis shows that a negative review displayed on top of the list does not necessarily lead to a lower purchase intention. Implicitly, this would indicate that webshops could generate more sales when the first review that is displayed has a positive sentiment, but that when the top review is negative, sales are not negatively affected.

Respondents' familiarity with buying books online also turned out to positively influence the OPI level. This second insight to come from the additional analysis suggest that consumers who are familiar with buying books are more easily inclined to buy the product compared to new customers. The latter have to take an extra hurdle, before they get convinced. Webshops therefore should look into opportunities to convince new customers to buy the product. Further research should look into the contributing factors of familiar and unfamiliar online shoppers on the willingness to buy a product.

General limitations

Besides the limitations regarding the inability to reject the hypothesis as pointed out above, other general limitations of the study are pointed out.

First, the sample of this study consists of members of OpinionBar who signed up to receive email invitations to participate in online surveys. Though the topics of the online surveys differ significantly and respondents do not know what type of questions to expect, results should be interpreted with care, because of possible self-selection bias. Another reason to be careful with generalizing results is because of the focus on only one product type. Repetitive research with different products will generate greater support for the findings.

Secondly, this research is looking into online purchase intention which comes close to (Kühberger et al., 2002; Wiseman & Levin, 1996) but is not identical to measuring purchase behavior. Assuming that The assumption that framing respondents into a hypothetical situation lead to similar results and affects the online purchase intention in the same direction as when examining purchase behavior, could be incorrect. Results can be biased as respondents could respond differently as no financial consequence is attached. For future research, a field experiment is recommended. Specifically, research could use A/B testing to play around with the way reviews are displayed to manipulate the review ratio of the overall cluster. Analysis on actual sales data would provide results on actual purchase behavior.

Thirdly, this research looked into positive and negative written reviews i.e. reviews with content. Though, reviews come in many different formats and retailers can choose the way reviews are displayed in their online shop. For example, the sentiment of a review can be given extra emphasis with the use of colors whereby positive reviews could be displayed in a green color while negative reviews get a red color. Likewise, webshops often use symbols. For example a checkmark to mark positive reviews while a negative review is displayed with a cross. Combinations of formats are also used. Specifically, these different formats would open up interesting future research topics to investigate whether purchase intention differs depending on a different review formats.

In sum, this study shows interesting results and can be seen as an in-depth research that enhance knowledge of how a cluster of reviews is perceived by potential consumers and how this affects purchase intention. At the same time, the scope of this research is limited to only a small aspect of the research topic. Many other explanatory factors that affect purchase intention/behavior should be taken into account in future research to gain more knowledge of the bigger picture. Examples are the online webshop environment, trust in the retailer, type of product and brand attitude. Hence, generalization of this research' results should be done with great care. Highlighting the limitations simultaneously open up a many interesting future research topics that can contribute to a better understanding of online herding behavior.

Chapter 6 | Conclusion

When buying a product online, potential consumers read reviews to know if previous consumers recommend to buy the product or not. The purpose of this research was to examine whether customers' Online Purchase Intention (OPI) is influenced by the overall sentiment of a cluster of reviews. To achieve this, this study examined the effect of the ratio of positive versus negative reviews on consumers' purchase intention. With the use of quantitative online research, respondents were exposed to an online webshop environment, creating multiple treatment groups that differed in the proportion of positive and negative reviews shown below a travel book.

Findings show that the ratio of positive versus negative reviews influences consumers purchase intention in case the cluster of reviews is either predominantly positive or negative. In both scenarios herding behavior is observed: when the majority of reviews is positive, i.e. recommending purchase of the product, prospective consumers tend to be more willing to buy the product themselves. On the other hand, when the majority of reviews is negatively framed, i.e. discouraging purchase of the product, potential consumers tend to rely on this recommendation to reduce risk and show a lower tendency to buy the product themselves. When it comes to a situation in which a webshop displays an equal amount of positive and negative reviews, leading to a dissent of opinions from reviewers, this study finds no decrease in purchase intention. This could indicate that potential consumers are not given (enough) direction from previous consumers in deciding what to do. Therefore, when seen an equal review ratio, potential consumers are not influenced by the herd in their decision making.

Consequently, this research concludes that customers are only swayed by reviews that are, on the whole, either positive or negative and that no significant effect on buying behavior has been found in cases where there was an equal number of positive and negative reviews. Lastly, this study finds no difference in consumers' purchase intention between displaying positive reviews with or without profile information of the review writer.

The results of this study indicate that displaying a couple of negative reviews in a cluster of multiple reviews does not negatively affect consumers' intention to buy a product, as long as the majority of reviews is positive. Therefore, webshops don't have to be put off as soon as a customer posts a negative review. Moreover, results imply that, because potential consumers are not more or less likely to buy a product when positive reviews display personal information, webshops are not in need to display personal information from their reviewers.

Nevertheless, expanding on the possibilities of how review ratios are displayed (e.g. with the use of colors, icons or ratings) can improve findings about the effect on buying intention. Overall, this study provides insights that supplement studies on both review sentiment and review proportion. Furthermore, it opens up many directions for research on the relevant topic of online reviews and purchase intention.

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Appendix

Appendix 1 | Questionnaire of the manipulation

Below, the questions and answers options of the manipulation check are shown.

TEXT: Bekijk en lees onderstaande recensies.

- [REVIEW - CREDIBLE] Kunt u aangeven hoe geloofwaardig u deze recensie vindt op een schaal van 1 (helemaal niet geloofwaardig) tot 5 (heel erg geloofwaardig)?
- [REVIEW - PERSUASIVENESS] Kunt u aangeven hoe overtuigdheid u deze recensie vindt op een schaal van 1 (helemaal niet overtuigend) tot 5 (heel erg overtuigend)?
- [REVIEW - TRUSTWORTHYNESS] Kunt u aangeven hoe betrouwbaar u deze recensie vindt op een schaal van 1 (zeer onbetrouwbaar) tot 5 (zeer betrouwbaar)?
- [REVIEW – QUALITY] Hoe vindt u de kwaliteit van de recensie op een schaal van 1 (heel erg slecht) tot 5 (heel erg goed)?
- [SOURCE CREDIBILITY based on(Cheung et al., 2012)] Kunt u aangeven hoe betrouwbaar u de schrijver van de recensie vindt op een schaal van 1 (helemaal niet betrouwbaar) tot 5 (heel erg betrouwbaar)?
- [SOURCE SINCIRITY] based on (Bataineh, 2015)] Kunt u aangeven hoe oprecht u de schrijver van de recensie vindt op een schaal van 1 (helemaal niet oprecht) tot 5 (heel erg oprecht).
- [REVIEW SENTIMENT] Hoe ontvangt u deze recensie?
  - Heel erg negatief
  - Negatief
  - Neutraal (niet positief en ook niet negatief)
  - Positief
  - Heel erg positief
- [REVIEW SENTIMENT CONSISTENCY] based on(Cheung et al., 2012)] In hoeverre vindt u dat de recensie zowel positieve als negatieve punten van het product benadrukt?
  - De recensie benadrukt alleen negatieve punten van het product
  - De recensie benadrukt zowel positieve als negatieve punten van het product
  - De recensie benadrukt alleen pos/itieve punten van het product
- [PURCHASE INTENTION (B. A. Sparks et al., 2013)] Hoe waarschijnlijk zo het zijn dat u dit boek zou kopen als u op reis zou gaan naar de desbetreffende locatie op een schaal van 1 (helemaal niet waarschijnlijk) tot 5 (heel erg waarschijnlijk)?
- [REVIEW QUANTITY] based on (Bataineh, 2015)] Wat vindt u van het aantal recensies dat wordt weergegeven onder het product?
  - Te veel 0-----0-----0-----0-----0-----0-----0 Te weinig

Appendix 2 | Example of positive and negative reviews

An example of a negative review as shown to the respondents:

Bart K | 46-50 jaar | Vlissingen | 26 juni 2016

Aan een aantal foto's in het boekje kun je zien dat ze niet heel recent zijn. Ook klopt de paginanummering regelmatig niet en mis je een eerlijke mening over bepaalde zaken. Het boekje zegt niet waar het op staat.

An example of a positive review as shown to respondents:

S Meerveld | 55-65 jaar | Stadskanaal | 4 april 2016

Absolute aanrader! Zeer uitgebreide en uitvoerige informatie over alle zaken die je je maar kunt bedenken bij het maken van zo'n reis. Zeer prettig en makkelijk te lezen.

An example of an anonymous positive review to respondents:

Jovd_09 | geen leeftijd | onbekend | 29 december 2016

Een boek met heel veel info, handig in diverse categorieën. Leest makkelijk weg, ter voorbereiding op een vakantie. Veel achtergrond informatie over de geschiedenis en het moderne Portugal.

Appendix 3 | Questionnaire of the study

1. In de denkbeeldige situatie dat u op zoek bent naar een reisboek, in hoeverre zou u dit boek kopen, rekening houdend met alle informatie die u tot uw beschikking heeft?
   - Ik zou zeker van plan zijn dit product kopen
   - Ik zou dit product misschien kopen
   - Ik weet niet of ik dit product zou kopen
   - Ik zou dit product waarschijnlijk niet kopen
   - Ik zou dit product niet kopen

2. Koopt u weleens producten online?
   - Ik koop nooit iets online
   - Ik koop zelden iets online
   - Ik koop af en toe iets online
   - Ik koop vaak iets online

3. Heeft u de afgelopen maand online een product gekocht?
   - Ja
   - Nee
   - Weet ik niet meer
   - Wil ik niet zeggen

4. Wat voor product(en) heeft u gekocht?
   - Kleding/schoenen
   - Sieraden/accessoires
   - Boeken
   - Levensmiddelen
   - Meubels
   - Witgoed
   - Elektronica
   - Anders

5. Leest u recensies voordat u online een product koopt?
   - Nooit
   - Nauwelijks
   - Soms
   - Vaak
   - Altijd

6. Hoeveel recensies leest u gemiddeld voordat u een beslissing neemt een product wel of niet te kopen?
   - [nummer invullen]

7. [FAMILIARITY] based on (Gefen & Straub, 2004) Op een schaal van 1 (heel erg bekend) tot 5 (helemaal niet bekend), kunt u aangeven hoe bekend u bent met het zoeken naar (reis)boeken op Internet?

8. [FAMILIARITY] based on (Gefen & Straub, 2004) Op een schaal van 1 (helemaal niet vertrouwd) tot 5 (heel erg vertrouwd), kunt u aangeven hoe vertrouwd u bent met het **online** kopen van (reis)boeken?

Appendix 4 | Example of hypothetical webshop

An example of the product page (as visualized in the survey) to the control group, is shown below.

Appendix 5 | Statistical output

Statistical output of chapter 4, the results section, can be found below.

5.1 | Descriptive statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	765	1	2	1.48	.500
Age	765	18	76	51.16	14.788
Treatmentgroups	765	1	7	4.06	1.987
OPI_original	765	1	5	3.22	1.206
Online Purchase Intention	765	1	5	2.78	1.206
T_neg	765	0	1	.2784	.44852
T_pos	765	0	1	.2954	.45653
First_review	765	0	1	.61	.488
Familiarwithbol	765	0	1	.9399	.23788
Online_purchase	765	1	4	3.24	.725
Online_purchase_4wk	749	1	4	1.32	.523
Purchase_4wk	749	0	1	.7089	.45455
Fam_review	749	1	5	3.55	.978
Fam_buy_books	765	1	5	2.93	1.342
Review_quantity	740	0	50	5.48	5.175
Cred_NA	114	0	6	3.4649	1.68901
Cred_A	114	0	6	4.2193	1.50961
Valid N (listwise)	106				

5.2 | Levine's test

Descriptives

Online Purchase Intention

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
Control | 6POS	106	3.21	1.169	.114	2.98	3.43	1	5
group 1 | 1POS_5NEG	97	2.41	1.231	.125	2.16	2.66	1	5
group 2 | 2POS_4NEG	116	2.63	1.212	.113	2.41	2.85	1	5
group 3 | 3POS_3NEG	106	2.69	1.116	.108	2.47	2.90	1	4
group 4 | 4POS_2NEG	123	2.76	1.255	.113	2.54	2.99	1	5
group 5 | 5POS_1NEG	103	2.91	1.139	.112	2.69	3.14	1	5
group 6 | 3POS_nc_3NEG	114	2.80	1.191	.112	2.58	3.02	1	5
Total	765	2.78	1.206	.044	2.69	2.86	1	5

Test of Homogeneity of Variances

Online Purchase Intention

Levene Statistic	df1	df2	Sig.
1.162	6	758	.325

ANOVA

Online Purchase Intention

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37.866	6	6.311	4.456	.000
Within Groups	1073.462	758	1.416		
Total	1111.328	764			

5.2 | Levine's test

5.3 | Result 1: Kruskal-Wallis test

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	25th	50th (Median)	75th
							Percentiles	
Online Purchase Intention	765	2.78	1.206	1	5	2.00	3.00	4.00
treatmentgroups	765	4.06	1.987	1	7	2.00	4.00	6.00

Test Statistics[a,b]

	Online Purchase Intention
Chi-Square	25.759
df	6
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: treatmentgroups

5.4 | Result 2: Mann-Whitney U test

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	25th	50th (Median)	75th
							Percentiles	
Online Purchase Intention	765	2.78	1.206	1	5	2.00	3.00	4.00
treatmentgroups	765	4.06	1.987	1	7	2.00	4.00	6.00

Ranks

	treatmentgroups	N	Mean Rank	Sum of Ranks
Online Purchase Intention	Control 6POS	106	119.02	12616.50
	group 1	1POS_5NEG	97	83.40	8089.50
	Total	203		

Test Statistics^a

	Online Purchase Intention
Mann-Whitney U	3336.500
Wilcoxon W	8089.500
Z	-4.465
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: treatmentgroups

Ranks

	treatmentgroups	N	Mean Rank	Sum of Ranks
Online Purchase Intention	Control 6POS	106	127.17	13479.50
	group 2 | 2POS_4NEG	116	97.19	11273.50
	Total	222		

Test Statistics^a

	Online Purchase Intention
Mann-Whitney U	4487.500
Wilcoxon W	11273.500
Z	-3.588
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: treatmentgroups

Ranks

	treatmentgroups	N	Mean Rank	Sum of Ranks
Online Purchase Intention	Control 6POS	106	119.82	12701.00
	group 3 | 3POS_3NEG	106	93.18	9877.00
	Total	212		

Test Statistics^a

	Online Purchase Intention
Mann-Whitney U	4206.000
Wilcoxon W	9877.000
Z	-3.289
Asymp. Sig. (2-tailed)	.001

a. Grouping Variable: treatmentgroups

Ranks

	treatmentgroups	N	Mean Rank	Sum of Ranks
Online Purchase Intention	Control 6POS	106	127.16	13478.50
	group 4 | 4POS_2NEG	123	104.52	12856.50
	Total	229		

Test Statistics[a]

	Online Purchase Intention
Mann-Whitney U	5230.500
Wilcoxon W	12856.500
Z	-2.680
Asymp. Sig. (2-tailed)	.007

a. Grouping Variable: treatmentgroups

Ranks

	treatmentgroups	N	Mean Rank	Sum of Ranks
Online Purchase Intention	Control 6POS	106	112.71	11947.50
	group 5 | 5POS_1NEG	103	97.06	9997.50
	Total	209		

Test Statistics[a]

	Online Purchase Intention
Mann-Whitney U	4641.500
Wilcoxon W	9997.500
Z	-1.950
Asymp. Sig. (2-tailed)	.051

a. Grouping Variable: treatmentgroups

Ranks

	treatmentgroups	N	Mean Rank	Sum of Ranks
Online Purchase Intention	Control 6POS	106	121.91	12922.50
	group 6 | 3POS_nc_3NEG	114	99.89	11387.50
	Total	220		

Test Statistics^a

	Online Purchase Intention
Mann-Whitney U	4832.500
Wilcoxon W	11387.500
Z	-2.652
Asymp. Sig. (2-tailed)	.008

a. Grouping Variable: treatmentgroups

5.5 | Result 2: Hypothesis 1

Ranks

	T_pos	N	Mean Rank	Sum of Ranks
Online Purchase Intention	0	213	204.21	43497.00
	1	226	234.88	53083.00
	Total	439		

Test Statistics^a

	Online Purchase Intention
Mann-Whitney U	20706.000
Wilcoxon W	43497.000
Z	-2.609
Asymp. Sig. (2-tailed)	.009

a. Grouping Variable: T_pos

5.6 | Result 4: Hypothesis 2

Ranks

	Treatmentgroup 4	N	Mean Rank	Sum of Ranks
Online Purchase Intention	0	213	155.70	33163.50
	1	106	168.65	17876.50
	Total	319		

Test Statistics^a

	Online Purchase Intention
Mann-Whitney U	10372.500

Wilcoxon W	33163.500
Z	-1.218
Asymp. Sig. (2-tailed)	.223

a. Grouping Variable: treatmentgroup 4

5.7 | Result 5: Hypothesis 3

Ranks

	Treatmentgroup 4	N	Mean Rank	Sum of Ranks
Online Purchase Intention	0	226	170.12	38448.00
	1	106	158.77	16830.00
	Total	332		

Test Statistics^a

Test Statistics[a]

	Online Purchase Intention
Mann-Whitney U	11159.000
Wilcoxon W	16830.000
Z	-1.039
Asymp. Sig. (2-tailed)	.299

a. Grouping Variable: treatmentgroup 4

5.8 | Result 6: Additional analysis first review shown

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Online Purchase Intention * First review shown	765	100.0%	0	.0%	765	100.0%

Report

Online Purchase Intention

First_review	Mean	N	Std. Deviation
Negative	2.60	297	1.238
Positive	2.89	468	1.173
Total	2.78	765	1.206

ANOVA Table[a]

			Sum of Squares	df	Mean Square	F	Sig.
Online Purchase Intention * First review shown	Between Groups	(Combined)	15.010	1	15.010	10.447	.001
	Within Groups		1096.318	763	1.437		
	Total		1111.328	764			

a. With fewer than three groups, linearity measures for Online Purchase Intention * First review shown cannot be computed.

5.9 | Result 7: Additional analysis familiarity with buying books online

Correlations

			Online Purchase Intention	Fam_buy_books
Spearman's rho	Online Purchase Intention	Correlation Coefficient	1.000	.251**
		Sig. (2-tailed)	.	.000
		N	765	765
	Fam_buy_books	Correlation Coefficient		1.000
		Sig. (2-tailed)	.000	.
		N	765	765

**. Correlation is significant at the 0.01 level (2-tailed).

5.10 | Result 8: Hypothesis 4

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Cred_NA	3.4649	114	1.68901	.15819
	Cred_A	4.2193	114	1.50961	.14139

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Cred_NA & Cred_A	114	.543	.000

Paired Samples Test

		Paired Differences							
				Std. Error Mean	95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation		Lower	Upper	t	df	
Pair 1	Cred_NA - Cred_A	-.75439	1.53750	.14400	-1.03968	-.46910	-5.239	113	.000

5.11 | Result 9: Hypothesis 5

Ranks

	Cred equal review ratio	N	Mean Rank	Sum of Ranks
Online Purchase Intention	0	114	112.75	12853.00
	1	106	108.08	11457.00
	Total	220		

Test Statistics[a]

	Online Purchase Intention
Mann-Whitney U	5786.000
Wilcoxon W	11457.000
Z	-.560
Asymp. Sig. (2-tailed)	.576

a. Grouping Variable: treatmentgroup 4