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**What Makes Reviews Trustworthy? An Investigation of User
Trust in Online Reviews when Making Purchase Decisions**

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This thesis is submitted for the degree of Doctor of Philosophy in Human
Computer Interaction Design

Centre for Human Computer Interaction Design
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Supervised by Dr. Simone Stumpf & Stephanie Wilson

August 2016

To my parents and my brother

Table of Contents

List of Figures	6
List of Tables.....	10
Acknowledgements	11
Declaration	12
Abstract	13
1 Introduction	14
1.1 User Trust in Online Vendors	14
1.2 User Trust in Online Reviews	16
1.3 Research Aim and Objectives.....	20
1.4 Contributions	22
1.5 Thesis structure	23
2 Background.....	26
2.1 User Trust in Online Vendors	27
2.1.1 What is User Trust?.....	27
2.1.2 Signals of Trust in Online Vendors	30
2.1.3 Effects of User Background on User Trust in Online Vendors.....	32
2.2 User Trust in eWOM and Online Reviews.....	37
2.2.1 Review-Related Factors	39
2.2.2 Reviewer-Related Factors	42
2.2.3 Potential Role of Perceived Reviewer’s Personality and Personality Similarity in User Trust in Online Reviews	46
2.2.4 Signals of Trust in Online Reviews	48
2.2.5 Overview of User Trust in Systems that Provide User-Generated Reviews.....	51
2.3 Chapter summary	52
3 Study 1: Exploring Signals of Trust in Online Reviews	54
3.1 Motivation & Research Questions	54
3.2 Methods.....	57
3.2.1 Participants.....	57
3.2.2 Design.....	57
3.2.3 Materials	58
3.2.4 Qualitative data.....	65
3.2.5 Procedure	66
3.2.6 Data Analysis.....	68
3.3 Results	73
3.3.1 Influence of Interface Signals on User Trust in Online Reviews (RQ-1)	73
3.3.2 Relationship between Interface Signals and the Perceived Trustworthiness of the Review and the Reviewer (RQ-2)	81
3.3.3 Effects of Dispositional Trust on Using Interface Signals (RQ-3).....	91
3.3.4 Effects of Perceived Review Quality, Reviewer’s Expertise and Bias on Perceived Review Helpfulness, Accuracy, and Trust in the Review (RQ-4)	93
3.3.5 Effects of Perceived Review Helpfulness and Accuracy on Trust in the Review (RQ-5).....	100
3.4 Discussion.....	102
4 Study 2: Effects of Review Valence, Online Community Opinions, and User-Generated Photos on User Trust in Online Reviews and Purchase Intention.....	106

4.1 Motivation & Research Questions	106
4.2 Methods	108
4.2.1 Participants.....	108
4.2.2 Study design.....	109
4.2.3 Materials.....	109
4.2.4 Procedure.....	120
4.2.5 Data Analysis.....	121
4.3 Results	124
4.3.1 Effects of Review Valence, Community Opinions, and Photo Presence, Type, and Valence on Trust in Online Reviews When Making Purchase Decisions (RQ-1).....	124
4.3.2 Role of User Background in Trust in Reviews and Purchase Intention (RQ-2).....	129
4.3.3 Interplay between the Influential Factors on Trust and their Relationship with Trust and Purchase Intention (RQ-3).....	130
4.4 Discussion	134
5 Study 3: User Perception of the Reviewer’s Personality and Its Relationship to Trust and Purchase Intention	138
5.1 Motivation & Research Questions	138
5.2 Methods	140
5.2.1 Participants.....	140
5.2.2 Study Design.....	141
5.2.3 Materials.....	143
5.2.4 Qualitative data.....	147
5.2.5 Procedure.....	147
5.2.6 Data Analysis.....	148
5.3 Results	160
5.3.1 Relationship between User Perception of the Reviewer’s Personality and User Trust in Online Reviews When Making Purchase Decisions (RQ-1).....	160
5.3.2 Relationship between User Perception of the Reviewer’s Personality Similarity to the User and User Trust in Online Reviews When Making Purchase Decisions (RQ-2).....	163
5.3.3 User Perception of the Reviewer’s Personality based on Interface Signals (RQ-3).....	166
5.3.4 Relationship between User Background and User Trust in Online Reviews When Making Purchase Decisions (RQ4).....	175
5.4 Discussion	178
6 DISCUSSION AND CONCLUSIONS	182
6.1 Summary of the Research	182
6.2 Towards a Framework of User Trust on Systems that Provide User-Generated Reviews	185
6.3 Practical Implications	193
6.4 Limitations and Future Work	195
6.5 Final Comments	197
6.6 Chapter Summary	198
References	200
Appendices	208
Appendix A: First Study	208
A.1: Constructed Reviews for First Study	208
A.2: Consent form	213

A.3: Trust factors questionnaire	216
A.3: Test of classification approach (Wilcoxon test output).....	218
Appendix B: Second study	220
B.1: Review valence and review quality test.....	220
B.1.1: Questionnaire.....	220
B.1.2: Results of review valence and quality test	221
B.2: Photos test	224
B.2.1: Food photos	224
B.2.2 Atmosphere photos.....	231
B.3: Introduction page	238
B.4: Background questionnaire	239
B.5: Trust factors questionnaire	243
B.6: Effects of review valence, community opinions, photo presence, valence and type on trust in online reviews and purchase intention (Kruskal Wallis - SPSS output).....	246
B.6.1: Effects of review valence.....	247
B.6.2: Effects of community opinions	248
B.6.3: Effects of photo presence.....	249
B.6.4: Effects of photo type	250
B.6.5: Effects of photo valence.....	251
Appendix C: Third study	252
C.1: Consent form	252
C.2: Background questionnaire.....	255
C.3: Familiarity check	262
C.4: Perceived personality and trust factors questionnaire.....	263

List of Figures

Figure 1.1: Overview of gaps addressed in this research (1) interplay of factors that have been suggested to influence trust in online reviews (2) Effects of perceived personality and personality similarity on trust in online reviews (3) relationship between interface signals and influential factors on trust in online reviews (4) Effects of user background on trust in online reviews	19
Figure 2.1: Overview of user trust in systems that provide user-generated reviews.....	52
Figure 3.1: Study 1 - investigating interface signals that matter in trust and the perception of the review and reviewer trustworthiness, and the effects of user background (Note: only objects in black are investigated)	55
Figure 3.2: Study 1 - investigating the interplay of the influential factors on trust and their effects on trust in online reviews (Note: only objects in black are investigated).....	57
Figure 3.3: Example of a review	59
Figure 3.4: Manipulation of review quality, reviewer's expertise and bias	62
Figure 3.5: Participants' dispositional trust measures ranging from 1.5 (lowest) to 4 (highest), median is 2.5	63
Figure 3.6: First study procedure	67
Figure 3.7: Number of participants who mentioned interface signals. Dark green bars refer to review-related signals, dark blue bars refer to reviewer-related signals, light green bars refer to emerging review-related signals and light blue bars refer to emerging reviewer-related signals	74
Figure 3.8: Number of participants who mentioned interface signals in their perception of high (dark bars) and low (light bars) review quality	83
Figure 3.9: Number of participants who mentioned interface signals in their perception of the helpful reviews (dark bars) and unhelpful reviews (light bars)	86
Figure 3.10: Number of participants who mentioned interface signals in their perception of high reviewer's expertise (dark bars) and low reviewer's expertise (light bars)	87
Figure 3.11: Number of participants who mentioned interface signals when perceiving high reviewer's bias (dark bars) and low reviewer's bias (light bars).....	89
Figure 3.12: Number of participants who mentioned interface signals when perceiving high review accuracy (dark bars) and low review accuracy (light bars)	91
Figure 3.13: Interface signals that differed between participants' with high dispositional trust (dark bars) and low dispositional trust (light bars).....	92
Figure 3.14: Participants' ratings of perceived review helpfulness according to high perceived review quality (blue diamonds) and low perceived review quality (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure agree, 4 agree and 5 strongly agree).....	95
Figure 3.15: Participants' ratings of perceived review accuracy according to high perceived review quality (blue diamonds) and low perceived review quality (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	95
Figure 3.16: Participants' ratings of trust in review according to high perceived review quality (blue diamonds) and low perceived review quality (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)	96
Figure 3.17: Participants' ratings of perceived review helpfulness according to high perceived reviewer expertise (blue diamonds) and low perceived reviewer	

expertise (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	97
Figure 3.18: Participants' ratings of perceived review accuracy according to high perceived reviewer expertise (blue diamonds) and low perceived reviewer expertise (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	98
Figure 3.19: Participants' ratings of trust in review according to high perceived reviewer expertise (blue diamonds) and low perceived reviewer expertise (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	98
Figure 3.20: Participants' ratings of perceived review helpfulness according to high perceived reviewer bias (blue diamonds) and low perceived reviewer bias (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	99
Figure 3.21: Participants' ratings of perceived review accuracy according to high perceived reviewer bias (blue diamonds) and low perceived reviewer bias (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	100
Figure 3.22: Participants' ratings of trust in review according to high perceived reviewer bias (blue diamonds) and low perceived reviewer bias (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	100
Figure 3.23: Participants' ratings of trust in review according to high perceived review helpfulness (blue diamonds) and low perceived review helpfulness (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	101
Figure 3.24: Participants' ratings of trust in review according to high perceived review accuracy (blue diamonds) and low perceived review accuracy (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree).....	102
Figure 4.1: Overview of study 2 (i) investigating the effects of review valence, community opinions and user-generated photos on trust and purchase intention (iii) effects of user background in the forms of dispositional trust and past experience (ii) interplay between the factors that can influence trust.....	108
Figure 4.2: Example of screenshot presenting a review.....	110
Figure 4.3: Positive review.....	112
Figure 4.4: Negative review.....	112
Figure 4.5: Positive food photo.....	116
Figure 4.6: Negative food photo.....	116
Figure 4.7: Positive atmosphere photo.....	117
Figure 4.8: Negative atmosphere photo.....	117
Figure 5.1: Overview of study 3 – investigating (i) signals that matter in the perception of personality (ii) how the perceived personality and personality similarity relate to trust in online reviews, trust factors of the review and reviewer and purchase intention and (iii) the role of the user background including the user own personality (Note: only objects in black font are investigated).....	140
Figure 5.2: Example of Yelp profile page.....	141
Figure 5.3: Example of two units of analysis (Note: blue refers to interface signals and green refers to personality traits).....	156
Figure 5.4: Heat map indicating strength of relationship between types of signals and personality traits. Red indicates a strong whereas white indicates a weak	

relationship. Strength of relationship is calculated based on number of participants who have used a signal type to justify a personality trait.....	169
Figure 5.5: Positive words (green bars) used in the perception of high agreeableness and low neuroticism, negative words (red bars) used in the perception of low agreeableness but high neuroticism.....	172
Figure 6.1: Framework of user trust on systems that provide user-generated reviews (Note: review-related signals and factors are bordered in dark black as these were more important than signals and factors of the reviewer).....	185
Figure 6.2: Framework of user trust on systems that provide user-generated reviews - user trust in the reviews is mostly affected by signals and factors of the review .	187
Figure 6.3: Framework of user trust on systems that provide user-generated reviews - user trust in reviews is mediated by signals and factors of the reviewer.....	188
Figure 6.4: Framework of user trust on systems that provide user-generated reviews - effects of the user's dispositional trust.....	190
Figure 6.5: Framework of user trust on systems that provide user-generated reviews - effects of the user's own personality.....	191
Figure 6.6: Framework of user trust on systems that provide user-generated reviews - role of the user's background, review and reviewer in user purchase intention .	192
Figure A.1: Constructed reviews presented in the first study.....	212
Figure B.1: Food photo 1 (mean perceived food quality =2.92).....	225
Figure B.2: Food photo 2 (mean quality =2.69).....	226
Figure B.3: Food photo 3 (mean quality = 3.18) (Note: photo chosen for positive food photo condition).....	226
Figure B.4: Food photo 4 (mean quality = 2.31).....	227
Figure B.5: Food photo 5 (mean quality = 2.58).....	227
Figure B.6: Food photo 6 (mean quality = 2.52).....	228
Figure B.7: Food photo 7 (mean quality = 2.33).....	228
Figure B.8: Food photo 8 (mean quality = 2.18) (Note: photo chosen for negative food photo condition).....	229
Figure B.9: Food photo 9 (mean quality = 2.62).....	229
Figure B.10: Food photo 10 (mean quality = 2.68).....	230
Figure B.11: Atmosphere photo 1 (mean atmosphere quality =2.51) (Note: photo chosen for positive atmosphere photo condition).....	232
Figure B.12: Atmosphere photo 2 (mean atmosphere quality = 2.68).....	233
Figure B.13: Atmosphere photo 3 (mean atmosphere quality = 2.95).....	233
Figure B.14: Atmosphere photo 4 (mean atmosphere quality = 3.73) (Note: Photo chosen for positive atmosphere photo).....	234
Figure B.15: Atmosphere photo 5 (mean atmosphere quality =3.65).....	234
Figure B.16: Atmosphere photo 6 (mean atmosphere quality = 3.15).....	235
Figure B.17: Atmosphere photo 7 (mean atmosphere quality = 2.86).....	235
Figure B.18: Atmosphere photo 8 (mean atmosphere quality = 2.94).....	236
Figure B.19: Atmosphere photo 9 (mean atmosphere quality = 3.47).....	236
Figure B.20: Atmosphere photo 10 (mean atmosphere quality = 3.33).....	237

List of Tables

Table 1.1: PhD Research objectives and respective gaps in previous research.....	21
Table 2.1: Signals that can increase user trust in online vendors (from Briggs et al., 2002)	31
Table 2.2: Summary of influential factors on trust and purchase intention suggested by previous work.....	45
Table 3.1: Descriptive statistics of trust factors	64
Table 3.2: Examples of two units of analysis	66
Table 3.3: Interface signals code set.....	69
Table 4.1: Descriptive statistics of participants' dispositional trust (Note: N=799 for dispositional trust and N= 704 for past experience).....	119
Table 4.2: Descriptive statistics of factors measured in trust factors questionnaire.....	120
Table 4.3: Results of normal distribution test of factors measured in trust factors questionnaire (Note: *p<0.05, **p<0.01, ***p<0.001, df = 799 for all factors)	122
Table 4.4: Main effects of review valence (Note: df=1 for all factors, *p<0.05, **p<0.01, ***p<0.001).....	124
Table 4.5: Main effects of community opinions (Note: df=4 for all factors, *p<0.05, **p<0.01, ***p<0.001).....	126
Table 4.6: Perceived review helpfulness at different ratios of community opinions	126
Table 4.7: Main effects of photo presence (Note: df=1 for all effects, *p<0.05, **p<0.01, ***p<0.001).....	128
Table 4.8: Main effects of photo type (Note: df = 1 for all effects, *p<0.05, **p<0.01, ***p<0.01)	128
Table 4.9: Main effects of photo valence (Note: df=1 for all effects, *p<0.05, **p<0.01, ***p<0.01)	129
Table 4.10: Correlations between participants' background with the influential factors on trust, trust and purchase intention (Note: N=799 for all correlations of dispositional trust, N=704 for all correlations of past experience, *p<0.05, **p<0.01, ***p<0.001, significant correlations are indicated by bold font)	130
Table 4.11: Interplay between the factors that can influence trust and their effects on trust and purchase intention (Note: N=799 for all correlations, *p<0.05, **p<0.01, ***p<0.001).....	130
Table 5.1: Descriptive statistics of participants' background (Note: N = 28 for dispositional trust, paste experience and all personality traits).....	145
Table 5.2: Descriptive statistics of data collected in the perceived personality and trust factors questionnaire (Note: N = 84 for all personality traits and trust factors).	146
Table 5.3: None-independence within dyads (Note: *p<.05, **p<.01, ***p<.001, N=84 for all traits and factors, Number of items for all traits and factors = 2, 95% Confidence Interval of lower and upper bound)	149
Table 5.4: Example of person mean centering.....	151
Table 5.5: Results of normal distribution test of data of perceived reviewer personality traits and perceived trust factors (Note df = 84 for all perceived personality traits and trust factors; *p<.05, **p<.01, ***p<.001).....	152
Table 5.6: Descriptive statistics of perceived similarity in personality traits (Note: N=84 for perceived similarity in all personality traits)	153
Table 5.7: Results of normal distribution test of participants' background and their average ratings of trust factors (Note: df = 28 for participants' dispositional trust, past experience, personality traits, average ratings of perceived trust factors, average ratings of trust in reviews and purchase intention, *p<.05, **p<.01, ***p<.001)	155
Table 5.8: Personality traits code set.....	157

Table 5.9: Interface signals code set.....	159
Table 5.10: Correlations between reviewer's perceived personality traits with trust factors, trust and purchase intention (Note: correlations are reported in Spearman rho r_s values and significance reported between brackets, * $p < .05$, ** $p < .01$, *** $p < .001$, N=84 for all correlations, significant correlations are indicated by bold font).....	161
Table 5.12: Number of participants mentioning interface signals in assessing Extraversion (E), Conscientiousness (C), Agreeableness (A), Neuroticism (N) and Openness to experience (O) personality traits.....	168
Table 5.13: Correlations of participants' background with trust factors, trust and purchase intention (Note: correlations are reported in Spearman r_s values and significance reported between brackets, * $p < .05$, ** $p < .01$, *** $p < .001$, N=28 for all correlations, significant correlations are indicated by cells with bold font).....	177
Table 6.1: Overview of research objectives, studies that addressed research objectives, research questions and findings.....	184
Table A.1: Reviews and manipulated factors in the first study	208
Table A.2: Descriptive of participants' ratings in high and low review quality conditions, high and low reviewer's expertise conditions and high and low reviewer's bias conditions	218
Table A.3: Ranks of participants' ratings in high and low review quality conditions, high and low reviewer's expertise conditions and high and low reviewer's bias conditions	219
Table A.4: Test statistics	219
Table B.1: Statics summary of equivalence test	222
Table B.2: TOST equivalence test (output-1)	223
Table B.3: TOST equivalence test (output-2	223
Table B.4: T-test result of difference between chosen positive food photo and negative photo in perceived food quality.....	230
Table B.5: T-test result of difference between chosen positive food photo and negative photo in perceived food quality.....	237
Table B.6: Effects of review valence - ranks	247
Table B.7: Effects of review valence - test statistics	247
Table B.8: Effects of community opinions - ranks	248
Table B.9: Effects of community opinions - statistics	248
Table B.10: Effects of photo presence - ranks	249
Table B.11: Effects of photo presence - statistics.....	249
Table B.12: Effects of photo presence - ranks	250
Table B.13: Effects of photo presence - statistics.....	250
Table B.14: Effects of photo valence - ranks	251
Table B.15: Effects of photo valence - statistics.....	251

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Declaration

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Abstract

With the growing number of systems that provide user-generated reviews the relationship between users and vendors, particularly unfamiliar vendors, is changing. Users are increasingly using online reviews for assessing vendors' services prior to purchasing them. However, users might be uncertain how much to trust reviews because most users are unfamiliar with reviewers and reviews might not be credible. Thus, it is becoming increasingly important to understand which reviews are trusted by users when they make purchase decisions and why.

Previous work has suggested that factors of the review and reviewer - perceived review valence, quality, helpfulness, accuracy, perceived reviewer's expertise and bias - influence user trust. It has also suggested that interface signals, such as the total number of reviews posted by the reviewer, are employed by users when deciding to trust reviews and reviewers as part of their purchase decision-making.

This research aims to advance knowledge regarding user trust in online reviews when making purchase decisions. It first explores how users employ interface signals in their perception of factors of the review and reviewer that influence trust. Second, it clarifies how these factors relate to one another and to trust. It explores the role of new factors - perceived reviewer's personality and personality similarity to the user - that have not been previously considered in trust in online reviews. Third, it demonstrates how the user's own background - dispositional trust, past experience and personality - shapes trust in online reviews. To do so, this research involved three empirical studies, two of which were lab-based studies that collected qualitative and quantitative data and one online study that collected quantitative data.

The findings show that there are two categories of interface signals, review-related and reviewer-related that matter in trust. Review-related signals seem more important not only in trust overall, but also are employed by users to perceive factors of both review and reviewer that influence trust more so than reviewer-related signals.

Regarding the interplay between the factors that have been suggested to influence trust, it seems that user perception of these factors are related to one another. The perceived quality and helpfulness of the review seem to be most related to the perceived reviewer's expertise and the perceived review accuracy seems to be most related to perceived reviewer's bias. While all these factors relate to trust, factors of the review seem to have a more significant role. The findings also show that the perceived reviewer's personality relates to trust and factors that can influence trust. For instance, the reviewer's perceived high conscientiousness is related to high perceived review quality, high perceived reviewer's expertise and high trust. The perceived reviewer's personality similarity to the user seems to play a weaker role in trust than the perceived reviewer's personality.

The user's own background seems to have a significant role in shaping trust in online reviews. High dispositional trust, extraversion and neuroticism are related to high perceived review quality, accuracy, high perceived reviewer's expertise and high trust. The user's positive past experience of using online reviews is related to high willingness of making a purchase based on reviews.

This research makes several theoretical and practical contributions. It builds on previous work on user trust in online reviews and vendors, and the perception of personality. The findings point the way towards a framework of trust relationships in systems that provide user-generated reviews. Also, the findings have design implications because they show which and how interface signals can influence trust.

1 Introduction

With the growing number of systems that provide user-generated reviews, such as TripAdvisor and Yelp, the ways in which users interact with online vendors, particularly with unfamiliar vendors, in the context of eCommerce has changed. Today, many users do not interact with unfamiliar vendors directly; rather, they search for reviews written by other users (i.e. reviewers) about their experiences with these vendors' services prior to purchasing. It has been reported that 30% of U.S. consumers read online reviews as part of the plethora of information they access to inform their purchase decisions (Simonson & Rosen, 2014). Furthermore, a report by Compete (2006) suggests that over 50% of travel consumers read online reviews about hotels and restaurants prior to making a purchase. Users tend to perceive independent sources of information, such as online reviews, as more credible than sources of information provided by vendors such as advertisements. With increasing use of online reviews come new forms of online trust relationships in which users' trust in unfamiliar vendors is becoming mediated by trust in the reviews, the reviewers, or possibly both.

1.1 User Trust in Online Vendors

A substantial body of previous work on user trust—defined as the “**willingness to be vulnerable based on positive expectations about the actions of others**” (Riegelsberger et al., 2005)—in the field of human–computer interaction (HCI) is within the context of eCommerce (e.g. Egger, 2001; Grabner- Kräuter & Kaluscha, 2003). This work has shown that a lack of user trust, or insufficient trust, in online vendors can deter users from making purchase decisions. Online purchases are transactions that involve risks and uncertainty. People may perceive risk and

uncertainty due to the limited information available when shopping online (Souza & Dornelas, 2008; Xu, 2014; McKnight et al., 2002a) or because of the separation in time and place, i.e. the exchange of money for purchased services may not happen simultaneously (Riegelsberger et al., 2005). Thus, online purchases are more likely when users trust the vendors. This, in turn, has led to research into ways of motivating online user purchases, by investigating what increase user trust in online vendors (Briggs et al., 2002). For example, seals of approval are a form of information embedded in the online interface that have been suggested to increase trust (Tan & Theon, 2000).

In addition, it has been shown that user trust in online vendors can be influenced by the user's own background. Notably, users' disposition to trust, their past experiences, and their personalities have been reported to influence not only their trust in online vendors but also their purchase intentions. Users with high dispositional trust (McKnight et al., 2002a), positive past experiences (Pavlou & Gefen, 2004), and particular personalities, such as extraverted personalities (Lumsden & MacKay, 2006), tend to have more trust in online vendors and are more willing to make purchases from online vendors.

Given the variety of factors that contribute to trust, it has been suggested that trust is a multi-dimensional concept which can be shaped by factors that relate to both the vendor (trustee) and the user (trustor) (McKnight et al., 2002a,b). Previous work (e.g. Riegelsberger et al., 2005) has emphasized the importance of understanding trust and how it is shaped, not only because it determines user purchase but also because it determines the success of eCommerce technology overall. The widely reported lack of trust in eCommerce can lead users to "stay away" from the technology altogether (Suh & Han, 2003; Grabner- Kräuter & Kaluscha, 2002; Egger, 2001).

1.2 User Trust in Online Reviews

The exchange of information about service providers between users via the Internet is called electronic word of mouth (eWOM). eWOM is characterised by either positive, neutral or negative information regarding the consumption experience (King et al., 2014). While there are various types of eWOM such as comments on social networking sites (Chu & Kim, 2011; Ladhari & Michaud, 2015), forums, blogs (See-To & Ho, 2014; Lin et al., 2012) and reputation metrics (i.e. rating scales) (Ye et al., 2011), the focus of this research is solely on online reviews as they represent a popular type of eWOM (Simonson & Rosen, 2014). In this PhD research, an online review is defined as the **textual and/or visual information generated by a user regarding her consumption experience with a particular vendor, publicly communicated on systems that provide user-generated reviews such as TripAdvisor and Yelp.**

Online reviews are likely to influence users to purchase from unfamiliar vendors when users trust the reviews, the reviewers, or possibly both. However, there are two issues that can decrease users' trust in reviews and reviewers. First, unlike traditional word-of-mouth which includes a direct relationship between the source and receiver, such as friends or family members, the context of online reviews usually lacks the connection between the sender (i.e. reviewer) and receiver (i.e. user who is seeking for information to make informed purchase decision). This means that that most users are not familiar with reviewers, which in turn can make it difficult for users to establish trust in the reviewers and reviews (Xu, 2014; Lis, 2013). Also, systems that provide user-generated reviews tend to lack a standard mechanism for assessing the credibility of reviews and have therefore been criticized for providing reviews that

might not be credible (Kobayashi et al., 2015; Ku et al., 2012). Consequently, user trust in online reviews has gained the interest of researchers, leading them to investigate which reviews are trusted by users and why (e.g. Riasanow et al., 2015; Lee et al., 2008; Li & Tang, 2010).

Whilst previous studies have investigated user trust in online reviews, there are three gaps in the previous work that restrict the understanding of what leads users to trust online reviews when making purchase decisions. These gaps are related to (i) interface signals that users employ when trusting reviews (ii) the interplay between the factors that have been suggested to influence trust and the role of new factors, and (iii) the effect of the user's own background on their trust in online reviews.

First, it has been suggested that users look for signals from the interface when determining whether to trust reviews. Signals in this thesis are defined as **information available in the interface, whether visual or textual, such as a profile photo, that matters in trust**. Whilst previous work has identified some interface signals that can affect trust (e.g. Riasanow et al., 2015; Xu, 2014), it is unclear how users employ interface signals in their perception of different factors that can influence trust, such as perceived review quality and reviewer's expertise. Thus, this research explores the relationship between the information available in the interface (i.e. interface signals) and the perceived factors that influence trust. It is important to note that this research investigates signals that are related either directly to the review or the reviewer but it does not investigate signals of the vendor's reputation such as rating scales. Rating scales have been already investigated in previous work (e.g. Ladhari & Michaud, 2015; Ye et al., 2011; Ogut & Tas, 2012) and they have been shown to influence both the users' purchase decisions and their trust in the posted reviews.

Second, previous research has examined factors related to the review and reviewer that can influence users' trust. Factors in this thesis are defined as **psychological constructs that might not be directly observable and require user interpretation**. These factors indicate the perceived trustworthiness of the review: perceived review valence (Kobayashi et al., 2015; Riasanow et al., 2015), quality (Lee et al., 2008), helpfulness, and accuracy (Li & Tang, 2010); and the perceived trustworthiness of the reviewer: perceived reviewer's expertise (Sun et al., 2011; Smith et al., 2005) and bias (Connors et al., 2011). The existing literature provides insights into the way some of these factors may relate to one another and to trust. For example, high perceived reviewer's expertise could lead to reviews being perceived as more helpful (Cheung et al., 2008) and also lead to higher trust (Smith et al., 2005). However, previous work has not investigated the interplay between all the factors that can influence trust. This represents a gap that is addressed by this research, motivated by the suggestion that trust is complex and influenced by a combination of factors that can relate to one another (e.g. Riegelsberger et al., 2005).

Furthermore, the current understanding of trust in online reviews can be broadened by integrating new factors that have not been considered before: perceived reviewer's personality and personality similarity. Perceived personality has been shown to be relevant to persuasion in the context of online movie reviews (Mohammadi et al., 2013), and perceived personality similarity has been shown to influence real-life relationships such as friendships, romantic relationships, and marriage that might include trust (e.g. Selfhout et al., 2009; Selfhout et al., 2010; Byrne, 1961). Thus, the effects of these new factors might extend to user trust in online reviews and the factors that have been suggested to influence trust.

Third, the user's own background has not been investigated in relation to trust in online reviews. Previous work on trust in eCommerce has shown that the users' background in the form of dispositional trust, past experience, and personality is relevant to the level of trust that users place in vendors (e.g. McKnight et al., 2002a; Lumsden & MacKay, 2006). However, the role of the users' background regarding trust in online reviews has not yet been investigated.

Figure 1.1 shows the three gaps in previous work that are addressed in this research in an effort to advance the knowledge regarding user trust in online reviews when making purchase decisions

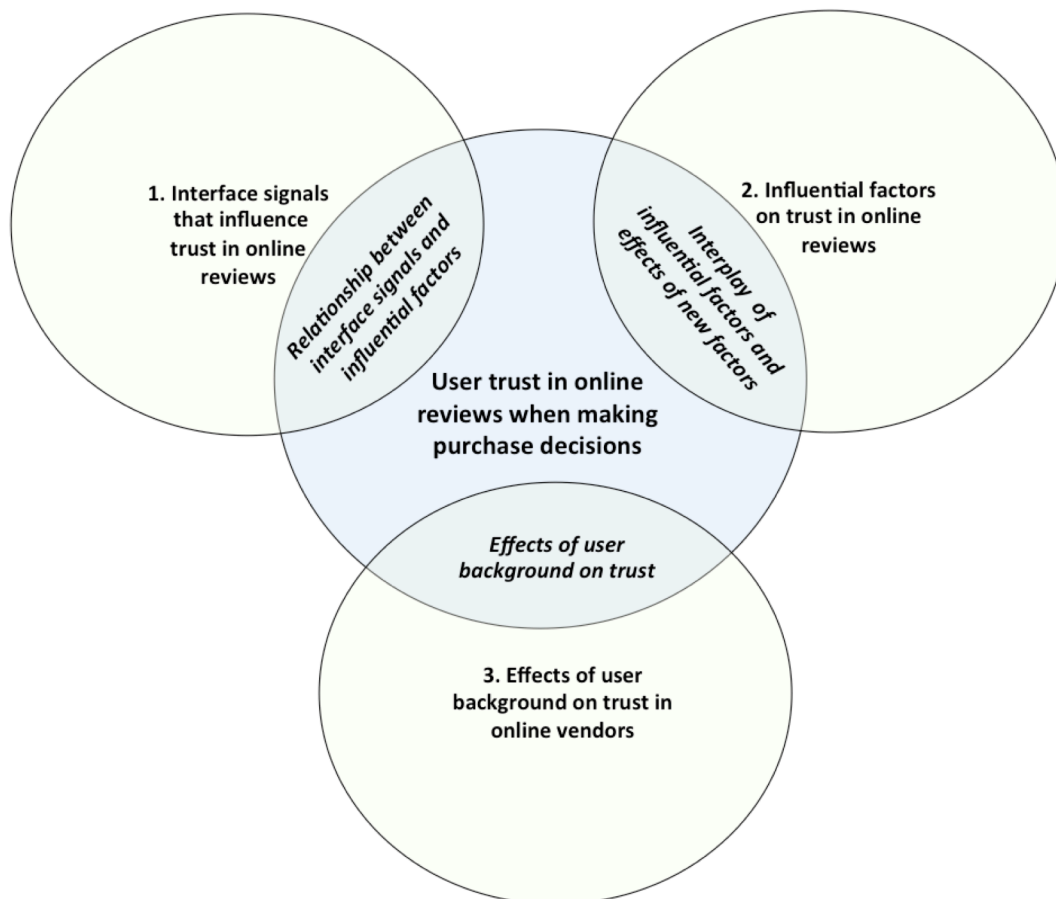


Figure 1.1: Overview of gaps addressed in this research (1) relationship between interface signals and influential factors on trust in online reviews (2) interplay of factors that have been suggested to influence trust in online reviews and the effects of new factors (i.e. perceived personality and personality similarity) on trust in online reviews (3) Effects of user background on trust in online reviews

1.3 Research Aim and Objectives

This research aims to advance knowledge regarding user trust in online reviews when making decisions to purchase from unfamiliar vendors. In doing so, it addresses the following overall research question:

What leads users to trust online reviews and make purchase decisions based on online reviews?

This research question is addressed by investigating user trust in online reviews when making purchase decisions based on review-related and reviewer-related factors. These factors are perceived by users through attending to interface signals. The effects of the user background are also explored. Three research objectives are developed and investigated in order to address the overall research question.

Objective 1: To investigate interface signals that matter in user trust in online reviews when making purchase decisions.

First, this research aims to identify the role of interface signals in trust in online reviews. To do so, it explores how users employ signals from the interface in their perception of the factors that influence trust. User assessment of vendors on systems that provide user-generated reviews is a situation of information asymmetry: the reviewer has more knowledge about the service quality than the user has (Utz et al., 2012). This, in turn, can lead users to seek signals when deciding to trust the reviews.

Objective 2: To investigate the perceived review-related and reviewer-related factors that influence user trust in online reviews when making purchase decisions and the interplay between these factors.

Second, this research investigates how the previously suggested factors, perceived review valence, quality, helpfulness, and accuracy and perceived reviewer’s expertise and bias, relate to one another and to trust in combination. It also explores whether user trust in online reviews can be influenced by other factors not previously considered, such as perceived reviewer’s personality and personality similarity, and how these new factors relate to factors that have been previously suggested to influence trust.

Objective 3: To investigate the way that a user’s background shapes user trust in online reviews when making purchase decisions.

Third, this research investigates how the users’ own background shapes their trust in online reviews. The users’ dispositional trust, past experience, and personality have been shown to influence trust in online vendors (McKnight et al., 2002a; Lumsden & MacKay, 2006) and these effects can extend to trust in online reviews. Table 1.1 shows the relationships between the objectives of this PhD research and the gaps in previous research.

Objective	Gap
1) To investigate interface signals that matter in user trust in online reviews when making purchase decisions.	1) Lack of knowledge about the way users employ interface signals in their perception of different factors that can influence trust in online reviews.
2) To investigate the perceived review-related and reviewer-related factors that influence user trust in online reviews when making purchase decisions and the interplay between these factors.	2) Lack of knowledge about the relationships between the factors that have been suggested to influence trust in online reviews and the role of new factors
3) To investigate the way that a user’s background shapes user trust in online reviews when making purchase decisions.	3) Lack of knowledge about the role of the user’s own background in trust in online reviews.

Table 1.1: PhD research objectives and respective gaps in previous research

1.4 Contributions

This research contributes to the work on user trust in online reviews in several ways. These contributions are listed according to the respective objectives.

Objective 1:

- Exploring interface signals that can influence user trust in online reviews (in chapter 3).
- Identifying interface signals that matter in the perception of the trustworthiness of the review and the reviewer (in chapter 3).
- Clarifying the effects of review-related signals (community opinions and user-generated photos) on trust in online reviews and purchase intention (in chapter 4).
- Identifying interface signals that matter in the perception of reviewer's personality (in chapter 5).

Objective 2:

- Clarifying the interplay between perceived review valence, quality, helpfulness, and accuracy and reviewer's expertise and bias and the way these factors relate to trust in online reviews and purchase intention (in chapters 3 and 4).
- Demonstrating the role of reviewer's perceived personality and personality similarity to the user in user trust in online reviews and purchase intention (in chapter 5).

Objective 3:

- Demonstrating how user's dispositional trust influences the use of interface signals as trust signals (in chapter 3).

- Clarifying the role of user's dispositional trust and past experience in trust in online reviews and purchase intention (in chapters 4 and 5).
- Demonstrating the role of the user's own personality in trust in online reviews and purchase intention (in chapter 5).

1.5 Thesis structure

This research addresses three objectives: the relationship between interface signals and trust in online reviews; the perceived review-related and reviewer-related factors that can influence trust and the interplay between these factors; and, finally, the role of the user's background in trust in online reviews. Chapter 2 presents the foundation of this research by reviewing previous relevant research. Chapters 3, 4, and 5 present three studies conducted in the course of this research. While all three studies investigated what leads users to trust online reviews when making purchase decisions, they differed in emphasis. Study 1 (chapter 3) explored signals of trust in online reviews and the results show that signals relating to the review play a more important role in trust in online reviews than signals relating to the reviewer. The results also show that users tend to seek signals to perceive the reviewer's similarity to themselves and that this perception can transfer onto trust in the reviews. Study 1 also primarily explored the interplay between the factors that can influence trust and their effects on trust. Study 1 formed the basis for study 2 (chapter 4) and study 3 (chapter 5).

Study 2 focused on the way review-related signals can affect trust. It also addressed the interplay of the factors that can influence trust and the way these factors relate to trust through a larger scale quantitative investigation than study 1.

Study 3 (chapter 5) focused on the relationship between the perceived reviewer's personality and personality similarity to the user and trust in online reviews. The user's background was taken into account throughout the three studies. The combined findings of the three studies clarify the new forms of trust relationships between the user, the reviewer, and the vendor on systems that provide user-generated reviews.

Chapter 2 presents a review of previous work related to this research area. The chapter consists of two parts. A substantial body of previous work on user trust in the HCI field is within the context of eCommere; thus, the first part reviews previous work on trust within this context. In doing so, the first part clarifies the concept of trust and explains how user trust in online vendors can be influenced by interface signals and the user's own background. The second part reviews previous work on trust in eWOM and online reviews and describes the factors as well as interface signals that can influence user trust in online reviews.

Chapter 3 presents the first study of the research reported in this thesis. This study followed a factorial design approach and gathered qualitative and quantitative data to explore interface signals that matter in user trust (objective 1). It outlines how users employ interface signals in their perception of the trustworthiness of the review (i.e. perceived review quality, helpfulness, and accuracy) and the trustworthiness of the reviewer (i.e. perceived reviewer's expertise and bias). It also shows how the user's background in the form of dispositional trust affects the use of interface signals (objective 3). In line with objective 2, this study provides an initial qualitative exploration of the interplay between the factors that can influence trust and the way these factors affect trust.

Chapter 4 presents the second study of this research. This study also followed a factorial design approach. It was conducted online and collected quantitative data to investigate the effects of review valence, community opinions about the review, and user-generated photos on user trust in online reviews and purchase intention. This study investigated the effects of review valence, which was not taken into account in study 1 (objective 2). The effects of community opinions and user-generated photos were investigated based on the findings of study 1, which suggested the importance of these signals regarding trust (objective 1). This study also shows how the user's background in the form of dispositional trust and past experience shape user trust in online reviews and purchase intention (objective 3). Finally, this study clarifies the interplay between factors that can influence trust and how these factors relate not only to trust but also to purchase intention (objective 2).

Chapter 5 presents the third study of this research. This study followed a round robin design approach and collected both qualitative and quantitative data to explore how users perceived the reviewer's personality based on interface signals (objective 1) and how the perception of the reviewer's personality and personality similarity to the user relate to trust in online reviews and purchase intention (objective 2). This study also shows how the user's own personality, as part of the user's background, shapes trust in online reviews and purchase intention (objective 3).

Chapter 6 summarizes the research reported in this thesis. It revisits the contributions of the empirical studies and shows how the findings of the studies point the way towards a framework that explains user trust on systems that provide user-generated reviews. It also revisits the design implications, point out the limitations of the research and directions of future work and finally, it concludes with final comments.

2 Background

This chapter provides the background to the research reported in this thesis and consists of two parts. The first part provides a review of previous work on user trust in online vendors (section 2.1). It defines the concept of trust and differentiates trust from related concepts such as reliance and assurance (section 2.1.1). Section 2.1.1 also differentiates trust as an internal state of the user from the perception of trustworthiness as well as from trusting decisions. Section 2.1.2 describes how user trust in online vendors can be affected by signals in the interface. It provides an overview of trust signals in online vendors and the different types of signals. Finally, section 2.1.3 reviews previous studies that have emphasized the role of the user's background, i.e. dispositional trust, past experience, and personality, in shaping user trust in online vendors.

The second part of this chapter focuses on user trust in eWOM and online reviews (2.2). It discusses the review-related factors (section 2.2.1) and reviewer-related factors (section 2.2.2) that have been suggested to influence user trust in online reviews and the way that these factors can relate to one another. Section 2.2.3 explains why user trust in online reviews can be affected by the perceived reviewer's personality and personality similarity to the user, which have not been previously considered regarding trust in online reviews. Section 2.2.4 reviews interface signals that have been suggested to influence user trust in online reviews. Finally, section 2.2.5 provides an overview of user trust in systems that provide user-generated reviews.

2.1 User Trust in Online Vendors

2.1.1 What is User Trust?

Trust is a difficult construct to investigate because it is hard to define (Briggs et al., 2002). Understanding user online trust requires taking into account various considerations such as the message, the source, and the channel. Previous work by Tan and Theon (2000) suggests that user trust relates to the processes upon which the user must rely in order to complete a transaction, as well as relating to the agent with which the user is dealing. Other work (e.g. Briggs et al., 2000) has suggested that trust is related to dependability, faith, predictability, reputation, and familiarity as well as expectation of the outcomes. Egger's (2000) view of trust combines these different views. Egger (2000) suggests that trust is first related to the user's knowledge of the domain and the reputation of the vendor. Second, trust is related to the initial impression of the vendor based on the interface (e.g. layout). Third, trust is related to the user perception of the quality of the content offered on the site.

The term "trust" is often used interchangeably with or perhaps confused with "reliance" and "assurance", both in everyday language and in academic research papers (Grabner-Kräuter et al., 2006). Thus, in order to clarify the investigation of this research, trust should be differentiated from these concepts. First, regarding trust and reliance, authors including Flechais et al. (2006) and Riegelsberger et al. (2005) suggest that the difference between these two concepts could depend on the stage of interaction between the trustor (i.e. the actor who is trusting) and the trustsee (i.e. the actor who is being trusted). Trust is of particular importance in the early stage of transactions, i.e. user first-time interaction with an online vendor. Reliance arises after

the trustor's engagement in the transaction, meaning that the user forms an impression of whether the vendor is reliable based on the outcomes of the transaction.

Second, regarding trust and assurance, Riegelsberger et al. (2005) and Flechais et al. (2006) differentiate assurance from trust by suggesting that assurance refers to contextual factors that lead the trustee to behave in a trustworthy manner, i.e. fulfilling the trustor's needs. An example of a contextual factor is institutional embeddedness, which refers to organisations such as consumer rights groups and ethics committees or institutions that have the authority to sanction untrustworthy behaviour.

Work on trust in the HCI field, such as the current research, has relied on definitions from the social sciences and has suggested that there are two crucial aspects of trust. First, trust includes two actors: the trustor and the trustee. Second, trust is required in situations that involve a level of uncertainty regarding the outcome that matters to the trustor. The trustor's uncertainty arises because the outcome depends on the behaviour of the trustee and the trustor has limited control over the outcome. The most common definition of trust used in the HCI field is as follows:

“Trust is the willingness to be vulnerable based on positive expectations about the actions of others” (Riegelsberger et al., 2005)

Given the definition stated in italics, trust has been viewed as an internal state of the trustor (McKnight et al., 2002a,b; Flechais et al., 2006; Lumsden, 2009; Riegelsberger et al., 2005; Wang & Emurian, 2005). To understand trust, it must be differentiated from (i) the **perception of trustworthiness**, which is an antecedent of trust, and (ii) the **trusting decision** which is an outcome of trust.

In the eCommerce context, it has been suggested that the look and feel of a website play significant roles in user perception of a vendor's trustworthiness (Briggs

et al., 2002). The perception of trustworthiness, in turn, can influence trust. Users tend to have high trust in the vendor when the vendor is perceived as trustworthy. However, user perception of trustworthiness might be inaccurate, and this, in turn, can lead to misplaced trust (Riegelsberger et al., 2005). Technology-mediated transactions might not include a large amount of information to help the trustor in their assessment of trustworthiness. For example, in shopping in physical stores, consumers can assess the vendor's trustworthiness based on the store size and location. They can also assess the staff's skills and motivation based on interpersonal cues (e.g. tone of voice). In contrast, online shopping is missing much of this information available in shopping in physical stores, and this can limit the assessment of the vendor's trustworthiness. Also, as online vendors aim to increase user trust and motivate purchase decisions, online vendors may provide information that increases their perceived trustworthiness rather than reflecting their actual trustworthiness.

In the context of this research, the perception of trustworthiness refers to the impression conveyed to the user about the trustworthiness of the review and the reviewer by interface signals. This perception of trustworthiness can in turn influence trust. For example, users might trust reviews when the review is perceived as trustworthy or when the reviewer is perceived as trustworthy.

Furthermore, trust as a concept must be clearly differentiated from trusting decision. Trusting decision refers to the user's actual behaviour based on her trust. An example of a trusting decision in the eCommerce context is the user making a purchase from an online vendor based on her trust in the vendor (McKnight et al., 2002a; Riegelsberger et al., 2005). It is important to note that even though trust can be viewed as a significant predictor of trusting decisions, trust might not always be sufficient to completely explain the trusting decision. This is because the trusting

decision could be influenced by external factors. For example, a user might have trust in a particular vendor but does not make a purchase from the vendor because of the offered price (Kim & Srivastava, 2007).

In the context of the research reported in this thesis, trusting decision refers to the user purchase of the vendor services based on reviews. The trusting decision can be influenced by trust in the reviews and it is measured by capturing the behavioural intention of the user towards the vendor, i.e. purchase intention.

2.1.2 Signals of Trust in Online Vendors

In the context of eCommerce, information available on the vendor's website has been referred to as signals. These signals can help the trustor (user) to assess the trustee's (vendor's) trustworthiness and therefore can increase trust and eventually lead to a trusting decision (Riegelsberger et al., 2005; Sasse and Kirlappos, 2011). Researchers such as Egger (2001) and Nielsen et al. (2000) have carried out research on what signals should be included in vendors' websites in order to increase user trust and thereby motivate users to make purchase decisions. These guidelines are based on user studies in which participants were asked for quantitative and/or qualitative feedback about aspects of the website that increased their perception of the vendor's trustworthiness. Briggs et al. (2002) provides a useful summary of these signals (Table 2.1).

Guideline	Source
Seals of approval, e.g. TRUSTe	Cheskin Research (1999); Tan & Theon (2000)
Explanations on advice given	Egger (2000)
Independent peer evaluation, e.g. testimonials from customers	Egger (2000); Schneiderman (2000)
Alternative views, i.e. links to independent sources	Schneiderman (2000)
Indicators of expertise and fulfilling past performance	Egger (2000); Fogg et al. (2001); Olson & Olson (2000)
Professional image	Egger (2000); Fogg et al. (2001)
Real world look and feel, e.g. real addresses and photos of real people	Fogg et al. (2001)
Policies of security, privacy, compensation and return	Cheskin Research (1999); Egger (2000); Schneiderman (2000)

Table 2.1: Signals that can increase user trust in online vendors (from Briggs et al., 2002)

Riegelsberger et al. (2005) has categorised the signals of trust in online vendors into two types: symbols and symptoms of trustworthiness. Symbols of trustworthiness act as signifiers of trust-warranting properties or characteristics. Examples of symbols of trustworthiness in the context of eCommerce include trust seals. Despite the fact that such signals represent common ways of signalling trustworthiness, vendors must still ensure that users are aware of the existence of these symbols and understand the meaning of the symbols (Bacharach & Gambetta, 2001). Riegelsberger et al. (2005) discuss how vendors can make use of interpersonal cues such as photos of smiling people as symbols in order to increase the perception of trustworthiness. Accordingly, in the context of this research, a smiling profile photo of a reviewer can be viewed as a symbol of the trustworthiness of the reviewer.

Symptoms of trustworthiness, the second type of signals, are “not necessarily created to signal trust-warranting properties rather they are given off as by-product of trustworthy action” (Riegelsberger et al., 2005). This means that unlike symbols, which are created for the specific purpose of signalling trustworthiness, symptoms are

gained as a consequence of previous trustworthy behaviour. For example, the existence of a large number of testimonials can indicate a high level of trustworthiness of a particular vendor. Because symptoms are obtained by vendors based on trustworthy behaviour, trustworthy vendors, in contrast to untrustworthy vendors, do not need to invest money in order to gain symptoms of trust. In the context of this research, the number of times a review is rated as helpful, referred to in this thesis as “number of helpful votes given to a review”, can be viewed as a symptom of the trustworthiness of the review.

Although this research investigates signals of trust in online reviews, it does not distinguish between symbols and symptoms of the trustworthiness of the review and the reviewer. Rather, it investigates the influence of interface signals on user trust in reviews and how users employ interface signals in their perception of different factors of the trustworthiness of the review (i.e. perceived review quality, helpfulness, and accuracy) and factors of the trustworthiness of the reviewer (i.e. perceived reviewer’s expertise and bias) (chapters 3 and 4).

2.1.3 Effects of User Background on User Trust in Online Vendors

Trust in online vendors has also been shown to be affected by the user’s own background, in the form of **dispositional trust**, **past experience**, and **personality**. However, the effects of user background in the context of online reviews have not been investigated, a gap that is addressed in this research (objective 3). The following sections discuss the role of user background in user trust in online vendors.

2.1.3.1 Dispositional trust

Dispositional trust is a general type of user belief defined as “the extent to which one displays a consistent tendency to be willing to depend on others across a

broad spectrum of situations and persons”. Dispositional trust affects user perception of the reliability of others, and it can be shaped by a user’s cultural background and personality type (McKnight et al., 2002a). McKnight et al. (2002a) suggested that dispositional trust involves four dimensions: **integrity**, **competence**, **benevolence**, and **trusting stance**. Integrity refers to the trustor’s perception of the trustee’s honesty. Competence refers to the trustor’s perception of the trustee’s ability to meet the trustor’s needs. Benevolence refers to the trustor’s perception of the trustee’s caring to act in accordance with the trustor’s interests. Finally, trusting stance means that “regardless of what one believes about people’s attributes, better outcomes result from dealing with people” (McKnight et al., 2002a).

McKnight et al.’s (2002a) model of trust suggests that the user’s dispositional trust matters significantly in both the perception of the vendor’s trustworthiness and trust in online vendors. This model is based on quantitative data from investigating what makes users trust service providers, particularly legal advice providers. Their model suggests that dispositional trust has statistically significant effects on the perceived trustworthiness of the vendor as well as on trust in the vendor. These effects mean that users with high dispositional trust tend to perceive the vendor as more trustworthy and also have more trust in vendors compared to users with low dispositional trust.

As dispositional trust has been found to influence the perception of vendor trustworthiness and the trust that a user places in the vendor (McKnight et al., 2002a), its effects may extend to the perception of trustworthiness of the review and reviewer and to trust in the reviews. Accordingly, this research takes user dispositional trust into account in all of the studies (chapters 3, 4, and 5).

2.1.3.2 Past experience

Pavlou and Gefen (2004) explain that a user's past experience is determined by the quality of the user's own encounter with a particular vendor. Past experience is therefore suggested to affect the user's *knowledge-based* trust in the vendor. This means that based on past experience, users can form a general idea about the vendor's performance and become familiar with the "what, who, how, and when" of what is happening during a purchase transaction. Pavlou and Gefen (2004) discuss that the user's past experience with the vendor can influence the user's trusting decision because of two reasons. First, positive past experience reduces the perception of risks and uncertainty involved in the trusting decision, i.e. the online purchase decision. The reduced perception of risk and uncertainty is due to the accumulated prior knowledge about the vendor's performance based on previous encounter. Second, positive past experience leads users to be more willing to make purchase decisions since positive past experience is based on the high quality of previous encounters (i.e. the vendor's fulfillment of the user needs).

Given the effect of the user's past experience on the user's trusting decision in online vendors, it is possible that user past experience of using online reviews can also influence the trusting decision in the reviews. Positive past user experience of using online reviews could be based on the high quality of outcomes of previous trusting decisions in online reviews, i.e. previous purchase decisions based on online reviews. Thus, positive past experience with online reviews might lead users to make a trusting decision in reviews, in contrast to negative past experience. Accordingly, this research investigates the potential effect of users' past experience of using online reviews on the trusting decision in the review, which is measured by capturing the

user behavioral intention towards the vendor, i.e. purchase intention. The effects of user past experience are investigated in study 2 (chapter 4) and study 3 (chapter 5).

2.1.3.3 Personality

Personality refers to the latent construct that accounts for “individuals’ characteristic patterns of thought, emotion and behavior” (Funder, 2001). The literature includes various models that describe personality. The most accepted model is the “big 5 personality traits” (Gosling et al., 2003; Vazire & Gosling, 2004; Selfhout et al., 2009; Mohammadi et al., 2013). In this model, personality is suggested to include five traits:

- *Extraversion*: extraverted, enthusiastic vs. reserved, quiet
- *Conscientiousness*: Dependable, self-disciplined vs. careless, disorganized
- *Agreeableness*: critical, quarrelsome vs. warm, sympathetic
- *Neuroticism*: Anxious, easily upset vs. emotionally stable, calm
- *Openness to experience*: open to new experience, complex vs. uncreative, conventional

Lumsden and MacKay (2006) discuss the role of the user’s personality in trust in online vendors. They suggest that extraverted users tend to perceive vendors as being more trustworthy than introverts do. Tan and Sutherland (2004) developed a multi-dimensional model of trust that shows that four personality traits of the user are relevant to trust in online vendors. Their model suggests that extraversion and openness to new experience are positively related to trust, i.e. individuals who are extraverted and open to new experience tend to have higher trust than introverted and conventional users. In contrast, conscientiousness and neuroticism are negatively

related to trust, meaning high conscientiousness (i.e. dependable and self-disciplined) and high neuroticism (i.e. anxious and easily upset) can decrease trust.

User personality has also been shown to be relevant to trust in recommender systems. In this respect, Goldbeck and Norris (2013) investigated the direct link between the user's personality and user trust in a movie recommender system (i.e. Netflix). Their results show that the user's personality has a significant role not only regarding trust in recommender systems but also regarding the perceived usefulness of the recommendations. Among the five personality traits, the user's conscientiousness seems to be particularly important. Users who are highly conscientious (i.e. dependable and self-disciplined) tend to have more trust in recommender systems and also perceive system-generated recommendations as more useful. This could be because users with high conscientiousness are organised, plan extensively, and are deliberate in their thinking. They therefore might tend to appreciate the recommender system as a way to help them organise their viewing experience (Goldbeck & Norris, 2013). It is interesting to note that the results regarding the effect of the user's own personality, particularly the user level of conscientiousness, in the context of the recommender system contradict the results in the context of eCommerce, in which Tan and Sutherland (2004) have suggested that high conscientiousness can reduce trust. These conflicting results raise questions regarding the effect of user personality on trust in the context of online reviews and whether user conscientiousness has a positive or negative effect on trust. The effects of the user's own personality on trust in online reviews when making purchase decisions are investigated in the third study of this research (chapter 5).

2.2 User Trust in eWOM and Online Reviews

Previous research has investigated different types of eWOM such as online reviews, forums, comments generated on Facebook and rating scales (Utz et al., 2012; King et al., 2014; See-To & Ho, 2014; Ladhari & Michaud, 2015; Ogut & Tas, 2012). It has been suggested that eWOM can influence users' trust in vendors and therefore their purchase decisions since users tend to perceive information posted by their peers as credible. See-To and Ho (2014) discuss that user trust in vendors can develop in online forums where users employ information posted by previous consumers when deciding to trust a particular vendor. In this respect, positive information in online forums can lead to high trust in the vendor. Ladhari and Michaud (2015) have investigated the effects of comments generated on the social networking site Facebook on the choice of a hotel. They found that this type of eWOM has a significant effect on the user's attitude towards the hotel, trust in the hotel and intention to book the hotel. Reputation metrics such as rating scales have been also suggested to influence users purchase of vendor services. In this respect, Ye et al. (2011) found that a 10% increase in the rating of a hotel can lead to 4.4% increase in sales. Ogut and Tas (2012) report that a 1% increase in the hotel rating can increase sales by more than 2.6%.

In addition to online forums, comments on social networking sites and rating scales, it has also been suggested that online reviews play an important part in user perception of and attitude towards vendors. Indeed, a study by Utz (2012) revealed that online reviews can impact the perceived trustworthiness of the vendor, to a even greater extent than assurance seals.

Given the importance of eWOM in users' trust in vendors and their purchase of the vendors' services, previous work has provided implications for vendors regarding

the use of and responding to eWOM. Overall, most previous work has recommended vendors to encourage users to post positive, rather than negative, eWOM in order to increase users' trust and motivate them to make purchase decisions (e.g. Kim et al., 2012). Some previous work suggests that vendors need to identify "social influencers" (Chu et al., 2011) or "opinion leaders" (Ladhari & Michaud, 2015) and encourage them to share positive eWOM. Social influencers or opinion leaders are users who possess a large network of connections such as friends or followers and therefore their opinions might strongly affect users' trust and purchase decision. Ye et al. (2011) and Ladhari & Michaud (2015) suggest that vendors need to respond to negative eWOM in an efficient manner to gain user trust and protect their online images. Finally, Ye et al. (2011) have also suggested that eWOM contains valuable information that can be used by vendors to improve their services and to gain competitive advantages.

Since this PhD research focuses on investigating user trust in online reviews, the following section covers previous work that investigated the factors that can influence user trust in online reviews. User trust in online reviews has captured researchers' interest because online reviews are more likely to influence users to purchase from a vendor when users trust the reviews, or reviewers, or possibly both, but user trust might be restricted because of unfamiliarity with reviewers and lack of credibility of the reviews (Xu, 2014; Kobayashi et al., 2015). A number of factors have been suggested to influence user trust in online reviews and purchase intention (e.g. Lee et al., 2008; Kim et al., 2008; Ku et al., 2012; Racherla et al., 2008). These factors are **perceived review valence**, **quality**, **helpfulness**, and **accuracy**, and **perceived reviewer's expertise** and **bias**. While previous work has provided some insights into the way some of these factors relate to one another and to trust, it has not

taken into account all of these factors together. This represents a gap that is addressed in this research, particularly in study 1 (chapter 3) and study 2 (chapter 4), because user trust can be influenced by a combination of factors that might relate to one another (e.g. Riegelsberger et al., 2005; Briggs et al., 2002) (objective 2).

2.2.1 Review-Related Factors

2.2.1.1 Perceived review valence

Findings of previous studies investigating the effects of user perception of review valence on trust have been inconsistent. Riasanow et al. (2015) suggest that users tend to trust negative reviews more than positive reviews. Given the numerous service providers in the online market place (e.g. hotels), there is a low cost associated with finding alternative service providers. Negative reviews can help users to filter out some of the available choices and therefore might be trusted more than positive reviews. Furthermore, negative reviews are unlikely to be perceived as self-serving, while positive reviews can be seen as self-serving. In contrast, a study by Kobayashi et al. (2015) found that users tend to trust positive reviews more than negative reviews. These contradictory findings suggest that the effect of review valence is still unclear and further work is needed to understand how review valence affects user trust in online reviews.

2.2.1.2 Perceived review quality

Previous work by Lee et al. (2008), Kim and Park (2012) and Racherla et al. (2008) argue that user perception of review quality has a significant role in the trust the user places in a review. The perceived review quality has been suggested to include four dimensions: perceived **understandability**, **sufficiency**, **relevance**, and

reliability (Lee et al., 2008). Perceived understandability refers to the ease with which the content can be understood by the user. Perceived sufficiency refers to the extent to which the content of the review is seen as informative regarding different aspects of the reviewed services. Perceived relevance refers to the extent of congruence between information needed by users and the actual information included in the review, and perceived reliability refers to the “dependability of information” as viewed by the user (Lee et al., 2008). Therefore, high perceived review quality could be characterised by easy-to-understand content, sufficient information about various aspects of offered services, relevant information needed by users for assessing services, and dependability of the included information. In contrast, a review with low perceived quality would be difficult to understand, lack information about the service, and could include irrelevant and unreliable information. Furthermore, Kim & Srivastava (2007) suggest that not all reviews influence the purchase intention as reviews tend to differ in quality. Online reviews are more likely to influence purchase intention when they are perceived as high quality.

Other studies have investigated the effects of perceived review quality on user perception of the usefulness of and trust in systems that provide user-generated reviews. In this respect, Li & Tang (2010) adapted the technology acceptance model (TAM) to the context of systems that provide user-generated reviews. Their model suggests that lack of high quality reviews can negatively impact the user’s perception of the usefulness of such systems because low quality reviews do not help the user assess the vendors and therefore do not aid the purchase decision. Lack of high quality reviews can also decrease user trust in systems that provide user-generated reviews. It is therefore recommended that these systems ensure the quality of posted reviews in order to maintain user trust.

2.2.1.3 Perceived review helpfulness

Previous studies by Connors et al. (2011) and Danescu-Niculescu-Mizil et al., (2009) have emphasized two reasons for the importance of perceived review helpfulness. First, reviews that are perceived as helpful have more impact on purchase decisions than reviews that are perceived to be unhelpful. Second, the helpfulness of reviews can affect user loyalty to the systems that provide user-generated reviews as users tend to continue using systems that provide helpful reviews and therefore facilitate their purchase decisions.

The existing literature provides insights on what can affect user perception of review helpfulness. A qualitative study by Connors et al. (2011) showed that the user's perception of review helpfulness is negatively related to high levels of emotion, i.e. users tend to perceive reviews as helpful when the review includes low levels of emotions. This suggests a relationship between perceived reviewer's bias, which can be indicated by the reviewer being highly emotional (as will be explained in section 2.2.2), and perceived review helpfulness (Ku et al., 2012; Ghose & Ipeirotis, 2011). Furthermore, Ghose and Ipeirotis (2011) propose that the perceived helpfulness of a review can be impacted by the quality of the review, particularly the understandability of the review. Thus, reviews that are easy to understand and do not include spelling and grammatical errors can be perceived as more helpful.

Finally, the reviewer's level of experience has also been shown to be relevant to the perceived helpfulness of the review. Liu et al. (2008) suggest that high levels of perceived reviewer's experience can have a positive effect on the perceived helpfulness of a review because experienced reviewers are perceived as providing more helpful information than inexperienced reviewers. This suggests a relationship between the perceived reviewer's expertise and the perceived helpfulness of the

review since the reviewer's experience represents a dimension of the reviewer's expertise (Kim et al., 2008).

2.2.1.4 Perceived review accuracy

Review accuracy is defined as the exactitude or correctness of the review and the extent to which the review reflects reality about the service being reviewed (Li & Tang, 2010). The perceived accuracy of online reviews has been investigated in relation to user trust in systems that provide user-generated reviews (Li & Tang, 2010) as well as in relation to the helpfulness of reviews (Connors et al., 2010). In Li and Tang's (2010) study, which adapted TAM, they suggest that users tend to trust systems that provide user-generated reviews when the reviews are perceived as accurate.

Connors et al. (2011) suggest that the perceived accuracy of reviews can affect the perceived helpfulness. This means that in order for reviews to help the purchase decision, reviews must first be perceived as accurate.

2.2.2 Reviewer-Related Factors

2.2.2.1 Perceived reviewer's expertise

Reviewer's expertise refers to the user's perception of the reviewer as having knowledge in a particular domain; it has been considered to be an influential factor in user willingness to depend on online information (Kim et al., 2008; Briggs et al., 2002). It has been argued that reviewer's expertise is important because it helps users to identify trustworthy content provided by reviewers with whom they have had no previous interaction (Kim et al., 2008).

Previous work by Sun et al. (2011) hypothesized a model that suggests a direct relationship between the perceived reviewer's expertise and the perceived trustworthiness of the review. Their model proposes that high perceived reviewer's expertise positively increases the perceived trustworthiness of the review, which in turn, increases the likelihood of purchase decision-making.

The effects of perceived reviewer's expertise have been further investigated by Smith et al. (2005), Pan and Chiou (2011), and Cheng and Zhou (2010). These studies show that user perception of the reviewer's expertise matters in both user trust in the reviewer and the purchase intention. Users tend to have more trust in expert reviewers and are more willing to make purchase decisions when the reviewer is perceived as an expert.

2.2.2.2 Perceived reviewer's bias

Reviewer's bias has been suggested as an important factor in user trust in online reviews (Ku et al., 2012; Lai et al., 2010). Biased reviews, referred to as untruthful reviews, are reviews generated by actors other than users who consumed the service. Biased reviews can be either positive or negative. Ku et al. (2012) suggest that positive biased reviews are characterised by the reviewer praising a service without sufficient justification. This kind of biased review could be posted by managers to encourage user purchase. Negative biased reviews are characterised by the reviewer being critical towards a service with a lack of reasoning. This type of biased review could be posted by business competitors. Whether positive or negative, biased or untruthful reviews have been suggested to be difficult to detect by users since these reviews have characteristics similar to genuine reviews.

Previous studies by Connors et al. (2011) and Brown et al. (2007) have suggested that overwhelmingly positivity or negativity of the reviewer can increase

the perceived reviewer's bias. This means that the perception of reviewer's bias can be related to the levels of emotions in the review. It has also been suggested that the perception of reviewer's bias has a negative influence on trust in reviews about services such as hotels and restaurants: trust decreases as the perception of reviewer's bias increases (e.g. Brown et al., 2007).

Another line of previous work has developed algorithms to detect reviewer's bias. In this respect, Ku et al. (2012) suggest that bias can be indicated by the content of the review as well as the reviewer behaviour. In regard to the content, the level of emotion in a particular review in comparison to other reviews can form the basis of identifying bias. Reviewer behaviour can also be used to predict bias. For instance, in the case of hotels, a reviewer posting reviews about hotels of the same brand but located in different cities or countries at the same time, or over a short time period, can indicate that the reviewer is being untruthful (Ku et al., 2012).

Table 2.2 provides a summary of previous studies investigating review-related and reviewer-related factors that can influence user trust and purchase intention.

Category	Factor	Author	Method	Key findings
Review-related	Review valence	Riasanow et al. (2015)	Experimental study gathering quantitative feedback	- Users trust negative reviews more than positive reviews
		Kobayashi et al. (2015)	Experimental study gathering quantitative feedback	- Users trust positive reviews more than negative reviews
	Review quality	Li & Tang (2010)	Survey	- Quality of reviews influences the usefulness of and trust in systems that provide user-generated reviews
		Lee et al. (2008)	Experimental study gathering quantitative feedback from users	- Users depend on and make decision based on high quality reviews. - Low quality reviews do not influence users
	Review helpfulness	Ghose & Ipeiritos (2011) and Hong et al. (2012)	Developing algorithm to predict review helpfulness	- Review helpfulness can be affected by the level of subjectivity (i.e. emotions) in the review. Subjectivity has a negative influence on the perceived helpfulness of the review. - Review helpfulness is related to the readability and linguistic correctness. Helpful reviews tend to be readable and do not include linguistic error
		Liu et al. (2008)		- Review helpfulness can be affected by the reviewer's expertise.
		Connors et al. (2011)	Qualitative interview	- User perception of high level of emotions in the review reflects negatively on the perception of review helpfulness.
	Review accuracy	Li & Tang (2010)	Survey	- The accuracy of reviews is important for user assessment of products and services. - Users tend to trust systems that provide accurate reviews.
		Connors et al. (2011)	Qualitative interview	- Perceived review accuracy can affect the perceived helpfulness of the review
	Reviewer-related	Reviewer expertise	Sun et al (2011)	Hypothetical model
Smith et al. (2005)			Experimental study gathering quantitative feedback	- Reviewer expertise has a positive effect on user trust in the reviewer. High level of perceived expertise leads to high trust in the reviewer. - Reviewer expertise is positively related with the source influence on the user purchase. Users tend to be influence by expert sources.
Cheung et al. (2008)			Survey	- Reviewer expertise has a positive influence on review helpfulness.
Reviewer bias		Brown et al. (2007)	Qualitative interview	- The perception of reviewer bias negatively influences trust in the review.
		Ku et al. (2012)	Developing algorithm to predict reviewer bias	- Biased reviews can be indicated by features of the review, i.e. level of emotions indicated in the review, and also the reviewer's reviewing behaviour.

Table 2.2: Summary of influential factors on trust and purchase intention suggested by previous work

2.2.3 Potential Role of Perceived Reviewer's Personality and Personality Similarity in User Trust in Online Reviews

The research reported in this thesis investigates the potential role of new factors, not previously considered, regarding user trust in online reviews when making purchase decisions. These factors are the perceived reviewer's personality and the perceived reviewer's personality similarity to the user. The following paragraphs review previous work on the perception of personality and personality similarity and provide insights on why these factors might matter in user trust in online reviews.

A line of previous work has investigated the way users perceive each other's personalities online and whether this perception of personalities matches the users' actual personalities. A study by Back et al. (2010) suggests that strangers' perception of a user's personality based on information included on the user's profile page on Facebook can match the user's actual personality. However, not all personality traits of the user seem to be perceived accurately by strangers. The accuracy seemed to be highest for extraversion and openness and lowest for neuroticism, indicating that extraversion and openness were the easiest to assess while neuroticism was the hardest to assess. The accuracy of assessment of conscientiousness and agreeableness was intermediate.

While the perception of personality has not been directly investigated in relation to trust, Mohammadi et al. (2013) have suggested that the perception of personality traits correlates with persuasion in the context of online movie reviews. Their study investigated how a user's perception of the reviewer's personality relates to the reviewer's persuasiveness, that is, the reviewer's influence on the user to watch a particular movie. This was investigated across three modalities: text, audio, and video. The results showed that the perceived reviewer's conscientiousness and neuroticism

are highly correlated with persuasion across the three modalities. High perceived reviewer's conscientiousness and low perceived reviewer's neuroticism increase the reviewer's persuasion. The perceived agreeableness and openness of the reviewer matter in persuasion in text and audio modalities; high perceived agreeableness and high perceived openness increase the reviewer's persuasion. The perceived reviewer's extraversion was the least related to persuasion: high perceived extraversion was not found to affect persuasion. Because the perception of the reviewer's personality is related to persuasion, it might be possible that the perception of reviewer's personality is also related to user trust in online reviews when making purchase decisions.

Users' trust in reviews may also be affected by their perception of the reviewer's personality similarity to themselves. There are two lines of previous work that support this argument. First, previous work from the recommender system literature has shown that similarity has a direct effect on trust: the more similar the recommender is to the user, the higher the user's trust in the recommendation. These studies investigated specific forms of similarity such as demographics (e.g. age, gender, and profession) and taste (Ziegler & Goldbeck, 2007; Bonhard et al., 2006; Goldbeck, 2009). Similarity in gender has also been suggested to impact user uptake of health-related online advice (Sillence et al., 2004; Sillence et al., 2005). Second, previous work from the social psychology literature (e.g. Selfhout et al., 2009) suggests that the perception of personality similarity is important in real-life relationships between individuals, such as cross-sex friendships, romantic relationships, and marriage, and these relationships might include trust.

Taken together, previous work has shown that perceived personality and personality similarity influence user behaviour in various domains, both in human relationships and in human-computer interactions. Thus, the current research takes

these factors into consideration and investigates (i) the way that users perceive the reviewer's personality based on information stated on profile pages on systems that provide user-generated reviews and (ii) whether the perception of reviewer's personality and personality similarity to the user are important in user trust in online reviews when making purchase decisions. These are investigated in study 3 (chapter 5).

2.2.4 Signals of Trust in Online Reviews

User assessment of vendors on systems that provide user-generated reviews is a situation of information asymmetry (Utz et al., 2012; Xu, 2014, Riasanow et al., 2015). A reviewer who has consumed the vendor's service has much more knowledge about the service quality than the user who is seeking information on which to base an informed decision. Signaling theory can be used to explain behavior in this situation. Information asymmetry can lead users to seek signals that help them assess the trustworthiness of the review and the reviewer prior to trusting the review and making the purchase decision.

Previous work (e.g. Riasanow et al., 2015; Kobayashi et al., 2015) has investigated the interface signals that matter in user trust in reviews; however, this previous work paid scant attention to how users use interface signals in their perception of each of the factors that can influence trust: perceived valence, quality, helpfulness, and accuracy of reviews and perceived reviewer's expertise and bias. Furthermore, there have been no previous studies investigating how interface signals influence users' perception of the reviewer's personality, which can affect trust, in the context of online reviews. Together, these represent a gap that is addressed in this research (objective 1). The following paragraphs discuss two types of interface signals: review-related and reviewer-related signals. The former refers to information

that is directly related to the review while the latter refers to information about the reviewer.

2.2.4.1 Review-related Signals

Spelling and structure errors

Spelling and structure errors can negatively impact the understandability of the content of reviews and therefore can decrease user trust in online reviews. Lee et al. (2008) has suggested that understandability is a dimension of review quality that influences trust. High quality reviews are characterized as reviews that are easy to read and understand due to lack of spelling and structure errors.

Review detail

Previous work by Lee et al. (2008) and Kobayashi et al. (2015) has emphasised the importance of the level of detail included in the review. Lee et al. (2008) suggest that reviews that include detailed information are more informative and therefore can be considered higher quality. Furthermore, Kobayashi et al. (2015) suggest that users tend to perceive detailed reviews as more credible than reviews that lack details.

Writing style

According to the conventions of expressing emotions (Reilly & Seibert, 2003; Kim & Gupta, 2012; Riasanow et al., 2015), emotions can be indicated by writing style. Capitals, bold font, and exclamation marks have been suggested as content cues that indicate the reviewer feels strong emotions about the service provider. Riasanow et al. (2015) suggests that high perceived levels of emotion in a review can increase the perceived trustworthiness of the review. This could be because users tend to be emotional when expressing pleasure or dissatisfaction about experiences. Ku et al. (2012) and Connors et al. (2011) suggest a contradicting view. They argue that user

perception of the reviewer as highly emotional can increase the perceived reviewer's bias and therefore can decrease trust. Accordingly, the current literature suggests that the effect of writing style indicating high levels of emotion is still unclear. Thus, more work is needed to better understand how user trust in online reviews is affected by the reviewer's writing style.

2.2.4.2 Reviewer-related signals

Total number of reviews posted by the reviewer

The number of reviews posted by a reviewer could increase the perceived reviewer's expertise (Kim et al., 2008) because a high number of reviews can indicate a high level of experience in the domain of interest. For example, in the context of hotels, a reviewer with a high number of posted reviews demonstrates a high level of experience in regard to consuming hotel services.

Total number of helpful votes given to the reviewer

In addition to the total number of reviews, Kim et al. (2008) suggest that the total number of helpful votes given to a particular reviewer also influences perceived reviewer's expertise. The total number of helpful votes given to the reviewer can indicate the reviewer's assistance – that is the extent to which the reviewer is helpful to other users in assessing vendor services. Kim et al. (2008) suggest that a reviewer is not perceived as having high expertise only by posting large numbers of reviews but that other users must also perceive these reviews as helpful.

Profile photo presence

Xu (2014) suggests that the presence of a profile photo can increase the perceived credibility of the review and trust in the reviewer. Her study suggests that the presence of a profile photo of the reviewer can make the impersonal process of

reading an online review about a service feel more like a “face-to-face” interaction. The positive effect of photos on trust has also been supported by Steinbruck et al. (2002), who suggest that photos increase social presence, defined as the “degree to which a medium allows users to experience others as being physically present”.

2.2.5 Overview of User Trust in Systems that Provide User-Generated Reviews

Figure 2.1 provides an overview of the research reported in this thesis. Overall, this research investigates the way that users employ interface signals in their perception of review-related and reviewer-related factors that can influence trust in online reviews (gap 1). It also focuses on the perceived factors that can influence trust by investigating the interplay between the factors that have been suggested to influence trust and the effect of new factors: perceived reviewer’s personality and personality similarity to the user (gap 2). Finally, it investigates how the user’s own background, in the form of dispositional trust, past experience, and personality, shapes trust in online reviews when making purchase decisions (gap 3).

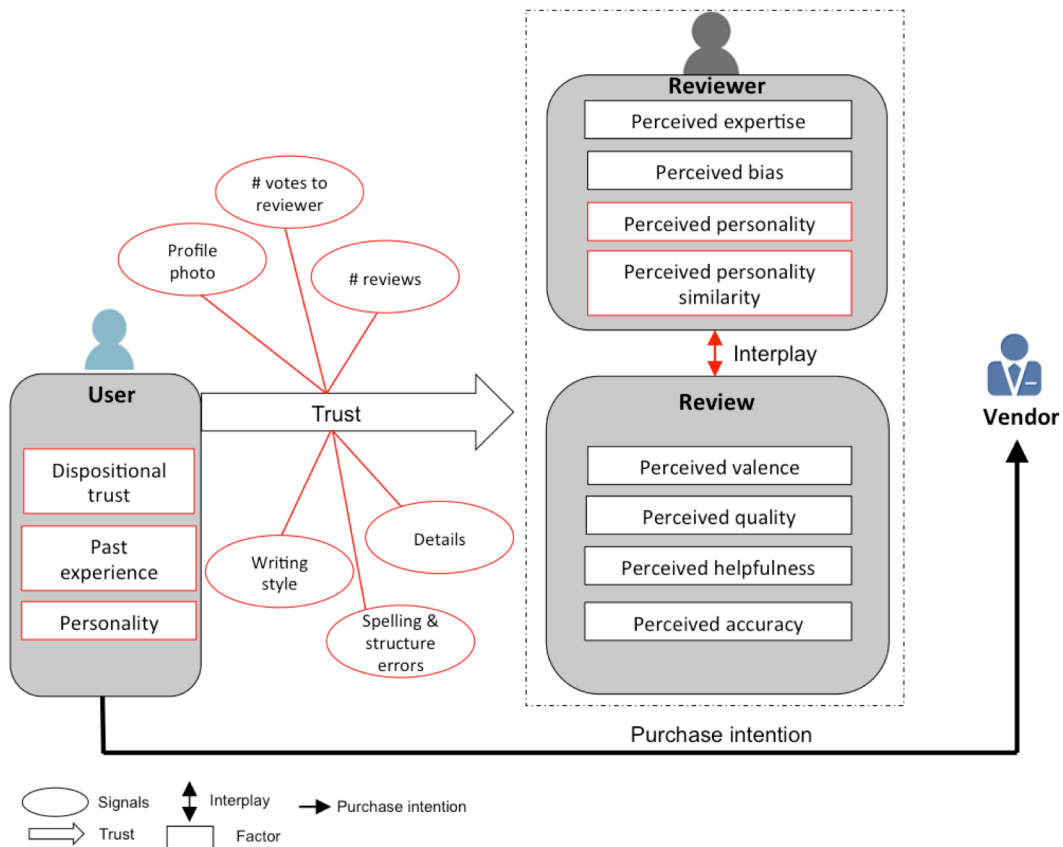


Figure 2.1: Overview of user trust in systems that provide user-generated reviews (Note: Objects in red refer to the literature gaps that are addressed in this research. These gaps are (i) relationship between interface signals and influential factors on trust in online reviews (ii) interplay of factors that have been suggested to influence trust in online reviews and the effects of new factors (perceived personality and personality similarity) on trust in online reviews, and (iii) effects of user background on trust in online reviews)

2.3 Chapter summary

This chapter reviewed the existing literature that is relevant to the research aim and objectives. The first part reviewed previous work on user trust in online vendors. In doing so, it clarified the concept of trust. It also differentiated trust from perceived trustworthiness (which is an antecedent of trust) and trusting decision (which is a consequence of trust). The first part also showed how trust can be influenced by signals from the interface as well as by the user's own background.

The second part of this chapter discussed user trust in eWOM and online reviews. It reviewed the review and reviewer-related factors that have been suggested to influence trust and discussed how new factors, not considered before, might affect trust in online reviews. These new factors are the reviewer's perceived personality and personality similarity. This was followed by reviewing previous work which has investigated interface signals that might affect user trust in online reviews and finally by providing an overview of user trust in systems that provide user-generated reviews.

3 Study 1: Exploring Signals of Trust in Online Reviews

3.1 Motivation & Research Questions

In line with objective 1, this study explored interface signals that influence user trust in online reviews. It explored how users employ signals from the interface in their perception of different factors of the trustworthiness of the review: perceived review quality, helpfulness, and accuracy, and factors of the trustworthiness of the reviewer: perceived reviewer's expertise and bias. This study also took into account the user's background in the form of dispositional trust regarding the use of interface signals in the perception of trustworthiness (objective 3). Accordingly, this study addressed the following research questions:

RQ-1: What interface signals affect user trust in online reviews?

RQ-2: How do users employ interface signals when perceiving the trustworthiness of the review and the reviewer?

RQ-3: How does a user's dispositional trust affect the use of interface signals?

Figure 3.1 provides a visual representation of the investigation of the first study in terms of the interface signals and the effects of the user's background.

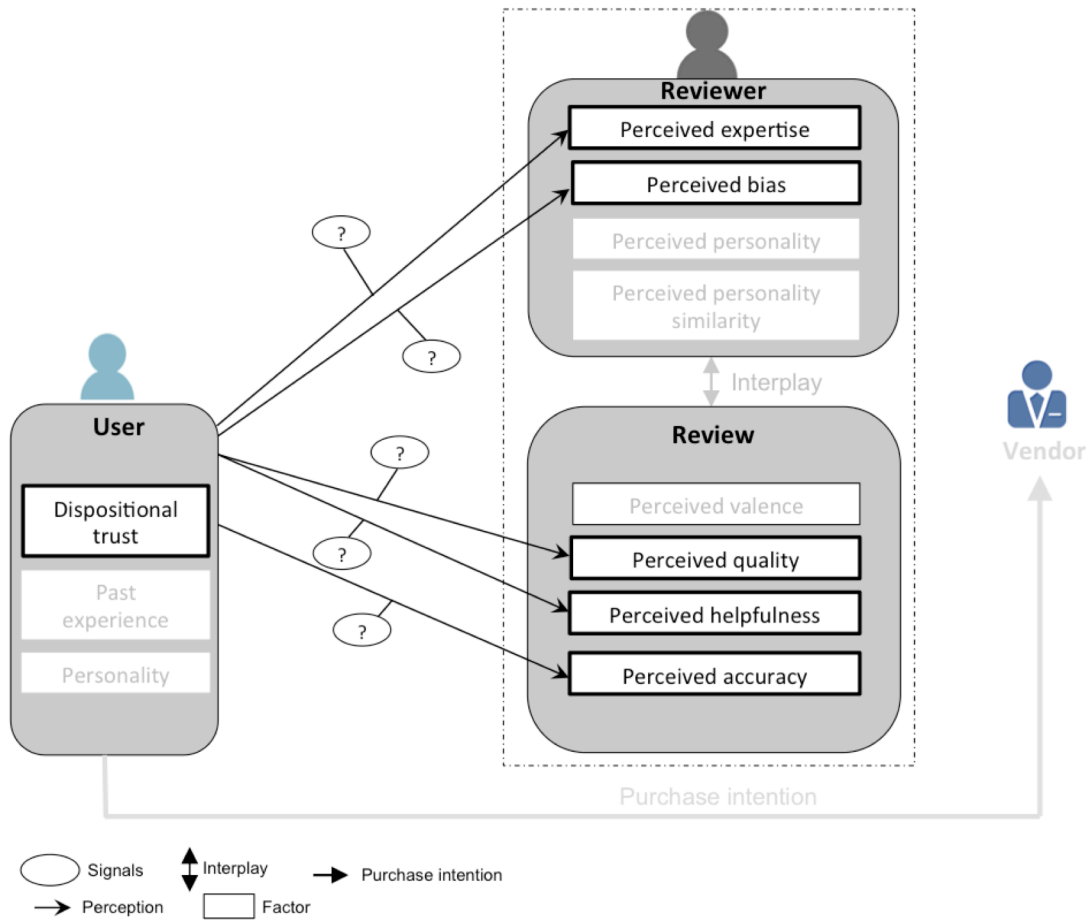


Figure 3.1: Study 1 - investigating interface signals that matter in trust and the perception of the review and reviewer trustworthiness, and the effects of user background (Note: only objects in black are investigated)

Study 1 also explored the way that the factors that can influence trust relate to one another and to trust. Previous work has provided insights about the interplay between these factors. Perceived review quality (Ghose & Ipeiritis, 2011; Lee et al., 2008), reviewer’s expertise (Cheung et al., 2008; Smith et al., 2005), and reviewer’s bias (Connors et al., 2011; Brown et al., 2007) have been suggested to influence the perceived review helpfulness as well as the user trust in online reviews. Because the perceived review accuracy has been shown to be related to the perceived helpfulness of the review (Connors et al., 2011), the perceived review accuracy can also be

influenced by the perceived review quality and the perceived reviewer's expertise and bias.

This study thus investigated how the user's perception of review quality and reviewer's expertise and bias influence the user's perception of review helpfulness and accuracy and the user's trust in the review. Furthermore, this study investigated the influence of perceived review helpfulness and accuracy on user trust in the review. Previous studies have investigated these factors but not jointly, representing a gap that is primarily addressed in this study (objective 2). Investigating these factors in combination is important because it has been suggested that trust is influenced by a combination of factors that might relate to one another (e.g. Riegelsberger et al., 2005). Thus, this study also addressed the following research questions:

RQ-4: How does the user perception of the review quality and the reviewer's expertise and bias influence the perception of the review helpfulness and accuracy and trust in the review?

RQ-5: How does the user perception of the review helpfulness and accuracy influence trust in the review?

Figure 3.2 shows the investigation of this study regarding the interplay between the factors that can influence trust and the way these factors can affect trust.

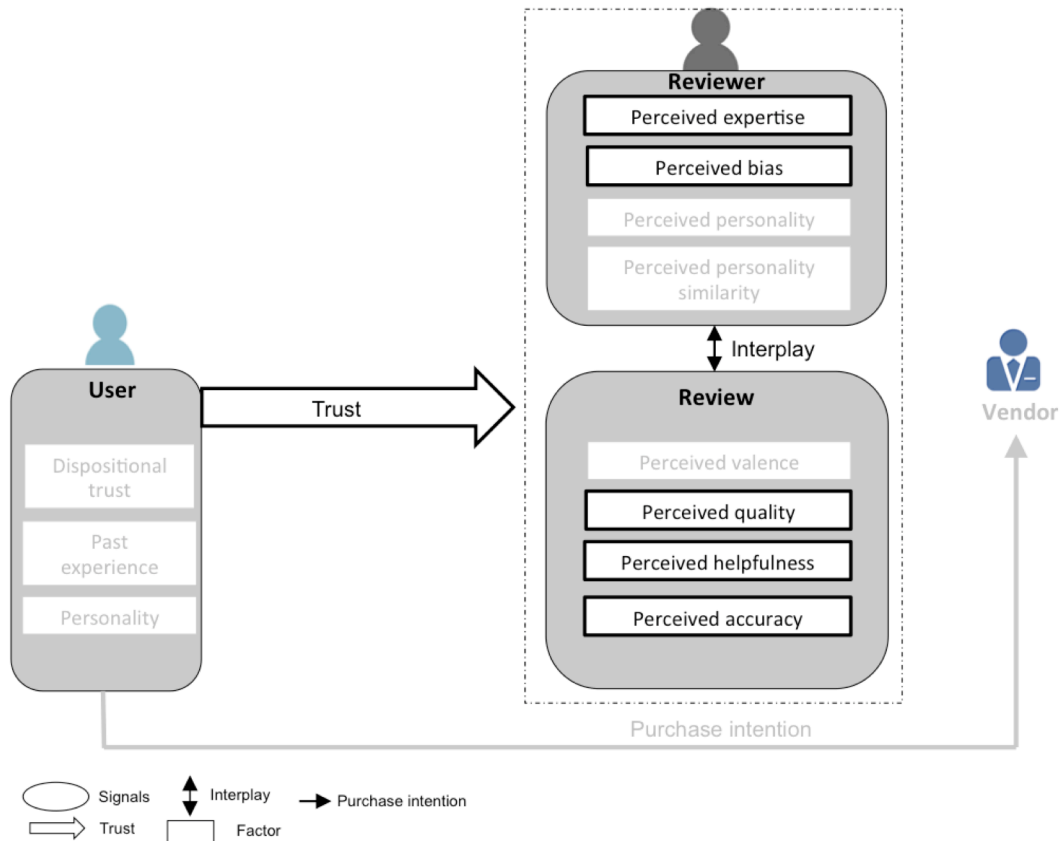


Figure 3.2: Study 1 - investigating the interplay of the influential factors on trust and their effects on trust in online reviews (Note: only objects in black are investigated)

3.2 Methods

3.2.1 Participants

Sixteen participants (seven female, nine male, mean age of 30) took part in this study. Participants were recruited by sending study invitations via email to City University London staff and students.

3.2.2 Design

A lab-based experimental study was conducted in order to address the research questions. The study followed a factorial design approach and manipulated three

factors: perceived review quality, reviewer's expertise, and reviewer's bias. It was a within subjects design, meaning that all participants experienced all conditions. Qualitative data was collected by asking participants to 'think aloud' to capture interface signals that matter in trust and the perception of trustworthiness. Quantitative data was captured regarding participants' background; their perception of the reviews' quality, helpfulness, and accuracy; their perception of the reviewers' expertise and bias; and, finally, their trust in the reviews. The study sessions took place at City University London Interaction Lab.

3.2.3 Materials

3.2.3.1 Reviews

Review construction

Eight positive reviews were constructed for the purpose of this study, with each review representing a condition (appendix A.1 shows all eight reviews). The reviews were presented on an interface mimicking a standard hotel page on the review website TripAdvisor. However, the interface excluded the explicit rating element and price information and used a fictitious name for the hotel in order to avoid confounding effects from explicit ratings, price, and brand attitude on participants' trust in the reviews. Figure 3.3 provides an example of a review used in the study.

Reviews were constructed in three stages. First, a set of real reviews was chosen from the review website TripAdvisor <www.TripAdvisor.com>. Second, the reviews were revised to be similar in length and date. In order to avoid the possible influence of review length on perceived review quality (Lee et al., 2008), all eight reviews were set to approximately ten lines. Furthermore, the date of each review was amended to be no more than one month before the study start date to prevent the

review date from influencing participants' perception of accuracy (Li & Tang, 2010). Lastly, the reviews were manipulated to create high or low variables for review quality, reviewer's expertise, and reviewer's bias.

Luminous Hotel

199 Jalan Bukit Bintang, Kuala Lumpur 55100, Malaysia

[Hotel website](#) [E-mail hotel](#) [Hotel amenities](#)



Professional photos



Traveller photos

Show the lowest price for this hotel*

Check In Check Out Adults

Show Prices

- Booking.com
- agoda.co.uk
- EasyToBook.com
- Venere.com
- Expedia.co.uk
- Octopus.com
- Hotels.com
- ebookers.com

reviews sorted by [Date](#) [Rating](#)

English first



Jack

London, UK

“Good Hotel”

Reviewed 31 August 2012

Stayed here for the last 4 nights of our honey moon and We liked it. We went to 4 other destinations during our honey moon and KL was the last stop. because it was late when we got there we headed down to the CC for a drink and grab something. It was like living back agian in the 80's !! People smoking and questioning Europop . We have to say it was a good experience to be in KL and we had nice time. We fuond many touristic places, we consider the prices in KL not too high. There are some shopping malls in KL which are big and there are different brands. Overall, it was a good expereince and we enjoyed it. We recommend the luminous as one of the good hotels.

Figure 3.3: Example of a review

Manipulated factors

Each of the eight reviews was manipulated to create high and low *review quality*, high and low *reviewer's expertise*, and high and low *reviewer's bias* ($2 \times 2 \times 2$). These three factors were manipulated based on interface signals. These factors were chosen because they capture aspects of the review and reviewer that might affect user perception of review helpfulness and accuracy as well as trust in the review (e.g. Liu et al., 2008; Connors et al., 2011). Negative reviews were excluded from this study in order to better control the influence of the trust factors and to limit

the investigated factors to a reasonable number. The following paragraphs describe how each of the three factors was manipulated.

Review quality

Review quality was manipulated into high and low categories based on two signals. First, *spelling mistakes* were used to manipulate understandability, which is a dimension of quality (Lee et al., 2008). Understandability is mainly affected by incorrectly structured sentences or *spelling mistakes*. A review was manipulated to be highly understandable when there were fewer than five *spelling mistakes* in the review. Otherwise, the review was manipulated to be difficult to understand (i.e. low on understandability).

Second, the *details* included in the review were used to manipulate the review sufficiency, which is another dimension of review quality (Lee et al., 2008). Sufficiency was manipulated based on how many of the following six information categories were mentioned: service, sleep quality, cleanliness, location, food, and room. Websites such as TripAdvisor suggest that these aspects of hotel services should be included in reviews. A review was deemed to be highly sufficient when *details* were included on at least three of the information categories. Otherwise, a review was deemed low on sufficiency when the details included less than three of information categories (Figure 3.4).

It has been suggested that relevance and reliability are also dimensions of review quality (Lee et al., 2008). However, these dimensions are aspects that are related to a user's perception and therefore could not be explicitly manipulated prior to the study.

Reviewer's expertise

The reviewer's expertise was manipulated into low and high categories based on two interface signals. First, the total *number of reviews* posted by the reviewer was used to manipulate the reviewer's experience, which is a dimension of expertise (Kim et al., 2008). Kim et al. (2008) suggest that on websites such as TripAdvisor, the reviewer's experience can be indicated by the *total number of reviews* the reviewer has contributed. Second, the total *number of helpful votes* given to the reviewer was used to manipulate the reviewer's assistance, which is another dimension of reviewer's expertise (Kim et al., 2008). Reviewer's assistance refers to the extent to which the reviewer is helpful to other users in assessing vendor services.

The expertise dimensions of experience and assistance suggest that a reviewer acquires high expertise not only by generating many reviews but by generating reviews that are perceived by other users as helpful (Kim et al., 2008). Thus, reviewer's expertise was manipulated as high based not only on having a high *number of reviews* (e.g. 30) but also on having a high number of *helpful votes* (at least 50% of the *number of reviews*). In contrast, reviewer's expertise was manipulated as low when the *number of reviews* was low and when the *number of helpful votes* was less than 50% of the total *number of reviews* (Figure 3.4).

Reviewer's bias

Reviewer's bias was manipulated based on the occurrence of *positive words* that can indicate high levels of emotion towards the service provider. This was based on Ku et al. (2012), who suggested that positive bias can be indicated by the reviewer being overwhelmingly positive. Thus, reviewer's bias was manipulated into high and low categories based on the occurrence of *positive words* and their derivatives: "awesome" "amaze", "best", "fantastic", "impress", "love", "great", and "surprise".

A reviewer was manipulated as highly biased when the number of *positive words* was greater than five. In contrast, bias was manipulated as low when the review included fewer than five of the positive words (Figure 3.4).

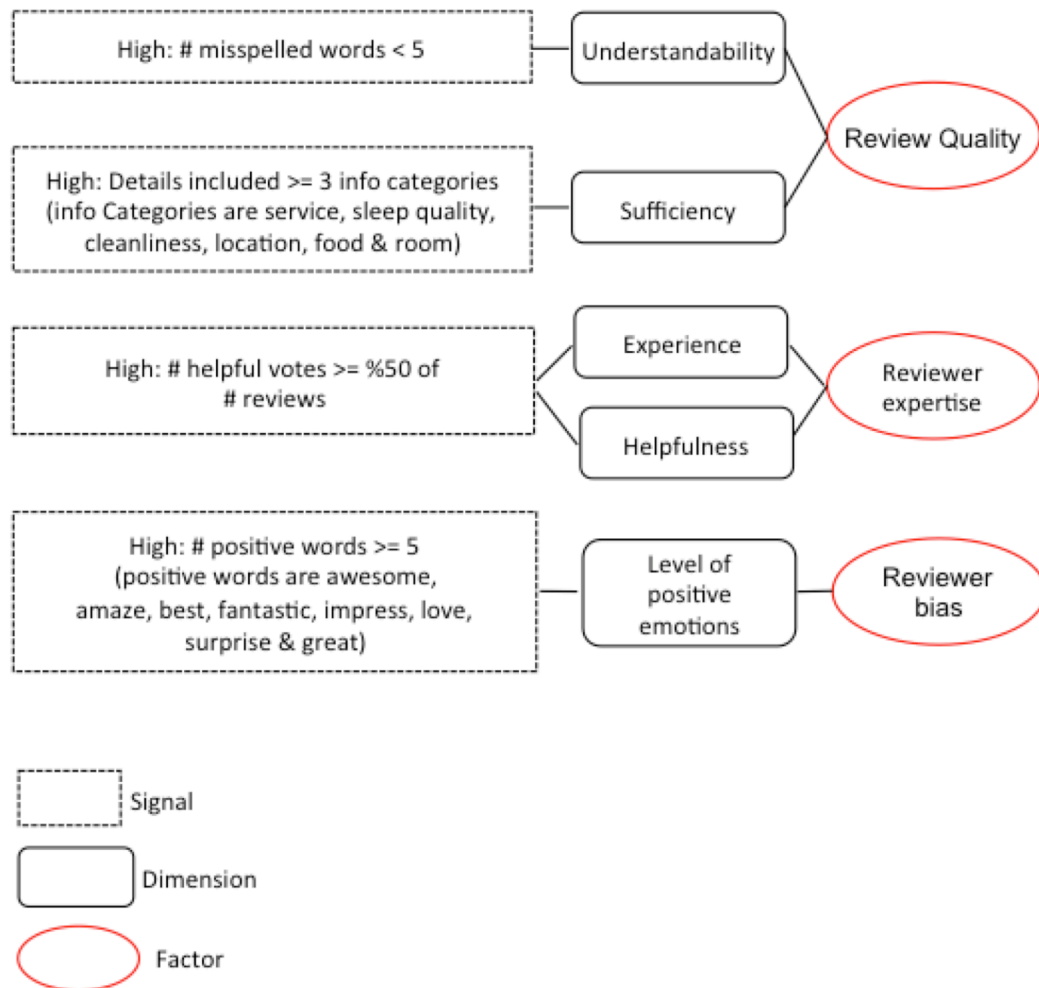


Figure 3.4: Manipulation of review quality, reviewer's expertise and bias

3.2.3.2 Questionnaires

Two questionnaires were used in this study: a *background questionnaire* and a *trust factors questionnaire*. The following paragraphs explain the way these questionnaires were designed in detail and also the data collected with each questionnaire.

Background questionnaire

Participants were asked to fill in a background questionnaire capturing their demographics (age and gender) as well as their dispositional trust. The approach to measuring dispositional trust was taken directly from McKnight et al. (2002a), who suggest that dispositional trust involves four dimensions: integrity, competence, benevolence, and trusting stance. Participants were asked to rate themselves on these dimensions on 5-point Likert scales, and dispositional trust was calculated as the average value of the four dimensions. Participants in this study had a large spread of dispositional trust scores (Figure 3.5), ranging from 1.5 (minimum) to 4 (maximum), with a standard deviation of 0.72, a mean of 2.56, and a median value of 2.5.

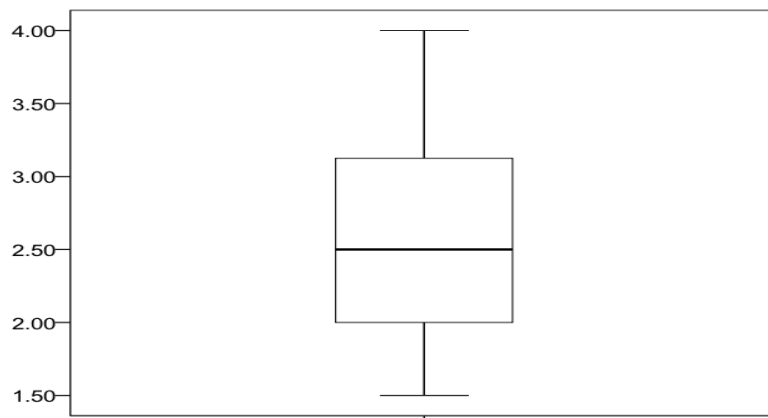


Figure 3.5: Participants' dispositional trust measures ranging from 1.5 (lowest) to 4 (highest), median is 2.5

Trust factors questionnaire

Participants were also required to fill in a trust factors questionnaire for each review. This questionnaire captured participants' ratings of six factors: perceived review quality, helpfulness, and accuracy, perceived reviewer's expertise and bias, and trust in the review. Since each participant completed a trust factors questionnaire

for each review, this resulted in 128 complete responses (16 participants × 8 reviews).

The approach to measuring these factors was also based on previous work using 5-point Likert scales (Lee et al., 2008; Ku et al., 2012; Liu et al., 2008; McKnight et al., 2002a). Review quality was measured using multiple scales based on four dimensions: understandability, sufficiency, relevance, and reliability (Lee et al., 2008). Each of these dimensions was measured using a 5-point Likert scale, and review quality was calculated as the average value of these four dimensions. Every other factor was measured using a single 5-point Likert scale. Appendix A.3 shows the scales used in the trust factor questionnaire. Table 3.1 shows the minimum, maximum, mean, median, and standard deviation of participants' ratings of the trust factors.

	Minimum	Maximum	Mean	Median	Standard deviation
Review quality	1	5	3.33	3.5	1.24
Review helpfulness	1	5	3.27	3	1.08
Review accuracy	1	5	3.26	3	1.01
Reviewer expertise	1	5	3.07	3	1.39
Reviewer bias	1	5	3.09	3	1.49
Trust in review	1	5	3	3	1.08

Table 3.1: Descriptive statistics of trust factors

Data from the participants' ratings of perceived review quality and reviewer's expertise and bias were used to test the manipulation of these factors (shown previously in Figure 3.4, section 3.2.1.2). This analysis aimed to investigate whether the manipulation of these three factors influenced participants' perception of the same factors. Each of the three manipulated factors was treated as two conditions (independent nominal variables) which then allowed a comparison of participants'

perceived ratings (dependent variable) using a Wilcoxon test. For example, the analysis compared the perceived review quality ratings in the two manipulated high/low review quality conditions. Similarly, it compared the perceived reviewer's expertise ratings in the high and low reviewer's expertise conditions and the perceived reviewer's bias ratings in the high and low reviewer's bias conditions.

The results showed that there were statistically significant differences in participants' ratings for each pair of conditions (i) high and low review quality ($z = -6.976, p < .001$) (ii) high and low reviewer's expertise ($z = -6.994, p < .001$) and (iii) high and low reviewer's bias ($z = -7.005, p < .001$). Appendix A.4 shows the complete results of the manipulation check analysis.

3.2.4 Qualitative data

Participants were video recorded while they were thinking aloud about the reviews. All of these recordings were transcribed. Then, the transcript was broken into units of analysis. A unit of analysis was defined as a participant's verbalisation about a single review. Since there were 16 participants and each participant verbalised her thoughts about eight reviews, this resulted in 128 units of analysis (16 participants \times 8 reviews). Table 3.2 shows examples of two units of analysis by participant 1.

Participant ID	Review	Unit of analysis
1	Faultless hotel	This one is very helpful, because it tells details and because of the fact that this guy has many reviews so this assures that what he is writing must be correct. When I was reading this review I thought this is better than the one who has 2 reviews only, so this guy is alright and he is giving many reviews. So if the reviewer has many helpful votes, then he might provide helpful stuff, so looking at the review content and reviews or helpful votes make a review helpful or not. This is the best review I read because of good details and the number of reviews by this guy, so it makes it stronger.
	Good hotel	The review is irrelevant, it tells more about the country and Kuala Lumpur in general than the hotel as I am specifically looking for a good hotel. So I think there must be something more about the hotel like the services provided by the hotel. So this guy stayed briefly in Kuala Lumpur and he is saying what he thinks about Kuala Lumpur as a city and as a tourist destination which makes the review not really helpful. I noticed some spelling mistakes like the word "fuond" but that's not much of a trouble for me and I give more importance to the content because most of the people English might not be their first language. So, I'm looking more for ideas about the hotel and as long as the review is understandable it is fine for me with spelling mistakes so it's alright, unless if it's something very extraordinary.

Table 3.2: Examples of two units of analysis

3.2.5 Procedure

All participants underwent the same procedure during a session lasting approximately one hour. As shown in Figure 3.6, participants were first asked to sign an informed consent form (step 1) (shown in appendix A.2). Then, participants completed the background questionnaire which captured their demographics as well as dispositional trust (step 2). Afterwards, participants were presented with the following scenario (step 3):

You decided to travel to Kuala Lumpur, the capital city of Malaysia, for holiday, so you search for appropriate hotels and the Luminous hotel was one of the search results. Therefore, you choose to read reviews posted by other

travellers to gain better knowledge about the Luminous hotel and to assess different aspects of the hotel.

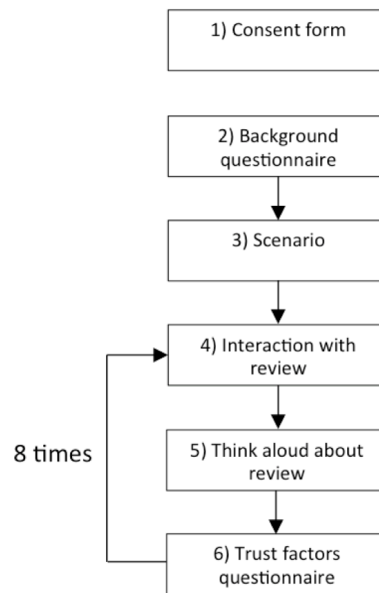


Figure 3.6: First study procedure

Participants were then presented with eight reviews about a fictitious hotel named “Luminous” (step 4); however, they were not informed that the hotel was fictitious in order to make the study setup as realistic as possible. For each review, the participant was asked to read the review, think aloud about the review (step 5), and then provide ratings on six factors (perceived review quality, helpfulness, and accuracy, reviewer’s expertise and bias, and trust in the review) in the form of a questionnaire (step 6), called the trust factors questionnaire. All participants saw the same reviews. However, the reviews were presented in a different order to each participant to prevent any possible order effect.

3.2.6 Data Analysis

3.2.6.1 Coding the qualitative data

Data from the participants' verbalisations were analysed to address RQ-1, -2, and -3. A coding scheme was developed based on the signals from the interface on which the reviews were presented. Participants mentioned nine signals and therefore the coding scheme included only codes that referred to these signals. These signals were: reviewer's *city & country*, reviewer *membership level*, *number of reviews* posted by the reviewer, *number of cities* in which the reviewer had reviewed services, *number of helpful votes* given to the reviewer, *number of people who found the review helpful*, *details* included in the review, *spelling mistakes* in the review, and *positive words* mentioned in the review.

In addition, participants mentioned four new signals. These signals did not exist in the interface which presented the reviews and were not used in the experimental manipulation. These signals emerged from participants' responses and were therefore named emerging interface signals. Since participants mentioned these new signals, the coding scheme included codes that referred to these signals. These signals were *number of people who found the review unhelpful*, *user-generated photos*, and the reviewer's similarity to the user in terms of *characteristics* and *satisfaction level*. The resulting coding scheme is shown in Table 3.3.

All the codes shown in Table 3.3, except reviewer's similarity to the user in *characteristics* and *satisfaction level*, referred directly to interface signals, i.e. in-vivo codes (Lazar et al., 2012). The codes for reviewer's similarity in *characteristics* and *satisfaction level* were descriptive, meaning that applying these codes required interpretation. The reviewer's similarity to the user in *characteristics* was defined as

the social similarity between the reviewer and user, for example, family status. The reviewer's similarity to the user in *satisfaction level* was defined as the extent of similarity between the reviewer and user in terms of their levels of satisfaction with hotels' services, which can be indicated by their prior expectations from hotels.

Type	Code	Example
Codes that referred to interface signals that existed in the interface that presented the reviews	City & country	The person is from the <i>same country</i> where the hotel is
	Membership level	How important it's for me if he is a <i>top contributor</i>
	Number of reviews	This guy has <i>41 reviews</i>
	Number of cities	He travelled to <i>25 cities</i>
	Number of helpful votes	He is a genuine reviewer because he has <i>18 helpful votes</i>
	Number of people who found the review helpful	I'm more impressed by <i>5 people who found the review helpful</i>
	Details	He gives <i>details</i> about the rooms and then he tries to say how big the room is so now I know if I put an extra bed it will be small
	Spelling mistakes	Although there is <i>spelling mistakes</i> but its fine
	Positive words	he is saying it's a "good value for money" instead of " <i>awesome</i> ", he is using neutral words and practical, I like that
Codes that referred to new interface signals that did not exist in the interface and were not used in the experimental manipulation	Number of people who found the review unhelpful	If I just see <i>how many people vote dislike or maybe unhelpful</i>
	User-generated photos	If I'd be able to see <i>photos with this review</i> , I'd feel I can depend on it
	Similarity in characteristics	There is a difference between me and the reviewer because <i>I don't have kids, I travel with friends usually.</i>
	Similarity in satisfaction level	I think he/she is easily <i>pleased kind of person</i> , all the things he/she mentioned are normal for me to find in a hotel.

Table 3.3: Interface signals code set

A reliability check was conducted only on the two descriptive codes, reviewer's similarity in *characteristics* and *satisfaction level*, because applying these codes required interpretation. The reliability of these two codes was checked using the Jaccard index, by calculating the similarity of coding between two independent researchers. The PhD student Dara Sherwani and a PhD colleague independently applied the codes to samples of the data. The similarity in the coding between the two researchers was then calculated by dividing the size of the intersection of the codes by the size of the union of the codes. The reliability check process involved four iterations. The first three iterations achieved similarities of 40%, 57%, and 77%, respectively. Each of these iterations included a minimum of 5% of the total data and disagreements resulted in refinements of the codes as well as the coding rules (i.e. when to apply the codes). The refinements based on each iteration were applied in the following iteration, leading to increasing similarity. The fourth iteration resulted in a similarity of 88.4% for a minimum of 10% of the data.

All the codes were then applied to the 128 units of analysis. If the same code occurred more than once in a unit, only the first occurrence was coded.

3.2.6.2 Influence of interface signals on user trust in online reviews (RQ-1)

The influence of interface signals on the participants' trust was determined by calculating the number of participants who mentioned particular interface signals when discussing trust in online reviews.

3.2.6.3 Relationship between interface signals and the perceived trustworthiness of the review and the reviewer (RQ-2)

This analysis explored how interface signals shaped the participants' perception

of the trust factors indicating perceived trustworthiness of the review (perceived review quality, helpfulness, and accuracy) and perceived trustworthiness of the reviewer (perceived reviewer's expertise and bias). To better understand the relationship between interface signals and trust factors, the interface signals coded from the participants' recorded verbalisations were used. This time, however, the analysis investigated the interface signals participants mentioned in relation to their perceived ratings of five trust factors: perceived review quality, helpfulness, and accuracy and perceived reviewer's expertise and bias. To do so, the ratings of the trust factors were divided into high (above the median) or low (below the median). Then, the analysis investigated the interface signals that were used by participants in relation to the trust factors' groupings.

3.2.6.4 Effects of dispositional trust on using interface signals (RQ-3)

This analysis explored how participants' background in the form of dispositional trust influenced the way they used interface signals in the perception of trustworthiness. First of all, participants were divided into two groups based on having high or low dispositional trust. The median value of 2.5 was used as the pivot point: those with a score of below 2.5 were classed as having low dispositional trust, and those with a score above 2.5 were classed as having high dispositional trust. Ideally, the groups would have been divided based on a score of 3 as that is the exact middle score; however, participants' dispositional trust measures were not normally distributed so the median was used to divide the participants. As a result, the groups were equal, each consisting of eight participants. Then, the analysis investigated whether these two groups differed in their mentions of the various interface signals.

3.2.6.5 Effects of perceived review quality, reviewer's expertise, and reviewer's bias on perceived review helpfulness, accuracy, and trust in the review (RQ-4)

This study investigated how the perceived review quality, helpfulness, and accuracy and perceived reviewer's expertise and bias relate to one another and to trust. Given the insights provided by previous work (e.g. Ghose & Ipeirotis, 2011; Smith et al., 2005; Connors et al., 2011), the analysis first investigated the influence of participants' perception of the review quality and the reviewer's expertise and bias on their perception of the helpfulness and accuracy of the review and their trust in the review.

Given the small sample size of this study, the analysis was conducted by visualising participants' ratings rather than applying statistical tests. To do so, the ratings of perceived review quality, reviewer's expertise, and reviewer's bias were divided into high (when the rating was above the median) or low (when the rating was below the median). Then, the analysis investigated how participants' ratings of perceived review helpfulness, accuracy, and trust in the review differed according to (i) high and low perceived review quality, (ii) high and low perceived reviewer's expertise, and (iii) high and low perceived reviewer's bias.

3.2.6.6 Effects of perceived review helpfulness and accuracy on trust in the review (RQ-5)

The analysis investigated how participants' perception of the review helpfulness and accuracy influenced their trust in the reviews. Once again, this analysis was conducted by visualising participants' ratings rather than by applying statistical analysis. Participants' ratings of perceived review helpfulness and accuracy were divided into high (when the rating was above the median) and low (when the

rating was below the median). Then, the analysis investigated how participants' ratings of trust in the review differed according to (i) high and low perceived review helpfulness and (ii) high and low perceived review accuracy.

3.3 Results

3.3.1 Influence of Interface Signals on User Trust in Online Reviews (RQ-1)

Previous work has investigated some interface signals that can affect user trust; (e.g. Kobayashi et al., 2015; Kim et al., 2008); however, little is known about the respective importance of interface signals with regard to user trust and the types of these signals. A better understanding of this could lead to improved interface designs that could help users, first, to perceive the strength of trustworthiness and, second, to decide whether to place trust in a review. This analysis investigated these two issues by analysing participants' thinking aloud regarding what interface signals were emphasised in relation to trust (previously explained in section 3.2.4.2).

Participants' trust seemed to depend on some interface signals more than others. Figure 3.7 shows the number of participants who mentioned each interface signal as they discussed trust in each of the reviews. Seven signals seemed to matter most in participants' trust. These signals were, in order of importance from most to least, *number of people who found the review helpful*, which was mentioned by all participants (16 out of 16); *details* included in the review, *spelling mistakes*, and *number of reviews* posted by the reviewer (each mentioned by 15 participants); *positive words* (mentioned by 14 participants); reviewer's *city & country* (mentioned by 13 participants); and *number of helpful votes* given to the reviewer (mentioned by 12 participants).

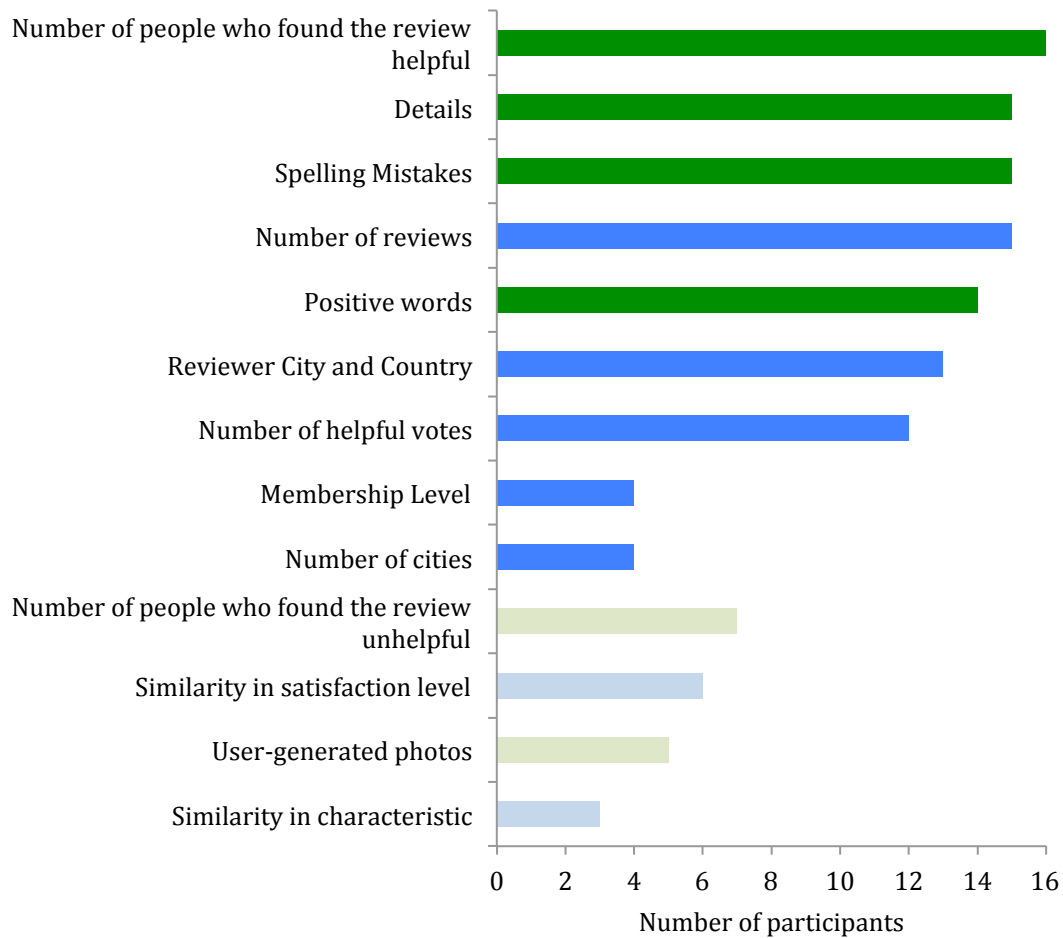


Figure 3.7: Number of participants who mentioned interface signals. Dark green bars refer to review-related signals, dark blue bars refer to reviewer-related signals, light green bars refer to emerging review-related signals and light blue bars refer to emerging reviewer-related signals.

Other signals were not considered frequently by participants, including *membership level* and *number of cities* (each mentioned by four participants). A factor in this lack of focus seemed to be that participants struggled in understanding how these levels were earned and, thus, the signal was clouded, such as:

P12: “Senior contributor, I wonder what that means? I guess this one is not swayed by mood, it sounds like somebody being fairly objective, and he is comparing the hotel with other places. And he says “not great in any special way”, so he sounds neutral, He is somebody who is not impressed by the receptionist, or not moody”

Some participants also paid more attention to other signals indicative of the reviewer's background instead of travelling experience. For example:

P11: "I prefer this review. I find this review accurate, I think it's honest, I feel comfortable with trusting this review, I'm more inclined to think about the amount of reviews written by this person and how many of his/her reviews are helpful to other people, I guess that makes it up for me to have an idea about him/her, I'm not sure if I care about how many places he's been in"

Trust in a review could be eroded if a user does not trust the reviewer, or, more positively, high trust in a reviewer could be transferred to a review. Hence, the analysis also investigated what types of interface signals played a role in participants' trust. Overall, there seemed to be two broad types of signals: review-related and reviewer-related.

Review-related signals

The interface signal that was mentioned by all participants was review-related: *number of people who found the review helpful*. When using this signal, participants relied extensively on the virtual communities' opinions to help them establish trust. Participants' responses suggest that this signal seemed to play an important role in their trust, leading to higher trust when there were more people who found the review helpful. Similarly, participants' trust seemed to decrease when reviews did not have any helpful votes by other users. For example:

P6: "The review is alright in terms of writing style but I cant trust this review because it doesn't provide information and no one found it helpful, it just talks about how he (the reviewer) felt when he was there but it didn't give information about the

hotel, I think the review should be about the hotel but it doesn't say anything about the hotel really”

Participants also made extensive use of the *details* included in the review in determining their trust in the reviews (mentioned by 15 participants). Their responses suggest that they tended to trust reviews when the review included details about the service. In contrast, trust seemed to decrease when the review lacked details. For example:

P1: “It gives a little detail about the hotel, so it is not really anything concrete that gives me a better idea about there. The review mentions the neighbourhood and the area but I still don't get it if the hotel is good or not like is the hotel providing all the services which I need? Or is there any particular service which is not good? So it's better than the before but not that much. I'm looking for more specific information... It's alright because it tells something about the location and there is a mall nearby with all kinds of food options but it's still not the review which I will trust”

P5: “it just gives a lot of detail about the place and also it sounds believable because the person is giving actual data about the rooms they stayed in . It sounds real, the review is reasonable with good details, I think the review has the kind of information which I care about and I think I would use this as one of the reviews to get a better sense of the hotel and to decide whether I should be staying at this hotel or not.”

Spelling mistakes were also frequently mentioned by participants (mentioned by 15 participants). However, it was unclear to what extent *spelling mistakes* were taken into consideration regarding trust. A possible explanation of this is that online

reviews represent a form of user generated content (UGC), which made participants not to consider *spelling mistakes* as serious, for example:

P2: "Although it has spelling mistakes, it's fine for me cause it's user generated, so sometimes when you type you can make mistakes, but I understood what he is trying to say. Its fine but I would probably want something more than this and I wouldn't necessarily trust this person. He (the reviewer) is describing Kuala Lumpur more than the actual hotel and all what he says about the hotel is that it was good while he is talking about the city"

The third most encountered review-related signal by participants referred to the *positive words* mentioned in the review. Positive words such as "great" and "fantastic" were mentioned by 14 participants. Out of these 14 participants, 13 participants co-mentioned *positive words* with the *details* included in the review. These participants' responses suggest two points. First, a high number of *positive words* did not seem to decrease trust when the review included *detailed* information. Second, a high number of *positive words* decreased trust when the review lacked details. For example:

P4: "For me its that this review is telling me that a member of the staff is friendly then this hotel could be potentially friendly, I think the review is flattering and there isn't a lot about the state of the hotel. This review is very flattering... he is saying its "great" without mentioning details. I will need more information and I wouldn't base my whole decision on this review"

P10: "This one is Ok. It's a little bit flattering but at least it's talking about details like the friendliness of the staff, it talks about the location quite a bit, but the language is definitely flattering. I would probably disregard some of the words the

actual facts would be helpful to me... I'm looking at the facts for instance 'it's a big room', and I ignore the 'amazing' word"

Reviewer-related signals

Participants also made use of reviewer-related signals in determining their trust. Participants frequently mentioned *number of reviews* a reviewer provided (mentioned by 15 out of 16 participants), reviewer's *city & country* (mentioned by 13 participants), and *number of helpful votes* given to the reviewer (mentioned by 12 participants). In these cases, the level of trust seemed to transfer from the reviewer to the review, for example:

P1: "When I was reading this review I thought this is better than the one who has two reviews only, so this guy is alright and he is giving many reviews. So if the reviewer has many helpful votes, then he might provide helpful stuff...this is the best review I read"

There was also negative transfer of trust when information about a reviewer's background aroused suspicion. For example, participants often wondered about the accuracy of reviews when reviewer's *city & country* was the same as the hotel:

P5: "I'm suspicious of this one even though the person has contributed a lot on TripAdvisor but he or she is from Malaysia and it makes me wonder whether it's a real review or not, I think it's flattering a lot and basically he sounds that he is in love with the woman on the desk, I'm not depending on it."

Intriguingly, this signal, which gave details of the reviewer, was also used by participants in a different way, to assess their similarity to the reviewer:

P15: “It could be good for me; the reviewer is from the UK like me which is relevant to me about cultural aspects, he the reviewer enjoyed it with whoever he went with...I can depend on it for evaluating the hotel”

Emerging review-related and reviewer-related interface signals

Participants’ verbalisation also included four new signals. These signals did not exist in the interface that presented the reviews and were not manipulated in the experimental setup. Two of these new signals were review-related: *number of people who found the review unhelpful* and *user-generated photos*, and two reviewer-related signals: reviewer’s similarity to user in terms of *characteristics* and *satisfaction level*.

Participants voiced the need for two new review-related signals embedded in the interface that could help them in trusting the reviews. The first of these relates to *number of people who found the review helpful*. While this signal already existed in the interface, 7 out of 16 participants also expressed the desire to see how many people found this review *unhelpful*. It seems that these participants intuitively understood that this signal captured only one aspect of a positive and negative perspective and wanted a more complete and balanced perspective. Interestingly, participants did not expect this balance of perspective to be extended to the *number of helpful votes* a reviewer has gained, even though it also expresses only positive aspect, and it transmits a signal about helpfulness. Possibly, the overall helpfulness of a reviewer is more difficult to assess than the helpfulness of a review. Secondly, participants’ responses revealed that user-generated photos alongside reviews may allow them to assess the trustworthiness of a review:

P13: “It has very specific information about how far is the hotel from the city centre and the shopping malls and I believe it’s accurate because it is specific... but I

cant judge accuracy of information completely based on the reviews. I'm looking here more for the content, if it would have more votes for being helpful , then my trust would be more, if I would be able to see photos of the hotel with this review, I would feel that I can depend on this review."

Five participants' mentioned this, possibly because photos were seen as less subjective and also less prone to falsification.

Some participants searched for signals indicating perceived similarity with the reviewer and this perception may have mattered in trust in the reviews. These signals were the reviewer's similarity to the user in terms of *satisfaction level* and *characteristics* (mentioned by six and three participants, respectively). In regard to the reviewer's similarity in *satisfaction level*, participants attempted to assess the reviewer's satisfaction level based on the content of the review. Their responses suggest that dissimilarity in *satisfaction level*, which can be indicated by prior expectations from the service provider, can hinder them from depending on the review, for example:

P5: "so I will use the review to get a little bit of details rather than depending on it, I'm just a bit hesitated with this review... when I read a review I think is this person like me, do they have the same expectations, I guess its not quite right to call a hotel the 'best' I'm not sure if there is anything tells me about these people taste with hotels, I can be dissatisfied with this hotel but this guy seem to be happy. So if this was the only review I wouldn't completely depend on it"

It is interesting to note that out of the six participants who mentioned the reviewer's satisfaction level, five participants co-mentioned *satisfaction level* with *positive words*. This suggests that participants justified the reviewer being overly

positive based on the possibility of the reviewer having a dissimilar *satisfaction level*, i.e. being easily satisfied or having lower expectations from the service provider.

With regard to the reviewer's similarity in *characteristics*, three participants mentioned that they preferred reviews posted by reviewers who have *characteristics* similar to their own. This could be because these participants found reviews that are posted by similar reviewers to be more relevant and therefore they were more willing to depend on these reviews. In contrast, dissimilarity between the reviewer's *characteristics* and those of the participant seemed to reflect negatively on trust in the review. For example:

P3: "When I read it, I think it has the problem that I can't relate to this person since he is a business traveller and I wouldn't trust him because his main consideration is location. There are irrelevant information like the credit card, a lot of the review is irrelevant like bus shuttles , night market which are general information about the city . The big mall nearby is not interesting to me anyway."

Previous work by Goldbeck (2009) has already shown that similarity can predict trust in the domain of recommender systems and the results of this study provide insights that similarity could also play an important role in trust in online reviews.

3.3.2 Relationship between Interface Signals and the Perceived Trustworthiness of the Review and the Reviewer (RQ-2)

The relationship between interface signals and trust factors was investigated by exploring the interface signals that participants mentioned in relation to their perceived ratings of the trust factors (previously explained in section 3.2.4.3). The following paragraphs explain the interface signals that were used by participants in

their perception of the review quality and helpfulness that were perceived based on similar interface signals. This is followed by interface signals that were used in the perception of reviewer's expertise. Then, signals that were used in the perception of reviewer's bias and review accuracy are reported (reviewer's bias and review accuracy were perceived based on similar interface signals).

Perceived review quality

Figure 3.8 shows the signals that participants mentioned when they perceived reviews as high quality (above the median of 3.5). One interface signal played a particularly important role: participants frequently mentioned the *details* mentioned in the reviews. Of 16 participants, 15 referred to this signal when they discussed high review quality.

P1: "Yes this one is good, I would click the helpful bottom because it tells me everything that I need to know like clean rooms, friendly staff, good food, generous breakfast and the reviewer says how it is decorated, the rooms are big, the location, its 10 minutes from shopping mall and its close to the city so it gives a broad overall idea about the hotel....I think the details in the review are enough so as much as I want to know"



Figure 3.8: Number of participants who mentioned interface signals in their perception of high (dark bars) and low (light bars) review quality

The second most used signal, referred to by 14 participants, when perceiving high review quality was the *number of people who found the review helpful*. In these instances, participants used the attitude of the virtual community in their perception of the review quality. For example:

P10: “3 others liked it, it has everything I care about , it gives me good details about the beds , the room, how big it is , the food but it sounds a little bit flattering because of the words used but it is believable because it backs up with details and 3 others liked it.”

The *positive words* mentioned in the review also seemed to matter in participants’ perception of high quality reviews (mentioned by 13 participants). Participants tended to perceive reviews that lacked *positive words*, or included a

smaller number of *positive words*, as of higher quality, possibly because these reviews were seen as more objective. For example:

P10: "This one is the best review so far , somebody else found this review helpful which makes me feel to trust it more ... I don't think it's too flatter either, he is saying it's a 'good value for money' instead of 'awesome", he is using neutral words and practical, I like that"

Despite the fact that the lack of, or low number of, *positive words* was seen as a signal of high review quality, the presence of a high number of *positive words* did not seem to always have the opposite effect. Reviews that included a high number of *positive words* were not necessarily perceived as being low quality, especially when the reviews included sufficient *details*. For example:

P1 "The review is good and I have no problems with it, the details are good, room, bed and cleanliness, location and the staff, the breakfast is good and the room service, and strategically located in the city, so these are the key things...this comment is flattering but its talking about details so its not too bad. As long as there are details I don't care if people find it great, I don't really think about that."

Participants supplemented their perception of high review quality with interface signals related to the reviewers. The next three most important signals that helped participants evaluate high quality reviews were *number of reviews* (mentioned by ten participants), *number of helpful votes* (mentioned by ten participants), and reviewer's *city & country* (mentioned by four participants).

Participants relied on similar signals when perceiving low quality reviews: *positive words* (by 13 participants), *details* (by 11 participants), *number of reviews*

(by 11 participants), *number of people who found the review helpful*, and *number of helpful votes* given to the reviewer (each mentioned by nine participants).

There may be a need to provide additional signals for low-quality reviews. Seven participants mentioned *number of people who found the review unhelpful* in relation to low review quality. None of the participants mentioned the need for this signal when they perceived high review quality, implying that this signal could have a direct effect on the perception of low-quality reviews. For example:

P12: “This one is bad, I wonder how many unhelpful votes it could get”

Perceived review helpfulness

The interface signals mentioned by participants in the perception of review helpfulness were similar to those that were mentioned in the perception of review quality. The *number of people who found the review helpful* and *details* included in the review (each mentioned by 15 participants), *positive words* and *number of reviews* (each mentioned by ten participants), the *number of helpful votes* (mentioned by nine participants), and the reviewer’s *characteristics* (mentioned by three participants) were used when the helpfulness was rated above the median of 3 (Figure 3.9). The same signals were used when the helpfulness was rated below the median of 3. These results point to review helpfulness being perceived in a similar way as review quality through signals in the interface.

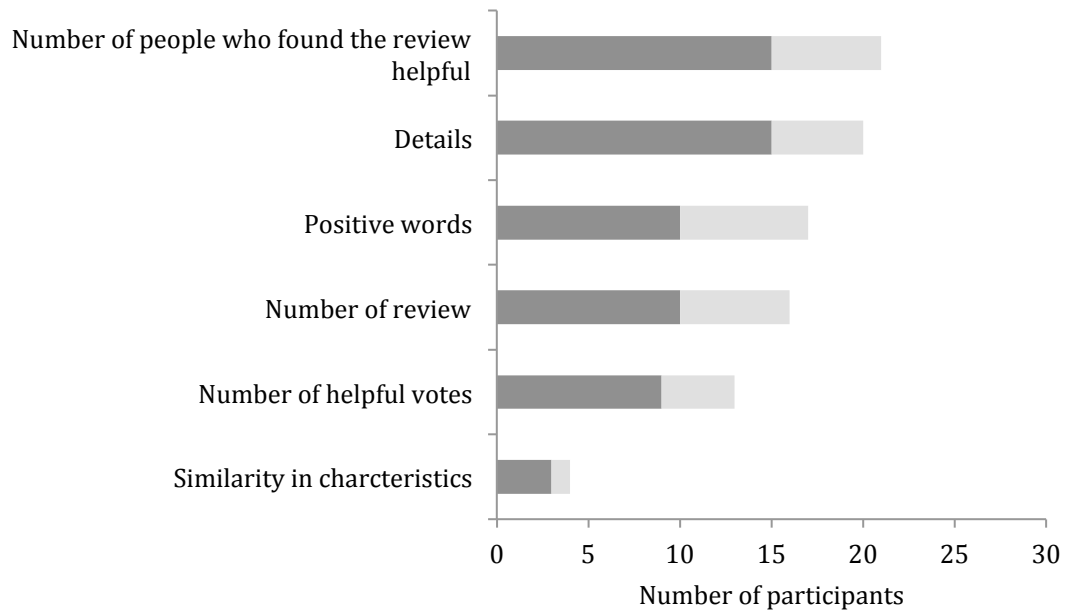


Figure 3.9: Number of participants who mentioned interface signals in their perception of the helpful reviews (dark bars) and unhelpful reviews (light bars)

Perceived reviewer's expertise

Reviewer's expertise relates to the reviewers' perceived knowledge in a particular domain and is often assumed to be associated with summarised ratings of a reviewer's generated content by other users (Kim et al., 2008). The results showed that not only did signals directly related to the reviewer matter in the perception of the reviewer's expertise, but signals that related to the review also mattered in the perception of the reviewer's expertise (Figure 3.10). Fifteen participants mentioned review *details* when they rated the expertise of the reviewer above the median of 3; they perceived detailed reviews to reflect high expertise on the part of the reviewer. For example:

P3: "He seems to know what people look for in reviews this is a really good review and it confirms the hotel is good... I like the details of describing of what is in a room with clean furniture, desk and a small sitting area"

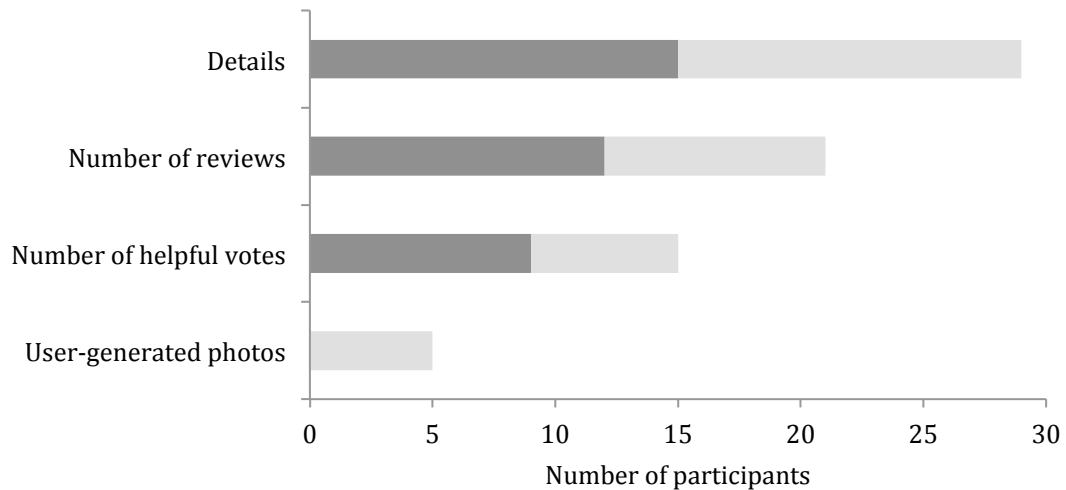


Figure 3.10: Number of participants who mentioned interface signals in their perception of high reviewer’s expertise (dark bars) and low reviewer’s expertise (light bars)

Out of the four reviewer-related signals that could have given clues about reviewer’s expertise, the *number of reviews* and *number of helpful votes* for a reviewer seemed to particularly influence the perception of this trust factor. Twelve participants mentioned *number of reviews* posted by the reviewer and nine participants mentioned *number of helpful votes* when perceiving high reviewer’s expertise. For example:

P2: “You can tell he/she has done reviews before and he/she has 47 reviews and 29 helpful votes so I’m starting to build relatively a good picture of the hotel so now I think this hotel is probably good so yes I can depend on it. So I think this guy knows what he’s saying”

Participants also seemed to consider the same signals for their perception of low reviewer’s expertise but to a lesser extent. In addition, five participants mentioned the need for *user-generated photos* when they rated reviewer’s expertise as low. This could be because participants perceived low-expertise reviewers as

inexperienced and unhelpful in comparison to high-expertise reviewers. This, in turn, could have led to uncertainty about reviewers and, therefore, to searching for further signals by which to assess trustworthiness.

Perceived reviewer's bias

It has been proposed that users perceive reviewer's bias based on reviews that praise a service without justification (Ku et al., 2012) and, therefore, on cues within the content of a review. The results of this study show that participants used both review-related and reviewer-related signals in their perception of reviewer's bias (Figure 3.11). Once again, the *details* included in the review seemed to be the most important factor. This signal was mentioned by 15 participants when bias was rated high (above the median of 3). Participants seemed to perceive reviews as potentially untruthful when the reviews lacked details. For example:

P3: "There is no detail about the hotel at all, no description of the room, its really just about the location, I think it's a review of this area in Kuala Lumpur and he says its 'fantastic' but I can't see any details... It isn't that believable that they loved the hotel"

The second most important signal in perceiving high reviewer's bias was *positive words* (mentioned by 14 participants). It seems that a high number of *positive words* triggered a high perception of bias, especially when the review lacked details. *Positive words* were co-mentioned with *details* by 13 participants when reviewer's bias was rated high. This suggests that the perception of bias is rather complex and it is not based only on high levels of emotions indicated in the review but also on the level of *details* in the review.

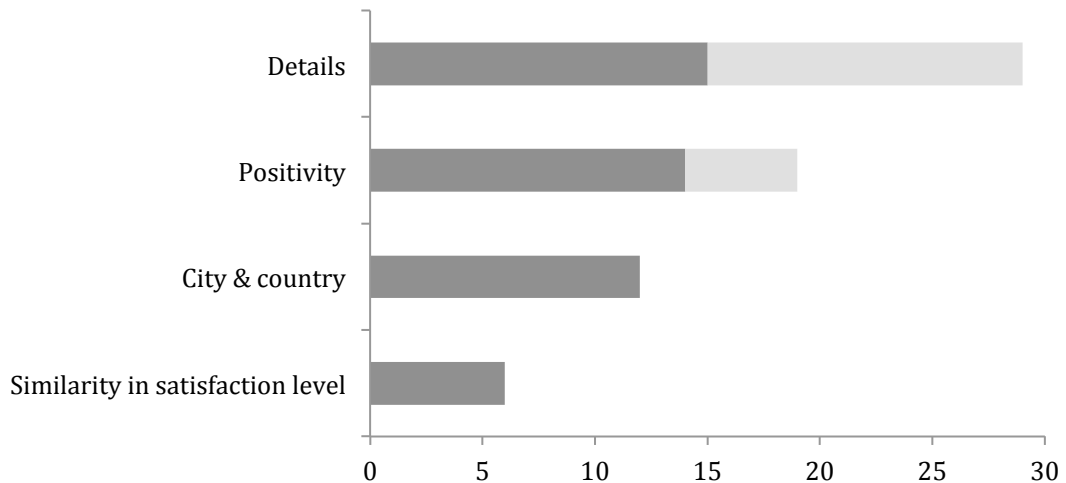


Figure 3.11: Number of participants who mentioned interface signals when perceiving high reviewer bias

The *details* included in the review and *positive words* were also used by participants when they perceived low reviewer’s bias. The responses of 14 participants suggested that reviews that included sufficient details decreased the perceived reviewer’s bias. Similarly, the lack, or low number, of *positive words* seemed to lead participants to perceive the reviewer as not biased (mentioned by five participants).

Among the reviewer-related signals, participants considered the reviewer’s *city & country* when perceiving high reviewer bias (mentioned by 12 participants). This signal seemed to increase the perception of bias especially when the reviewer’s *city & country* matched the service destination. Finally, six participants mentioned the reviewer’s *satisfaction level* when perceiving high bias. For example:

P3: “It seems the reviewer does not have high expectations so the hotel was adequate but they thought that was amazing. Perhaps they are being slightly flattering, so my view is the hotel is adequate, like the ‘hot food changed daily’ is something basic for me, nothing positive”

Even though participants used different signals in their perception of high bias, it seems that it was difficult for participants to judge whether the reviewer was biased. In fact, 9 of our 16 participants specifically mentioned that they struggled when source bias was perceived as high, such as:

P4: “Nothing there tells me these people are real customers”

Perceived review accuracy

Participants used signals in their perception of review accuracy that were similar to the signals used in the perception of reviewer’s bias. The signals *details* and *positive words* were mentioned by participants when they perceived the reviews as accurate (mentioned by 14 and 12 participants, respectively). These two signals were also mentioned by participants when they perceived the reviews as potentially inaccurate. Participants’ responses suggested that their perception of the review accuracy increased when the review included sufficient *details* but lacked or included a low number of *positive words*. In contrast, lack of *details* and a high number of *positive words* seemed to decrease the perceived accuracy of the reviews.

In addition, participants’ mentioned the reviewer’s *city & country* in their perception of the review accuracy, especially in their perception of low review accuracy. Six participants mentioned that they suspected the accuracy of the reviews when the reviewer’s background (i.e. *city & country*) matched the service destination (Figure 3.12).

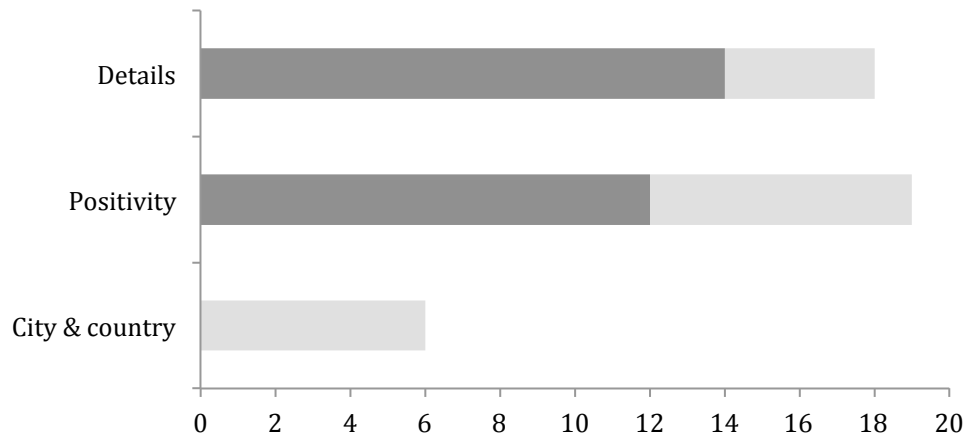


Figure 3.12: Number of participants who mentioned interface signals when perceiving low review accuracy

3.3.3 Effects of Dispositional Trust on Using Interface Signals (RQ-3)

A person's beliefs can affect how trustworthy they consider another person to be from the outset in real life, and this disposition to trust also applies online to the relationship between users and vendors (McKnight et al., 2002a,b; Hsu, 2008). Low dispositional trust could lead to users not trusting reviewers, regardless of signals that indicate that reviewers have adequate experience. Currently, there is a lack of insight into the role of dispositional trust in using interface signals, and this may hamper the design of interfaces that could assist users with low dispositional trust.

The effects of participants' dispositional trust on the way they used interface signals was analysed by classifying participants into two groups, high dispositional trust and low dispositional trust, and then investigating how these two groups differed in their use of interface signals (previously explained in section 3.2.4.4). Figure 3.13 shows the two interface signals that were used differently by participants with high or low dispositional trust; the remaining signals were used similarly by both groups and therefore are not discussed in detail.

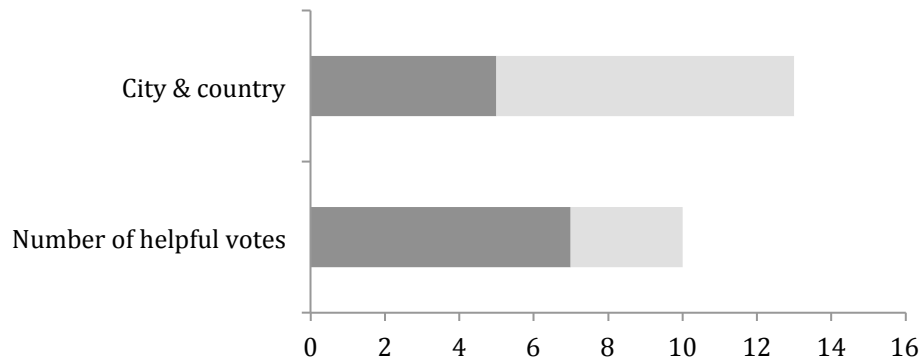


Figure 3.13: Interface signals that differed between participants' with high dispositional trust (dark) and low dispositional trust (light)

Participants with low dispositional trust paid more attention to background details of reviewers. All participants with low dispositional trust (eight out of eight) mentioned the reviewer's *city & country*, while only five out of eight participants with high dispositional trust referred to this signal. It appears that participants with low dispositional trust used this interface signal to judge the reviewer as less trustworthy. Low disposition to trust led participants to focus on negative aspects of the reviewer, confirming their suspicions. Hence, interface designs may inadvertently provide signals that cause users with low dispositional trust to trust reviewers even less.

One of the signals that directly relates to the reviewers' expertise was used more extensively by participants with high dispositional trust than by participants with low dispositional trust. Seven out of eight participants with high dispositional trust mentioned the *number of helpful votes* given to the reviewer while three out of eight participants with low dispositional trust referred to this signal. It seems that participants with high dispositional trust, who, by definition, have a disposition to trust others, were more swayed by what other users thought of reviewers. This in turn

suggests that user belief can reinforce how signals in the interface are interpreted, for example:

P2 (high dispositional trust participant): “you can tell he/she has done reviews before and he/she has 47 reviews and 29 helpful votes so I’m starting to build relatively a good picture of the hotel so now I think this hotel is probably good so yes I can depend on it.. So I think this guy knows what he’s saying”

P15 (low dispositional trust participant): “It looks like the reviewer is a professional or experienced reviewer based on the 41 reviews and helpful votes but I don’t know if just looking at these kind of push me to go for it or say that this is more helpful.”

These results suggest that low dispositional trust seemed to be associated with a more critical interpretation of trust signals, whereas some signals in the interface boosted trust for users who already had a disposition to trust others.

3.3.4 Effects of Perceived Review Quality, Reviewer’s Expertise and Bias on Perceived Review Helpfulness, Accuracy, and Trust in the Review (RQ-4)

Given the insights provided by previous work (e.g. Ghose & Ipeirotis, 2011; Connors et al., 2011), this study investigated how perception of three factors, review quality, reviewer’s expertise, and reviewer’s bias, influenced users’ perception of review helpfulness and accuracy as well as trust in online reviews. This was investigated by dividing participants’ perceived ratings of review quality, reviewer’s expertise, and reviewer’s bias into high and low categories based on the median. Then, the analysis investigated how participants’ ratings of perceived review helpfulness, accuracy and trust differed according to (i) high and low perceived

review quality, (ii) high and low perceived reviewer's expertise, and (iii) high and low perceived reviewer's bias. The data analysis approach was previously discussed in detail (section 3.2.4.5).

Effects of perceived review quality on the perception of review helpfulness, accuracy and trust in review

Figures 3.14 to 3.16 show participants' ratings of the review helpfulness, accuracy, and trust according to high perceived review quality and low perceived review quality. In these Figures, the blue diamonds indicate participants' ratings of helpfulness, accuracy, and trust when the reviews were perceived as high quality (above the median of 3.5). The red diamonds indicate participants' ratings of helpfulness, accuracy, and trust when the reviews were perceived as low quality (below the median).

It is interesting to note in Figures 3.14, 3.15, and 3.16 that there is little overlap between the blue and red diamonds. Indeed, the majority of the blue diamonds are distributed on the high side of the scale while the red diamonds are distributed on the low side of the scale. The distributions of blue and red diamonds in Figures 3.14, 3.15, and 3.16 indicate that participants' perception of high review quality seemed to increase the perceived helpfulness and accuracy and also led participants to have more trust in the reviews. When the review was perceived as high quality, most of the participants' ratings of review helpfulness (Figure 3.14), accuracy (Figure 3.15), and trust (Figure 3.16) ranged between 4 and 5 (on 5-point Likert scales). In contrast, participants' perception of low review quality seemed to decrease the perceived helpfulness and accuracy, as well as lowering trust in the review. When the reviews

were perceived as low quality, almost all participants' ratings of helpfulness, accuracy, and trust ranged between 1 and 3.

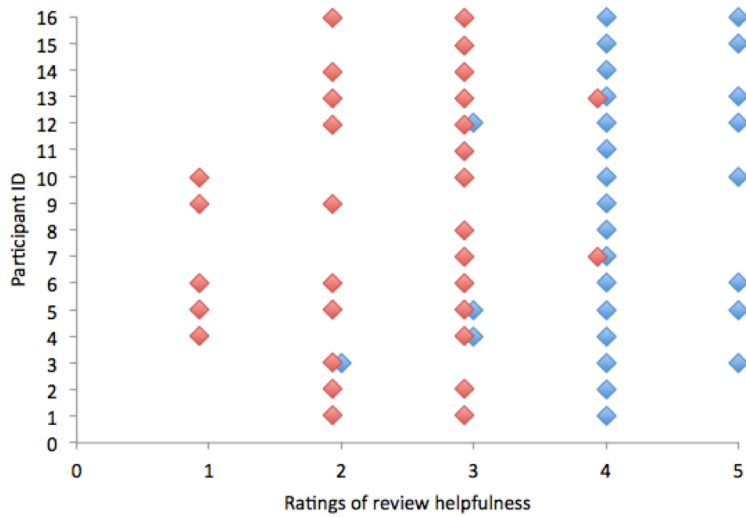


Figure 3.14: Participants' ratings of perceived review helpfulness according to high perceived review quality (blue diamonds) and low perceived review quality (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure agree, 4 agree and 5 strongly agree)

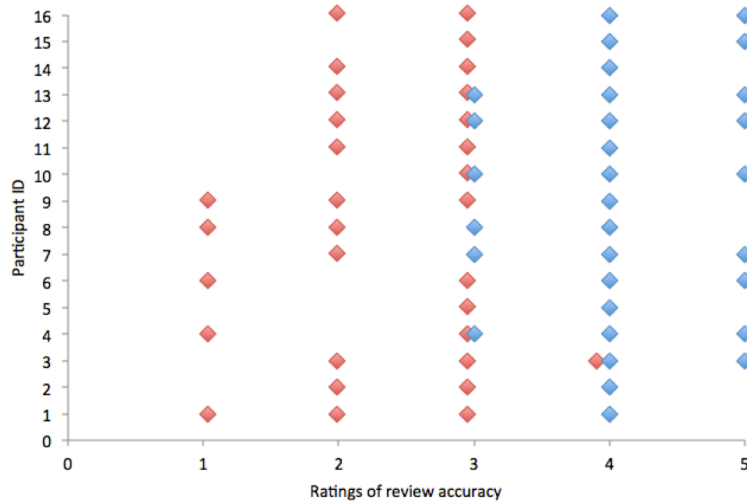


Figure 3.15: Participants' ratings of perceived review accuracy according to high perceived review quality (blue diamonds) and low perceived review quality (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

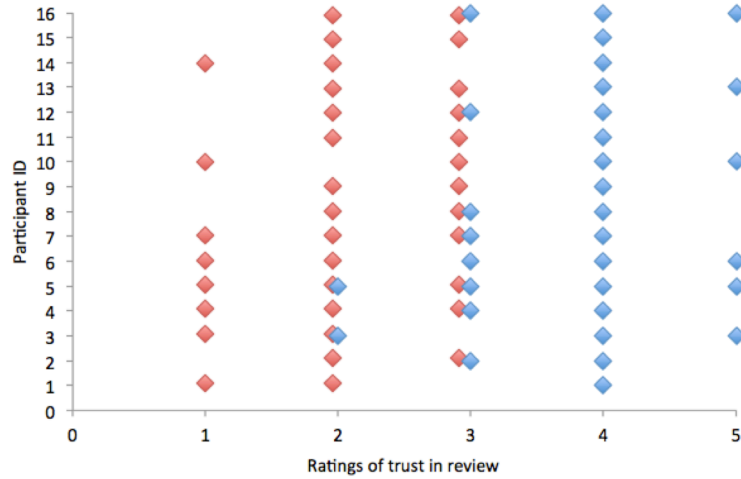


Figure 3.16: Participants' ratings of trust in review according to high perceived review quality (blue diamonds) and low perceived review quality (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

It is important to note that the Figures used to visualize participants' ratings in order to demonstrate the interplay between the factors that can influence trust and their effects on trust, such as Figures 3.14, 3.15, and 3.16, do not account for repeated ratings. For example, in Figure 3.14, P16 rated review helpfulness as 2 twice and also rated the review helpfulness as 3 twice when the reviews were perceived as low quality. However, Figure 3.14 does not show these repeated ratings. Repeated ratings were not taken into account because the analysis investigated *how many participants* rated the review helpfulness in a particular way according to perceived review quality, rather than *how many times* each participant rated the review helpfulness in a particular way. Thus, repeated ratings are not taken into account in any of the Figures reported in this section.

Effects of perceived reviewer's expertise on the perception of review helpfulness, accuracy, and trust in review

Figures 3.17, 3.18, and 3.19 show participants' ratings of review helpfulness,

accuracy, and trust according to high and low perceived reviewer's expertise. The blue diamonds refer to participants' ratings of helpfulness, accuracy, and trust when the reviewers were perceived as having high expertise (above the median of 3). The red diamonds refer to participants' ratings of helpfulness, accuracy, and trust when the reviewers were perceived as having low expertise (below the median of 3).

In Figures 3.17 to 3.19, the red and blue diamonds are overlapping and there seem to be no clear patterns regarding the distributions of red and blue diamonds on either side of the scale. This suggests that participants' perception of the reviews' helpfulness, accuracy, and trust in the reviews were not affected by the perceived reviewers' expertise. High perceived reviewers' expertise did not seem to lead participants to perceive the reviews as more helpful or accurate and did not seem to increase participants' trust in the reviews. Similarly, low perceived reviewers' expertise did not seem to decrease participants' perception of the reviews' helpfulness or accuracy or their trust in the reviews.

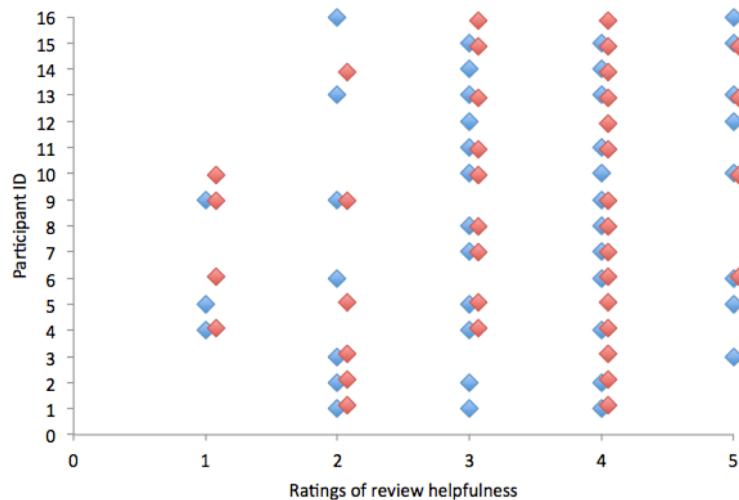


Figure 3.17: Participants' ratings of perceived review helpfulness according to high perceived reviewer expertise (blue diamonds) and low perceived reviewer expertise (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

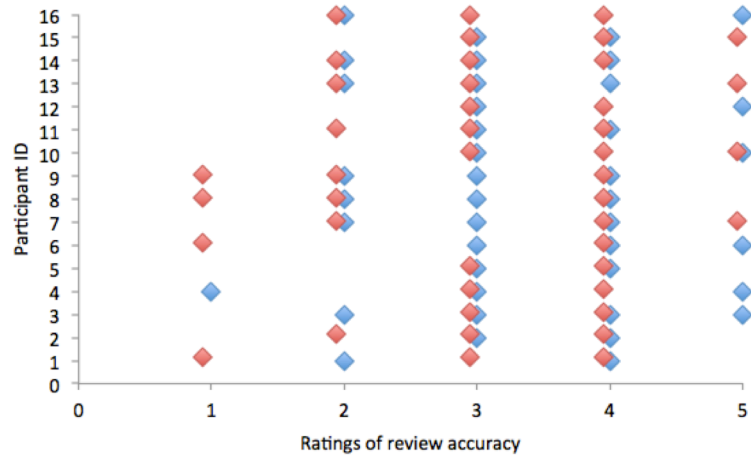


Figure 3.18: Participants' ratings of perceived review accuracy according to high perceived reviewer expertise (blue diamonds) and low perceived reviewer expertise (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)



Figure 3.19: Participants' ratings of trust in review according to high perceived reviewer expertise (blue diamonds) and low perceived reviewer expertise (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

Effects of perceived reviewer's bias on the perception of review helpfulness, accuracy, and trust in review

Figures 3.20, 3.21, and 3.22 show participants' ratings of review helpfulness, accuracy, and trust in relation to high and low perceived reviewers' bias. The same approach described in the previous paragraphs was followed to visualize participants'

ratings. The blue diamonds refer to participants' ratings of helpfulness, accuracy, and trust when the reviewers were perceived as having high bias (above the median of 3). The red diamonds refer to participants' ratings of helpfulness, accuracy, and trust when the reviewers were perceived as having low bias (below the median of 3).

Similar to results on perceived reviewers' expertise (Figures 3.18–3.20), perceived reviewers' bias did not seem to influence the perception of review helpfulness, accuracy, and trust. As shown in Figures 3.20, 3.21, and 3.22, the red and blue diamonds are overlapping and there seem to be no obvious patterns regarding the distribution of the red and blue diamonds on either side of the scale. Thus, contrary to expectations, high perceived reviewers' bias did not seem to decrease the perceived helpfulness, accuracy, and trust. Also, the low perceived reviewers' bias did not increase the perceived helpfulness, accuracy, and trust.

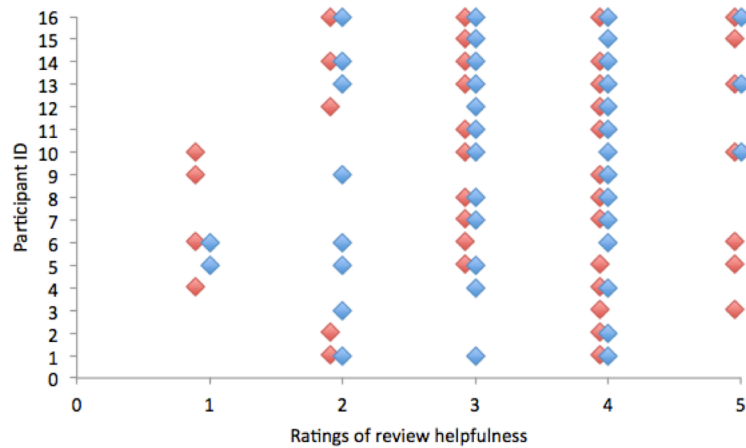


Figure 3.20: Participants' ratings of perceived review helpfulness according to high perceived reviewer bias (blue diamonds) and low perceived reviewer bias (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

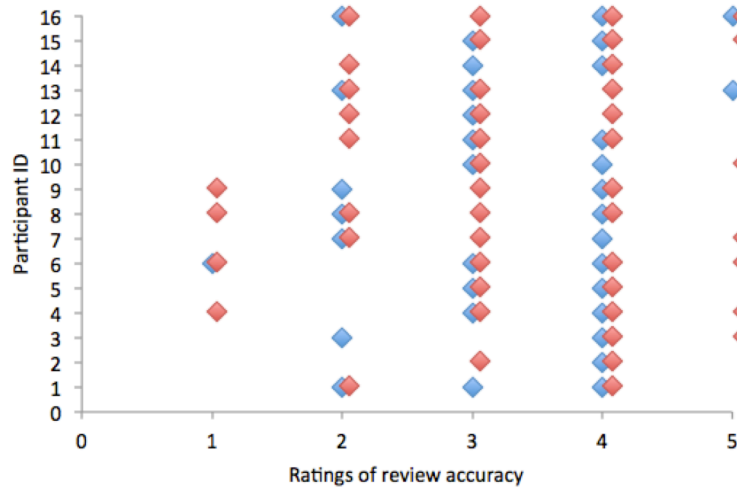


Figure 3.21: Participants' ratings of perceived review accuracy according to high perceived reviewer bias (blue diamonds) and low perceived reviewer bias (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)



Figure 3.22: Participants' ratings of trust in review according to high perceived reviewer bias (blue diamonds) and low perceived reviewer bias (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

3.3.5 Effects of Perceived Review Helpfulness and Accuracy on Trust in the Review

(RQ-5)

Perceived review helpfulness and accuracy have been suggested as important factors that can influence user trust in online reviews (Hong et al., 2012; Liu et al., 2008). Thus, the analysis investigated how participants' perception of these two

review-related factors influences their trust in the reviews. This was investigated by dividing participants' ratings of perceived review helpfulness and accuracy into high and low groups based on the median values. Then, the analysis investigated how participants' ratings of trust differed according to (i) high and low perceived review helpfulness and (ii) high and low perceived review accuracy. The analysis approach was previously explained in detail (section 3.2.4.6).

The same approach was followed as in the previous subsection to visualize participants' responses (Figures 3.23 and 3.24). The blue diamonds refer to participants' ratings of trust in the review when the review was perceived as helpful (above the median of 3) (Figure 3.23) and accurate (above the median of 3) (Figure 3.24). The red diamonds refer to participants' ratings of trust in the review when the review was perceived as unhelpful (below the median 3) (Figure 3.23) and inaccurate (below the median 3) (Figure 3.24).



Figure 3.23: Participants' ratings of trust in review according to high perceived review helpfulness (blue diamonds) and low perceived review helpfulness (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

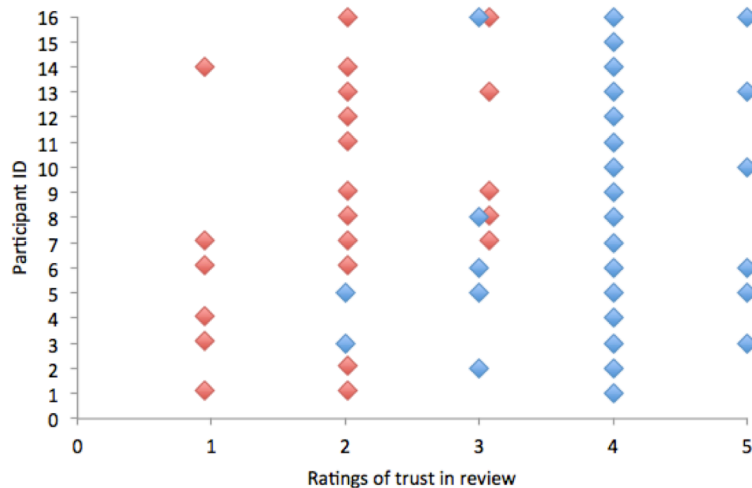


Figure 3.24: Participants' ratings of trust in review according to high perceived review accuracy (blue diamonds) and low perceived review accuracy (red diamonds) (Note: 1 stands for strongly disagree, 2 disagree, 3 not sure, 4 agree and 5 strongly agree)

In both Figures 3.23 and 3.24, there is little overlap between the blue and red diamonds. Most of the blue diamonds are distributed on the high side of the scale and most of the red diamonds are on the low side of the scale. This means that when the review was perceived as helpful and accurate, participants tended to give a higher trust rating to the review. In contrast, when the review was perceived unhelpful and inaccurate, participants gave a lower rating of trust in the review. Accordingly, it seems that participants' perception of review helpfulness and accuracy were important in their trust in the reviews.

3.4 Discussion

This study showed how user trust in online reviews is influenced by signals from the interface (RQ-1) (objective 1). The findings build on previous work investigating trust signals (e.g. Kobayashi et al., 2015; Riasanow et al., 2015) in two ways. First, they reveal new review-related and reviewer-related signals that have not been considered before. These signals are online community opinions about the

review and user-generated photos (review-related signals), and the reviewer's background (i.e. city & country) and the reviewer's similarity to the user in terms of characteristics and satisfaction level (reviewer-related). Second, the findings of this study contribute to previous work by providing insights into the importance of each type of signal regarding trust. Overall, it seems that review-related signals are more important in trust than signals that are related to the reviewer.

Previous work has focussed extensively on exploring what factors influence trust in online reviews (Lee et al., 2008; Kim et al., 2008; Ku et al., 2012), and the findings presented here extend this line of work by exploring the way interface signals are used in the perception of these factors (RQ-2). The way that users use interface signals in their perception of trust factors of the review and reviewer (i.e. perceived trustworthiness of the review and the reviewer) does not appear to be straightforward. First, users tend to use various independent signals in their perception of trust factors. For instance, review quality seems to be perceived based on a variety of signals that relate to both the review and the reviewer. Second, some signals seem to be used in combination. For example, positive words mentioned in the review seemed to be used in combination with details included in the review in the perception of different trust factors such as perceived review quality and reviewer's bias. In these cases, a high number of positive words, indicating a high level of emotions, can lead users to perceive the review as of low quality and the reviewer as being highly biased, especially when the review lacks details. In contrast, when the review includes sufficient details, a high number of positive words does not seem to have an effect.

This study represents the first attempt to understand the role of user's dispositional trust in the context of online reviews, particularly in the way users use

interface signals (RQ-3) (objective 3). It appears that users with low dispositional trust are more critical in their interpretation of interface signals as trust signals than users with high dispositional trust. Previous work (Hsu, 2008; McKnight et al., 2002a,b) has paid scant attention to the role of dispositional trust in the context of online reviews, and this warrants further investigation.

In regard to the factors that can influence trust, this study provided support to previous work (e.g. Lee et al., 2008; Connors et al., 2011) which suggested that perceived review quality, helpfulness, and accuracy can influence user trust in online reviews. However, the current study showed no effects of the perceived reviewer's expertise and bias on trust (RQ-4 and -5) (objective 2). This may indicate that factors of the review are more important in user trust in online reviews than factors of the reviewer. Nevertheless, the effects of perceived reviewer's expertise and bias need to be further investigated because these factors have been suggested to matter in trust (e.g. Sun et al., 2011; Ku et al., 2012).

There are two limitations associated with this study and its findings. First, this study included only positive reviews, while negative reviews were excluded. Previous work by Riasanow et al. (2015) suggested that negative reviews can be very influential in user trust, possibly more so than positive reviews. Thus, further work needs to take negative reviews into account. Second, the findings were based on data collected from a small sample. Thus, a larger scale investigation could provide quantitative evidence to validate (i) the effect of interface signals on trust and the perception of trustworthiness, (ii) the interplay between the factors that can influence trust and their effects on trust, and (iii) the effects of dispositional trust.

Finally, the findings of this study have practical implications for designers of systems that provide user-generated reviews. The findings can be applied to interface

designs to better help users in perceiving the trustworthiness of the reviews and the reviewers and in establishing trust in online reviews. First, signals that relate to the online community's opinions about reviews should be transparent as the results revealed that participants relied on community opinions in their trust in the reviews as well as in their perception of the quality and helpfulness of reviews. The findings recommend capturing a more balanced perspective by signalling both positive and negative opinions about reviews.

Second, participants' responses suggested that they would appreciate objective evidence to verify the information given by a reviewer. This evidence could come in the form of photographs, but it is less obvious how other service-oriented information items (e.g. service, sleep quality, etc.) that may be important in purchasing decisions could be represented in this way.

Last, the results showed that participants used various signals but still struggled to determine reviewers' bias. Designers could help users by providing more direct signals that could be used to determine bias.

4 Study 2: Effects of Review Valence, Online Community Opinions, and User-Generated Photos on User Trust in Online Reviews and Purchase Intention

4.1 Motivation & Research Questions

Study 2 extended study 1 in four ways. First, study 2 investigated how user trust in online reviews is influenced by review valence. Review valence has been suggested to be an influential factor on trust and previous work has shown mixed results of review valence on trust (e.g. Lee et al., 2008; Kobayashi et al., 2015; Riasanow et al., 2015). Because review valence was not considered in study 1, study 2 took review valence into account in relation to trust (objective 2).

Second, study 2 focused on review-related signals (community opinions about the review and user-generated photos) that were suggested by study 1 to influence trust (objective 1). Study 2 further investigated the effects of these signals by investigating how community opinions that reflect different perspectives, rather than only positive perspectives, can influence trust. It also investigated how user trust can be influenced not only by the presence of photos but also by the photo type and valence. This is because photos can be of different types depending on the content and can be of difference valence similar to the textual content of a review.

Third, study 2 extended study 1 by further investigating the role of the user's own background in trust in online reviews (objective 3) and the way that the factors that can influence trust relate to one another and to trust (objective 2). While these were primarily addressed in study 1, the findings were based on a small sample and therefore the findings needed to be validated based on a larger scale investigation. In

regard to the user's background, study 2 took into account the user's past experience using online reviews in addition to the user's dispositional trust.

Finally, study 2 investigated not only user trust in online reviews but also user purchase intention based on online reviews. This is in line with the main aim of this research, which is about investigating **what leads users to trust online reviews and make purchase decisions based on online reviews**. Accordingly, study 2 addressed the following research questions:

RQ-1: How do review valence, online community opinions about the review, and user-generated photos influence user trust in online reviews when making purchase decisions?

RQ-2: How does a user's background in the forms of dispositional trust and past experience shape trust in online reviews when making purchase decisions?

RQ-3: How do the influential factors on trust relate to one another, to trust in online reviews, and to purchase intention?

Figure 4.1 provides a graphical representation of the investigation of study 2.

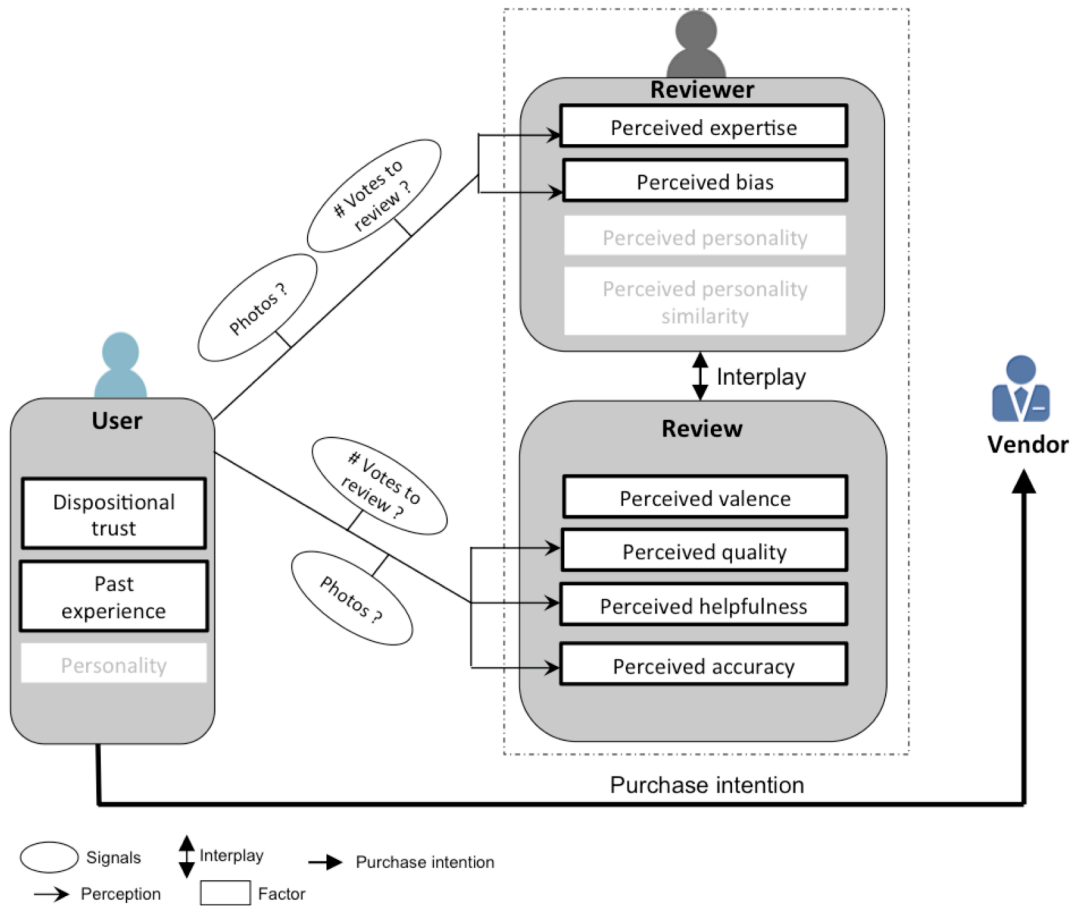


Figure 4.1: Overview of study 2 (i) investigating the effects of review valence, community opinions and user-generated photos on trust and purchase intention (iii) effects of user background in the forms of dispositional trust and past experience (ii) interplay between the factors that can influence trust (Note: Only objects in black are investigated)

4.2 Methods

4.2.1 Participants

A total of 884 participants took part in this study. Participants were recruited by advertising the study on social media sites: Twitter, Facebook, and LinkedIn, where the online study linked was shared. Also, study invitations were sent to City University London staff and students via email.

Among the 884 participants who took part in this study, 74 participants' responses were incomplete and were therefore excluded from the analysis. An additional 11 participants' responses were excluded from the analysis because these 11 participants spent no time (i.e. zero seconds) on the review page and therefore they were not aware of the experimental manipulation. As a result, the data analysis included responses from 799 participants (mean age of 33.3 years, 54% male and 46% female).

4.2.2 Study design

An online experimental study was conducted in order to address the research questions. The study followed a factorial design approach; it manipulated review valence, community opinions about the review, and photo presence, type, and valence. The study used a between subjects design, i.e. each participant was assigned randomly to one condition. It collected quantitative data about the participants' background, trust factors of the review and the reviewer, trust in the review, and purchase intention.

4.2.3 Materials

4.2.3.1 Reviews

Fifty restaurant reviews were constructed for the purpose of this study; each review represented a condition. Each review was presented on a screenshot using the tool Qualtrics <www.qualtrics.com> and each participant was randomly shown only one review. Figure 4.2 provides an example of a review presented on a screenshot. The reviews were evenly randomised, i.e. reviews were set to be presented equally to

participants, in order to obtain an equal, or similar, number of responses for all reviews.

To avoid confounding effects of explicit rating elements, price information, and review date, these elements were excluded from the screenshots that presented the reviews. Also, the screenshots used a fictitious restaurant name (Ledbarry) to avoid the confounding effect of familiarity with brand on participants' responses. All the reviews were set at the same length, five lines, in order to eliminate any effect of

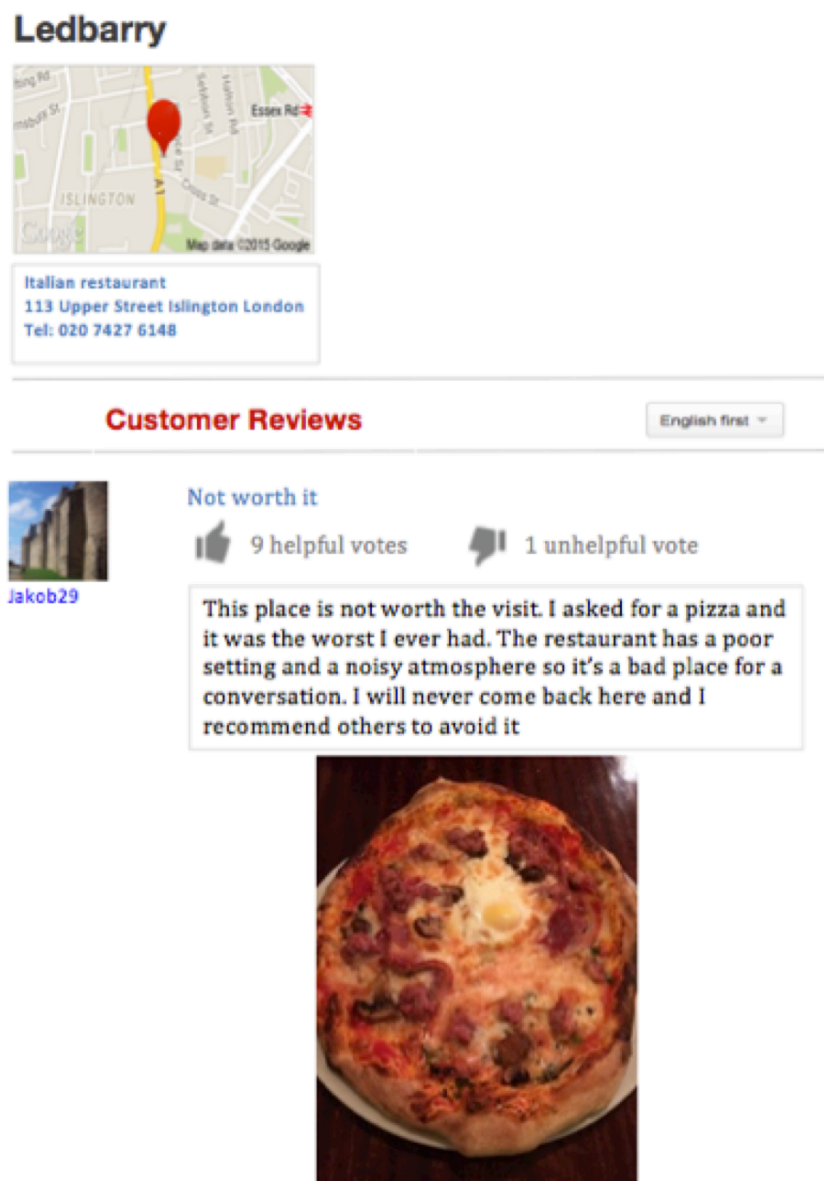


Figure 4.2: Example of screenshot presenting a review

review length on perceived quality because long reviews can be more informative (Lee et al., 2008).

Manipulation of Variables

Following a factorial design approach, this study included a total of 50 conditions: 2 review valence (positive and negative) \times 5 community opinions (2:8, 3:7, 5:5, 6:4, and 9:1 helpful to unhelpful votes) \times 5 user-generated photos (absent, positive food photo, negative food photo, positive atmosphere photo, and negative atmosphere photo). The following paragraphs explain how each of these variables was manipulated.

Review valence

First, review valence was manipulated as either positive or negative based on the content of the review. The manipulation approach was based on previous work (Utz et al., 2012; Riasanow et al., 2015). The positive review referred to a pleasing customer experience and recommended the restaurant to others. In contrast, the negative review referred to a dissatisfying customer experience and warned others about the restaurant. Both the positive and negative reviews were constructed to be identical in structure. The reviews started with an introductory sentence about the overall experience, i.e. whether the restaurant is worth visiting or not. Then, the reviews included information about the food served and atmosphere. Finally, the reviews concluded with a recommendation sentence. Figures 4.3 and 4.4 show the positive and negative reviews that were constructed for this study.

This place is worth the visit. I asked for a pizza and it was the best I ever had. The restaurant has a wonderful setting and a calm atmosphere so it's a good place for a conversation. I would definitely come back here and I recommend others to try it

Figure 4.3: Positive review

This place is not worth the visit. I asked for a pizza and it was the worst I ever had. The restaurant has a poor setting and a noisy atmosphere so it's a bad place for a conversation. I will never come back here and I recommend others to avoid it

Figure 4.4: Negative review

Prior to the main study, the positive and negative reviews (shown in Figures 4.3 and 4.4) were tested. This test first aimed at validating the classification of review valence, i.e. whether the positive review actually represented a pleasing customer experience and the negative review actually represented a dissatisfying customer experience. Second, the test aimed to ensure the similarity of the positive and negative reviews in terms of quality, as review quality has been suggested to influence trust (Li & Tang, 2010; Lee et al., 2008) and therefore can have a confounding effect on participants' responses.

The test included two conditions: positive review and negative review. It was conducted online using Survey Monkey <www.surveymonkey.com> and each participant was assigned to one condition (i.e. between subjects design). Forty participants were assigned randomly and evenly to either the positive or the negative condition. This was done in order to obtain an equal number of responses for each condition.

During the test, participants were asked to provide explicit feedback about the review valence and quality. Review valence was measured by asking participants to

choose whether the reviewer had a *good experience* or *bad experience* with the restaurant based on the review presented. Review quality was measured based on the approach of Lee et al. (2008). Participants were asked to rate four dimensions, understandability, sufficiency, relevance, and reliability, on 5-point Likert scales and review quality was calculated as the average value. Appendix B.1.1 shows the questionnaire used in this test.

The results confirmed the validity of the manipulation of review valence. All of the participants (20 out of 20) who were assigned to the positive review condition chose the option *the reviewer had a good experience with the restaurant*. Also, 100% of participants (20 out of 20) who were assigned to the negative review condition chose the option *the reviewer had a bad experience with the restaurant*.

In regard to the review quality, a two one-sided t-test (TOST) using the XLStat – a statistical analysis software that integrates into Excel – was applied to participants' ratings of the quality of positive and negative reviews. The TOST analysis investigated the statistical equivalence between the positive review quality and the negative review quality. Prior to reporting the results of TOST analysis, it is important to point out some details of this analysis. TOST analysis requires the researcher to choose a threshold difference such that only smaller differences than the threshold can be considered as statistical equivalence. In contrast, when the difference exceeds the chosen threshold, the variables are considered to be statistically different. For the analysis of review quality, the threshold was set at 10% of the scale size. Because review quality was measured using 5-point Likert scales, the maximum threshold difference was set as 0.5. This means that if the difference in participants' ratings of the quality of the positive review and the quality of the negative review exceeds 0.5, then the positive and negative reviews are considered

different in terms of quality. Otherwise, the positive and negative reviews are considered to be equivalent in quality.

Results of the TOST analysis showed that the difference between the positive review quality and the negative review quality did not exceed 0.4 (90% confidence), which was even less than the chosen threshold of 0.5. The difference between the positive review quality and negative review quality ranged from -0.394 to 0.194 with a p value of 0.047 ($p < 0.05$). Therefore, the positive and negative reviews were considered to be statistically equivalent in terms of quality. Appendix B.1.2 shows the complete results of TOST analysis.

Community opinions

Community opinions can be indicated as the ratio of helpful to unhelpful votes given by community members to a particular review. Since the ratio of helpful to unhelpful votes can represent a broad spectrum of community opinions, this study included five different random ratios. These ratios were: 2:8, 3:7, 5:5, 6:4, and 9:1 (helpful to unhelpful votes). Each of these ratios represented a condition of community opinions about the review, i.e. five conditions in total. The total number of votes, both helpful and unhelpful, was set to be 10 for all reviews to prevent any possible confounding effects of the total number of votes on participants' responses.

Photo presence

Photos were classified as either absent or present. In the absence condition, there was no photo presented alongside the review. In contrast, the presence condition included one photo presented alongside the review. The photo was either of food, specifically, pizza, or the internal atmosphere of the restaurant, and it was either

positive or negative. The selection of photos is explained in the following subsections.

Photo type

Previous work by Jang and Namkung (2009) has suggested that food and atmosphere represent aspects of restaurants that can influence individuals' behavioural intention towards restaurants. These aspects were therefore used for the two types of photos in this study: food (specifically pizza) and atmosphere.

Photo valence

Similar to the textual content of reviews, the valence of photos can be different. Some photos can convey favourable meanings (i.e. positive photos) while other photos can convey unfavourable meanings (i.e. negative photos). Accordingly, this study included positive and negative photos and of food and atmosphere.

The photos were selected in two stages. First, a set of 20 user-generated photos (ten photos of pizza and ten photos of atmosphere) were selected from the review website Yelp <www.Yelp.com>. Second, an online test was conducted with these photos to choose positive and negative food photos and positive and negative atmosphere photos. The test was conducted using the survey tool Survey Monkey <www.surveymonkey.com>. The test included two conditions: photos of food (ten pizza photos) and photos of atmosphere (ten atmosphere photos). A total of 48 participants were randomly and evenly assigned to one condition (i.e. between subjects design) in order to obtain the same number of responses for each condition.

For the photos of food, each participant was shown 10 photos of pizza, one photo at a time. For each photo, the participant was asked to rate four dimensions of perceived food quality: perceived visual appearance, tastiness, freshness, and

healthiness. Each of these dimensions was measured using a 5-point Likert scale taken from Jang and Namkung (2009) (appendix B.2.1.1). Perceived food quality was then calculated as the average value of the dimensions' ratings.

The photo with the highest mean value of perceived food quality ($M=3.18$) was chosen to be the positive food photo (Figure 4.5) and the photo with the lowest mean value of perceived food quality ($M=2.18$) was chosen to be the negative food photo (Figure 4.6). Appendix B.2.1.2 shows all the photos that were tested and the mean values of perceived food quality.



Figure 4.5: Positive food photo



Figure 4.6: Negative food photo

In order to ensure that the chosen food photos differed regarding the perceived food quality, a paired sample *t*-test using Microsoft Excel 2011 was applied to participants' ratings of perceived food quality of the positive food photo (Figure 4.5) and ratings of perceived food quality of the negative food photo (Figure 4.6). The results showed that there was a significant difference between the positive food and negative food photos in regard to perceived food quality ($p < 0.01$).

The second condition included photos of the internal atmosphere of restaurants. Each participant was shown ten photos, one photo at a time. For each photo, the participant was asked to rate four dimensions of perceived atmosphere: perceived restaurant setting, colors used inside the restaurant, lighting inside the restaurant, and interior design. Each of these dimensions was measured using 5-point Likert scales taken from Jang and Namkung (2009) (appendix B.2.2.1). Perceived atmosphere was then calculated as the average value of the dimensions' ratings.

The photo with the highest mean value of perceived atmosphere ($M = 3.73$) was chosen as the positive atmosphere photo (Figure 4.7) and the photo with the lowest mean value of perceived atmosphere ($M = 2.51$) was chosen for the negative atmosphere photo (Figure 4.8). Appendix B.2.2.2 shows all the atmosphere photos that were included in the test and the mean values of each.



Figure 4.7: Positive atmosphere photo



Figure 4.8: Negative atmosphere photo

A paired sample *t*-test using Microsoft Excel 2011 was applied to participants' ratings of perceived atmosphere of the positive atmosphere photo (Figure 4.7) and the negative atmosphere photo (Figure 4.8) to ensure that these photos differed in regard to the perceived atmosphere. The results showed statistical difference ($p < 0.05$) in the perceived atmosphere between the positive atmosphere photo and the negative atmosphere photo.

4.2.3.2 Questionnaires

Two questionnaires were used in this study: background questionnaire and trust factors questionnaire. The following paragraphs explain the way these questionnaires were designed and also the data collected from each questionnaire.

Background questionnaire

The background questionnaire (shown in appendix B.4) captured participants' age, gender, dispositional trust, and past experience using online reviews. The approach to measuring participants' dispositional trust was taken directly from McKnight et al. (2002a). Dispositional trust was measured based on four dimensions: integrity, competence, benevolence, and trusting stance. Each of these dimensions was measured using 7-point Likert scales and dispositional trust was calculated as the average value.

Participants were also asked to provide feedback about their past experience using online reviews for making purchase decisions. Participants were first asked whether they had prior experience using online reviews. This was used as a filter question: if the participant answered "yes", then the participant was asked to respond to three 7-point Likert scales about past experience adapted from Pavlou and Gefen (2004). Past experience was then calculated as the average value of the three scale

ratings. If the participant answered “no”, then the participant was directed to proceed to the scenario page. Ninety-five participants reported that they had not used online reviews before and thus did not rate their past experience. The analysis therefore included 704 participant responses about past experience. Table 4.1 shows the minimum, maximum, mean, and standard deviation of participants’ dispositional trust and past experience.

	Minimum	Maximum	Mean	Standard deviation
Dispositional trust	1.17	6.92	4.65	0.85
Past experience	1.00	5.00	4.02	0.51

Table 4.1: Descriptive statistics of participants’ dispositional trust (Note: N=799 for dispositional trust and N= 704 for past experience)

Trust factors questionnaire

After reading their assigned review, participants were required to provide ratings on seven factors: perceived review quality, helpfulness, and accuracy; perceived reviewer’s expertise and bias; trust in review; and purchase intention. The approach to measuring these factors was based on previous work (Lee et al., 2008; Liu et al., 2008; Kusumasondjaja et al., 2012; Kim et al., 2008; McKnight et al., 2002a; Park et al., 2007; Sparks & Browning, 2011) and used 7-point Likert scales (shown in appendix B.5).

The perceived review quality and trust in the review were measured using multiple scales. Review quality was measured based on four dimensions: understandability, sufficiency, relevance, and reliability. Each of these dimensions was measured using a 7-point Likert scale taken from Lee et al. (2008) and the perceived review quality was calculated as the average value. Participants’ trust in the review was measured based on the approach of McKnight et al. (2002a), by adapting

four 7-point Likert scales. Trust in the review was then calculated as the average value of the scale ratings. Table 4.2 shows the minimum, maximum, mean, and standard deviation of the factors measured in the trust factors questionnaire.

	Minimum	Maximum	Mean	Standard deviation
Review quality	1.00	5.00	3.64	0.61
Review helpfulness	1.00	5.00	3.46	0.85
Review accuracy	1.00	5.00	2.95	0.67
Reviewer's expertise	1.00	5.00	3.16	0.78
Reviewer's bias	1.00	5.00	2.82	0.65
Trust in review	1.00	5.00	2.97	0.85
Purchase intention	1.00	5.00	2.82	1.01

Table 4.2: Descriptive statistics of factors measured in trust factors questionnaire

4.2.4 Procedure

The main study was conducted online using the tool Qualtrics <www.qualtrics.com>. Participants were first shown an introductory page that explained the purpose of the study, procedure, tasks, and total required time to complete the study which was approximately 10 minutes (shown in appendix B.3). Then, participants completed a background questionnaire that captured their demographics (age and gender), dispositional trust, and past experience using online reviews.

Afterwards, a scenario was presented to each participant asking that participant to imagine s/he intends to find a restaurant for her/his birthday and conducts an online search. Search results included an online review about an Italian restaurant called “Ledbarry”. Participants were then asked to proceed to the next page which

included a screenshot of an online review about the restaurant. Then, participants were asked to proceed to the next page and rate seven factors on 7-point Likert scales, perceived review quality, helpfulness, and accuracy; perceived reviewer's expertise and bias; trust in the review; and purchase intention.

4.2.5 Data Analysis

4.2.5.1 Effects of review valence, community opinions, and user-generated photos on user trust in online reviews when making purchase decisions (RQ-1)

RQ-1 was addressed by investigating the effects of review valence, community opinions about the review, and photo presence, type, and valence on participants' ratings of seven factors that were measured in the trust factors questionnaire. Review valence, community opinions, and photo presence, type, and valence were categorical variables. The seven factors captured in the trust factors questionnaire, including perceived review quality, helpfulness, and accuracy; perceived reviewer's expertise and bias; trust in the review; and purchase intention, were continuous variables.

There were two possible analysis techniques: parametric multivariate analysis of variance (MANOVA) or non-parametric Kruskal–Wallis test. The appropriate analysis technique was chosen based on data distribution: MANOVA requires normally distributed data, whereas Kruskal–Wallis can be applied to data that is not normally distributed (Dancey & Reidy, 2002).

The data distribution was tested by applying the Shapiro–Wilk test to participants' ratings of the seven factors that were measured in the trust factors questionnaire. The Shapiro–Wilk test tests the null hypothesis that the tested variables are not normally distributed and therefore significant results indicate non-normality of data distribution. The results of the Shapiro–Wilk test were significant

on all the factors ($p < .0001$), indicating that the participants' ratings of all the factors were not normally distributed (Table 4.3).

	Statistic	Significance
Review quality	0.959	< 0.0001***
Perceived helpfulness	0.817	< 0.0001***
Perceived accuracy	0.798	< 0.0001***
Reviewer's bias	0.778	< 0.0001***
Reviewer's expertise	0.848	< 0.0001***
Trust in review	0.950	< 0.0001***
Purchase intention	.900	< 0.0001***

Table 4.3: Results of normal distribution test of factors measured in trust factors questionnaire (Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, $df = 799$ for all factors)

Accordingly, the non-parametric Kruskal–Wallis test was chosen as the appropriate test for investigating the main effects of review valence, community opinions about the review, and photo presence, type, and valence. These were treated as the independent variables and the seven factors captured in the trust factors questionnaire were treated as the dependent variables.

4.2.5.2 Role of user background in trust in online reviews when making purchase decisions (RQ-2)

This study investigated the way that participants' background in the form of dispositional trust and past experience shaped their trust in the reviews and their purchase intention based on the reviews. To do so, a Spearman correlation was applied to investigate the relationship between participants' dispositional trust and past experience and their ratings of the seven factors that were captured in the trust factors questionnaire: perceived review quality, helpfulness, and accuracy; perceived reviewer's expertise and bias; trust in the review; and purchase intention. The

Spearman correlation was chosen rather than its parametric equivalent (Pearson correlation) because participants' ratings of the seven factors were not normally distributed (as shown previously in Table 4.3, section 4.2.4.1).

4.2.5.3 Interplay between the influential factors on trust and their relationship with trust and purchase intention (RQ-3)

The first study primarily investigated the interplay between the factors that can influence trust and the way these factors relate to trust. These factors were perceived review quality, helpfulness, and accuracy and perceived reviewer's expertise and bias. However, the findings of the first study were based on a small sample. Thus, this study investigated the interplay between these factors and the way these factors relate to trust based on a larger sample. Also, this study took into account user purchase intention and investigated how it relates to the factors that can influence trust, and to trust. This analysis was also conducted by applying the Spearman correlation because of the non-normal distribution of the collected data. The same analysis was applied to address RQ-2 and RQ-3, i.e. the role of the user background and the interplay between the influential factors on trust were investigated by applying Spearman correlation to data collected from the background and trust factors questionnaire.

4.3 Results

4.3.1 Effects of Review Valence, Community Opinions, and Photo Presence, Type, and Valence on Trust in Online Reviews When Making Purchase Decisions (RQ-1)

4.3.1.1 Review valence

The results showed that review valence influenced participants' perception of the trustworthiness of both the review and the reviewer, their trust in the review, and their purchase intention (Table 4.4) (complete results shown in appendix B.6.1).

Factor	Chi-square	Significance
Review quality	8.865	0.003**
Review helpfulness	7.839	0.005**
Review accuracy	0.369	0.544
Reviewer's bias	9.764	0.002**
Reviewer's expertise	2.387	0.122
Trust in review	4.908	0.027*
Purchase intention	83.161	0.000***

Table 4.4: Main effects of review valence (Note: $df=1$ for all factors, * $p<0.05$, ** $p<0.01$, *** $p<0.001$)

The valence of the review significantly influenced participants' perception of two factors of the trustworthiness of the review: perceived review quality and helpfulness. Participants perceived the positive review as of higher quality (mean rank = 423.44, mean = 3.70) than the negative review (mean rank = 375.42, mean = 3.57) ($\chi^2(1, N = 799) = 8.865, p = 0.003$). Similarly, the positive review was perceived as more helpful (mean rank = 420.24, mean = 3.52) than the negative review (mean rank = 378.77, mean = 3.39) ($\chi^2(1, N = 799) = 7.839, p = 0.005$). Unlike the perceived review quality and helpfulness, the perceived review accuracy

was not significantly influenced by the review valence ($\chi^2 (1, N = 799) = 0.369, p = 0.544$).

The effect of review valence extended to participants' perception of the trustworthiness of the reviewer, especially the perceived reviewer's bias ($\chi^2 (1, N = 799) = 9.764, p = 0.002$). It seems that the negative review increased the perceived reviewer's bias in contrast to the positive review. This means that participants tended to perceive the reviewer to be more biased when the review was negative. Participants reported higher bias of the reviewer (mean rank = 422.18, mean = 2.88) when the review was negative than when the review was positive (mean rank = 378.85, mean = 2.76). The valence of the review did not have a significant effect on participants' perception of the reviewer's expertise ($\chi^2 (1, N = 799) = 2.387, p = 0.122$).

Finally, the results showed that participants had more trust in the positive review ($\chi^2 (1, N = 799) = 4.908, p = 0.027$) and were also more likely to make a purchase decision based on the positive review ($\chi^2 (1, N = 799) = 83.161, p < 0.0001$) compared to the negative review. Participants reported higher trust in the positive review (mean rank = 417.56, mean = 3.03) than the negative review (mean rank = 381.59, mean = 2.91). They also reported higher purchase intention based on the positive review (mean rank = 469.70, mean = 3.12) than the negative review (mean rank = 326.90, mean = 2.50).

4.3.1.2 Community opinions

Unlike review valence, community opinions about the review mattered only in the perception of the trustworthiness of the review. The results showed that community opinions about the review only significantly affected the perceived

helpfulness of the review ($\chi^2(4, N = 799) = 13.600, p = 0.009$) (Table 4.5) (complete results shown in appendix B.6.2).

Factor	Chi-square	Significance
Review quality	8.122	0.087
Review helpfulness	13.600	0.009**
Review accuracy	9.286	0.054
Reviewer's bias	4.902	0.529
Reviewer's expertise	3.002	0.419
Trust in review	8.826	0.066
Purchase intention	8.025	0.091

Table 4.5: Main effects of community opinions (Note: $df=4$ for all factors, * $p<0.05$, ** $p<0.01$, *** $p<0.001$)

Overall, it seems that an increase in community positive opinions (i.e. helpful votes) increased participants' perception of the reviews' helpfulness. For example, reviews with opinions 3:7 (helpful to unhelpful votes) were perceived as more helpful (mean rank = 377.45, mean = 3.40) than reviews with opinions 2:8 (mean rank = 361.09, mean = 3.29) (Table 4.6). This pattern was observed for all opinion ratios with one exception. Reviews with opinions 6:4 were perceived as less helpful (mean rank = 406.08, mean = 3.47) than reviews with opinions 5:5 (mean rank = 417.85, mean = 3.55). This was contrary to expectations because the opinions 6:4 included

Community opinions ratios	Mean rank of perceived helpfulness of review	Mean of perceived helpfulness of review
2:8	361.09	3.29
3:7	377.85	3.40
5:5	417.47	3.55
6:4	406.47	3.47
9:1	437.66	3.58

Table 4.6: Perceived review helpfulness at different ratios of community opinions

more helpful votes than opinions 5:5.

4.3.1.3 Photo presence

The presence of a user-generated photo alongside the review significantly influenced participants' perception of the trustworthiness of the review and reviewer. Among factors of the perceived trustworthiness of the review, the perceived review quality was significantly influenced by the presence of a photo ($\chi^2(1, N = 799) = 5.446, p = 0.020$) (Table 4.7). It seems that the presence of a photo decreased the perceived quality of the reviews. When the review was presented with a photo, participants reported lower perceived review quality (mean rank = 390.44, mean = 3.61) than when the review was presented without a photo (mean rank = 437.01, mean = 3.75) (complete results shown in appendix B.6.3).

The negative effect of photo presence extended to participants' perception of the trustworthiness of the reviewer. The presence of a photo increased participants' perception of the reviewer's bias ($\chi^2(1, N = 799) = 5.760, p = 0.016$). Participants reported higher bias when the review was presented with a photo (mean rank = 408.46, mean = 2.84) than when the review was presented without a photo (mean rank = 367.26, mean = 2.73). In contrast, the presence of a photo seemed to decrease the perceived reviewer's expertise ($\chi^2(1, N = 799) = 6.320, p = 0.012$). Participants reported lower reviewer's expertise when a photo was present (mean rank = 390.33, mean = 3.12) than when there was no photo (mean rank = 437.46, mean = 3.29).

Factor	Chi-square	Significance
Review quality	5.446	0.020*
Review helpfulness	0.727	0.394
Review accuracy	0.201	0.654
Reviewer's bias	5.760	0.016*
Reviewer's expertise	6.320	0.012*
Trust in review	1.927	0.165
Purchase intention	1.502	0.220

Table 4.7: Main effects of photo presence (Note: df=1 for all effects, *p<0.05, **p<0.01, ***p<0.001)

4.3.1.4 Photo type

There were no significant effects of photo type on participants' responses (Table 4.8) (appendix B.6.4 shows complete results). The results showed that the effects of photo type on factors of the perceived trustworthiness of the review and reviewer, trust in the review, and purchase intention were insignificant.

Factor	Chi-square	Significance
Review quality	0.316	0.574
Review helpfulness	0.207	0.649
Review accuracy	0.121	0.728
Reviewer's bias	0.677	0.411
Reviewer's expertise	0.278	0.598
Trust in review	0.541	0.462
Purchase intention	0.036	0.849

Table 4.8: Main effects of photo type (Note: df = 1 for all effects, *p<0.05, **p<0.01, ***p<0.01)

4.3.1.5 Photo valence

Similar to photo type, photo valence did not have a significant effect on any of the factors of the perceived trustworthiness of the review and reviewer, on trust in the review, or on purchase intention (Table 4.9) (complete results shown in appendix B.6.5).

Factor	Chi-square	Significance
Review quality	0.053	0.818
Review helpfulness	0.002	0.968
Review accuracy	0.001	0.977
Reviewer's bias	1.590	0.207
Reviewer's expertise	1.463	0.226
Trust in review	2.325	0.127
Purchase intention	1.119	0.290

Table 4.9: Main effects of photo valence (Note: $df=1$ for all effects, * $p<0.05$, ** $p<0.01$, *** $p<0.01$)

4.3.2 Role of User Background in Trust in Reviews and Purchase Intention (RQ-2)

Participants' dispositional trust related to their perception of the trustworthiness of the review, particularly the perceived quality of the review ($r_s = 0.093$, $p = 0.020$) (Table 4.10). This positive significant relationship suggests that participants with high dispositional trust tended to perceive reviews as higher quality than participants with low dispositional trust.

There was a significant relationship between participants' past experience using online reviews and their purchase intention based on the reviews ($r_s = 0.103$, $p = 0.010$). Participants who had positive past experiences using online reviews were

more willing to make a purchase based on the reviews than participants who had negative past experience.

	Review quality	Review helpfulness	Review accuracy	Reviewer's bias	Reviewer's expertise	Trust in review	Purchase intention
Dispositional trust	0.093* (0.020)	0.022 (0.584)	0.037 (0.356)	-0.036 (0.366)	0.067 (0.093)	0.024 (0.548)	0.002 (0.967)
Past experience	-0.073 (0.068)	-0.055 (0.170)	-0.027 (0.500)	0.094 (0.369)	-0.055 (0.164)	0.037 (0.355)	0.103** (0.010)

Table 4.10: Correlations between participants' background with the influential factors on trust, trust and purchase intention (Note: N=799 for all correlations of dispositional trust, N=704 for all correlations of past experience, *p<0.05, **p<0.01, ***p<0.001, significant correlations are indicated by bold font)

4.3.3 Interplay between the Influential Factors on Trust and their Relationship with Trust and Purchase Intention (RQ-3)

Table 4.11 provides an overview of the interplay between the factors that can influence trust and the way these factors relate to trust in online reviews and purchase intention.

		Review quality	Review helpfulness	Review accuracy	Reviewer's bias	Reviewer's expertise	Trust in review	Purchase intention
Interplay between the influential factors	Review quality	1						
	Review helpfulness	0.611*** (0.000)	1					
	Review accuracy	0.361*** (0.000)	0.328*** (0.000)	1				
	Reviewer's bias	-0.155*** (0.000)	-0.185*** (0.000)	-0.257*** (0.000)	1			
	Reviewer's expertise	0.413*** (0.000)	0.434*** (0.000)	0.315*** (0.000)	-0.131*** (0.000)	1		
Relationships with trust and purchase	Trust in review	0.501*** (0.000)	0.563*** (0.000)	0.392*** (0.000)	-0.195*** (0.000)	0.430*** (0.000)	1	
	Purchase intention	0.205*** (0.000)	0.237*** (0.000)	0.165*** (0.000)	-0.128*** (0.000)	0.128*** (0.000)	0.292*** (0.000)	1

Table 4.11: Interplay between the factors that can influence trust and their effects on trust and purchase intention (Note: N=799 for all correlations, *p<0.05, **p<0.01, ***p<0.001)

Table 4.11 shows that there were significant relationships between all the factors investigated in this study. However, these relationships were of difference strengths (based on the Spearman rho r_s values). The following paragraphs explain how factors of the review and reviewer related to one another, to trust in online reviews, and to purchase intention.

Interplay between factors of the review

The results showed that the strongest relationship was between the perceived review quality and the perceived review helpfulness ($r_s = 0.611, p < 0.001$). This relationship suggests that reviews that were perceived as high quality were also perceived as helpful. The perceived review quality was also related to the perceived review accuracy ($r_s = 0.361, p < 0.001$), but to a lesser extent than to the perceived review helpfulness. This could be because the perceived review quality might not be sufficient to help users in their perception of the review accuracy. These results support results of the first study which suggested that the perceived review quality influences the perceived helpfulness and accuracy of reviews (chapter 3, section 3.3.4). The results add that perceived review quality might be more important in the perceived helpfulness of the review than in the perceived accuracy of the review. Furthermore, the perception of the review helpfulness and accuracy seem to be related to one another ($r_s = 0.328, p < 0.001$) meaning that participants tended to perceive helpful reviews as more accurate and vice versa.

Interplay between factors of the reviewer

There was a significant relationship between the two factors of the perceived trustworthiness of the reviewer: perceived reviewer's expertise and bias. Participants' responses suggest that their perception of these two factors is related ($r_s = -0.131, p <$

0.001). While this relationship was not strong, it suggests that participants tended to perceive reviewers with high expertise as less biased. It also suggests that reviewers who were perceived as having low expertise were perceived as having high bias. These results extend the first study (chapter 3) and previous work (e.g. Sun et al., 2011; Brown et al., 2007) that has investigated the effects of these review-related factors on trust in online reviews separately. Results of this study show that the perception of these factors could be related to one another.

Interplay between factors of the reviewer and the review

There were significant relationships between trust factors of the review and the reviewer, implying that participants' perception of the trustworthiness of the review was associated with their perception of the trustworthiness of the reviewer. In this respect, the strongest relationships were between the perceived reviewer's expertise and the perceived review quality ($r_s = 0.413, p < 0.001$) and the perceived review helpfulness ($r_s = 0.434, p < 0.001$). These relationships suggest that high quality and helpful reviews reflected high reviewer's expertise, and vice versa. The perceived reviewer's expertise was also related to the perceived review accuracy ($r_s = 0.315, p < 0.001$), but to a lesser extent. Thus, it seems that participants' perception of the review quality and helpfulness are more related to the perceived reviewer's expertise than is perceived review accuracy.

The results showed significant relationships between the perceived reviewer's bias and the perceived quality ($r_s = -0.155, p < 0.001$), helpfulness ($r_s = -0.185, p < 0.001$), and accuracy ($r_s = -0.257, p < 0.001$) of reviews. These results suggest that reviews that were perceived as high quality, helpful, and accurate decreased the perceived reviewer's bias, and vice versa. It is interesting to note that perceived reviewer's bias was related to review accuracy more strongly than to the review

quality and helpfulness. The first study suggested that users tend to use similar interface signals in their perception of the reviewer's bias and review accuracy and this suggestion extends to the results of this study, which reveal a significant relationship between the perceived reviewer's bias and review accuracy.

These results contradict the results of the first study (chapter 3, section 3.3.4) because they suggest that the perceived reviewer's expertise and bias can play significant roles in the perception of the helpfulness and accuracy of reviews. A possible explanation for the contradictory results could be related to the designs of studies 1 and 2. In study 1, the review quality was manipulated into high and low categories; therefore, high and low perceived review quality appeared to be most important in the perception of the helpfulness and accuracy of reviews. In study 2, however, the review quality was controlled. In this case, the reviewer's expertise and bias seemed to have significant roles in the perceived review helpfulness and accuracy. This implies that user perceptions of helpfulness and accuracy are first influenced by the perceived review quality and then by the perceived reviewer's expertise and bias.

Relationship between the review-related and reviewer-related factors that can influence trust and trust and purchase intention

All the factors of the perceived trustworthiness of the review and the reviewer were significantly related to trust in online reviews. Participants' trust in online reviews was related to their perception of the trustworthiness of the review, i.e. perceived review quality ($r_s = 0.501, p < 0.001$), helpfulness ($r_s = -0.563, p < 0.001$), and accuracy ($r_s = 0.392, p < 0.001$), and also to their perception of the trustworthiness of the reviewer, i.e. perceived reviewer's expertise ($r_s = 0.430, p <$

0.001) and bias ($r_s = -0.195, p < 0.001$). However, it is important to note that participants' trust in the reviews was more strongly related to factors of the perceived trustworthiness of the review than to factors of the perceived trustworthiness of the reviewer. This means that the perceived trustworthiness of the review seemed to be more important in trust than the perceived trustworthiness of the reviewer. Of the three factors of the perceived trustworthiness of the review, the perceived review quality and helpfulness strongly related to trust. Of the two factors of the perceived trustworthiness of the reviewer, perceived reviewer's expertise was the most related to trust. The perceived review accuracy and reviewer's bias were the least related to trust possibly because these factors have been difficult for participants to judge.

All the factors of the perceived trustworthiness of the review and the reviewer were significantly related to purchase intention: participants were more willing to make a purchase decision when the review and reviewer were perceived as trustworthy. However, these relationships were weaker than the relationships with trust. This could mean that the relationship of the perceived trustworthiness of the review and reviewer and purchase intention are mediated by trust in the review. High perceived review' and reviewer's trustworthiness can lead to higher trust in the review, which in turn leads to higher purchase intention ($r_s = 0.292, p < 0.001$).

4.4 Discussion

This study contributed to the PhD research in several ways. It first investigated the effects of review valence, which was not considered in the first study (RQ-1) (objective 2). This finding contributes to the debate on the effects of review valence on trust; the findings support previous work by Kobayashi et al. (2015) while contradicting work by Riasanow et al. (2015). The findings suggest that users tend to

have trust in positive reviews more than in negative reviews and that users do not perceive positive reviews as potentially self-serving.

This study also investigated two new review-related signals that were suggested to be important in trust by the first study: community opinions about the review and user-generated photos (RQ-1) (objective 1). Community opinions about the review are shown to be relevant, especially regarding the perceived helpfulness of the review. The findings suggest that as community positive opinions about the review increase, the perceived helpfulness of the review also increases. In contrast, community negative opinions about the review decrease the perceived helpfulness of the review. However, the findings on community opinions are surprising, especially because community opinions had only one effect in this study, while community opinion was shown to be the most important review-related signal in trust in study 1. This could be because review valence was not included in the first study but was included in this study. Review valence could be a more powerful indicator of the perception of trustworthiness and trust than community opinions. But when the review valence is controlled, the community opinions become very important in the perception of trustworthiness and trust.

In regard to user-generated photos, this is the first study to investigate how user trust in online reviews can be influenced by the presence of a photo alongside the review (RQ-1) (objective-1). Overall, the findings suggest that the presence of a photo can negatively influence the perception of the trustworthiness of the review and the reviewer. One could argue that this finding is surprising, especially because photos can provide additional information about the reviewed services and therefore could increase the perceived trustworthiness of the review and the reviewer. There are two possible explanations of the negative effects of photo presence. First,

participants might have perceived photos as a means of manipulating their trust. Previous work (Riegelsberger et al., 2002) investigating the effects of photos, particularly photos of staff, on user trust in online vendors has suggested that photos can decrease trust and there could be a similar pattern regarding the effect of user-generated photos on trust in online reviews. The second explanation relates to the study setting and the photos used in the study. Participants might have perceived the positive photos, particularly the positive food photo, as not appealing and this could have led to negative effects. The positive food photo that was used in the study had a mean rating of 3.18 (on a 5-point Likert scale) in the pre-test (discussed in section 4.2.1.1). This means that the positive food photo might not have been perceived as positive in the main study. Thus, the presence of food photos, both positive and negative, might have led to a decrease in the perceived trustworthiness of the review and the reviewer.

This study extends previous work (e.g. Lee et al., 2008; Liu et al., 2008; Connors et al., 2011; Ku et al., 2012) investigating the factors that can influence user trust in online reviews when making purchase decisions in three ways. First, this study clarified the interplay between the factors of the perceived trustworthiness of the review and the reviewer. Perceived review quality and helpfulness seem to be most related to the perceived reviewer's expertise. Perceived review accuracy seems to be most related to the perceived reviewer's bias. Second, factors of the perceived trustworthiness of the review, particularly perceived review quality and helpfulness, seem to be the most important in trust. Third, the findings also suggest that the perceived trustworthiness of both the review and the reviewer are related to the user purchase intention. However, these relationships might be mediated by trust in the

review, implying that the perceived trustworthiness of review and reviewer influence the trust in the review, which in turn influences the purchase intention.

It is worth noting that participants in this study interacted with only one review and this represents a limitation of this study. Participants' interaction with one review may be somewhat unrealistic given that users in real life may read several reviews, and the impact of a positive review could be reduced by several other negative reviews, while the impact of a negative review could be reduced by several positive reviews. Thus, further work is needed to take into account the quantity of reviews and investigate its effects on trust in online reviews.

Finally, the findings of this study show that users' trust in online reviews when making purchase decisions are related to their own background in the form of dispositional trust and past experience (RQ-2) (objective 3). Participants with high dispositional trust perceived the reviews as higher quality than participants with low dispositional trust and participants with positive past experiences were more willing to make purchase decisions based on the reviews than participants with negative past experience. Previous work by McKnight et al. (2002a,b) and Pavlou and Gefen (2004) has suggested that dispositional trust and past experience can affect user trust in online vendors, and this was extended to the context of online reviews.

5 Study 3: User Perception of the Reviewer's Personality and Its Relationship to Trust and Purchase Intention

5.1 Motivation & Research Questions

Study 3 extended the previous studies by investigating the roles of new factors in user trust in online reviews when making purchase decisions (objective 2). Study 1 suggested that the perceived similarity of the reviewer to the user might increase user trust in reviews. This supports previous work (e.g. Goldbeck, 2009) which has shown that similarity in demographics and taste can increase trust in recommendations. However, no research has been done on the role of personality similarity in trust in online reviews. The perception of personality similarity can influence real-life relationships such as friendship that might include trust (Selfhout et al., 2009). Thus, it is possible that the perceived personality similarity could also matter online, particularly in user trust in online reviews.

The perception of the reviewer's personality has been shown to be relevant to the persuasiveness of the reviewer in the context of online movie reviews. In this respect, Mohammadi et al. (2013) suggested that the perceived reviewer's conscientiousness, neuroticism, agreeableness, and openness are significantly related to the reviewer's persuasion. The perceived reviewer's extraversion is suggested to be the least related to persuasion.

Taken together, previous work indicates that the perceived reviewer's personality and personality similarity to the user might be important regarding user trust in online reviews. Thus, in an attempt to broaden the understanding of what leads users to trust online reviews when making purchase decisions, this study

investigated how these factors are related the user's trust in online reviews and purchase intention.

To better understand the role of the perception of personality in trust, this study explored the relationship between the perception of personality and interface signals (objective 1). To do so, it explored the interface signals that users employ in their perception of each of the reviewer's personality traits.

Finally, just as dispositional trust and past experience have been shown to influence user trust in online vendors (McKnight et al., 2002a,b; Pavlou & Gefen, 2004), the user's own personality has also been shown to be relevant (Lumsden and MacKay, 2006). Thus, this study took the user personality, in addition to dispositional trust and past experience, into account as part of the user's background and investigated its role in trust and purchase intention (objective 3). Accordingly, this study addressed the following research questions:

RQ-1: How does the perceived reviewer's personality relate to users' trust in online reviews when making purchase decisions?

RQ-2: How does a user's perception of *similarity* of a reviewer's personality to their own relate to users' trust in online reviews when making purchase decisions?

RQ-3: How do users employ interface signals in their perception of the reviewer's personality?

RQ-4: How does the user's background in the form of personality, dispositional trust and past experience shape trust in online reviews when making purchase decisions?

Figure 5.1 provides a graphical representation of the investigation of study 3.

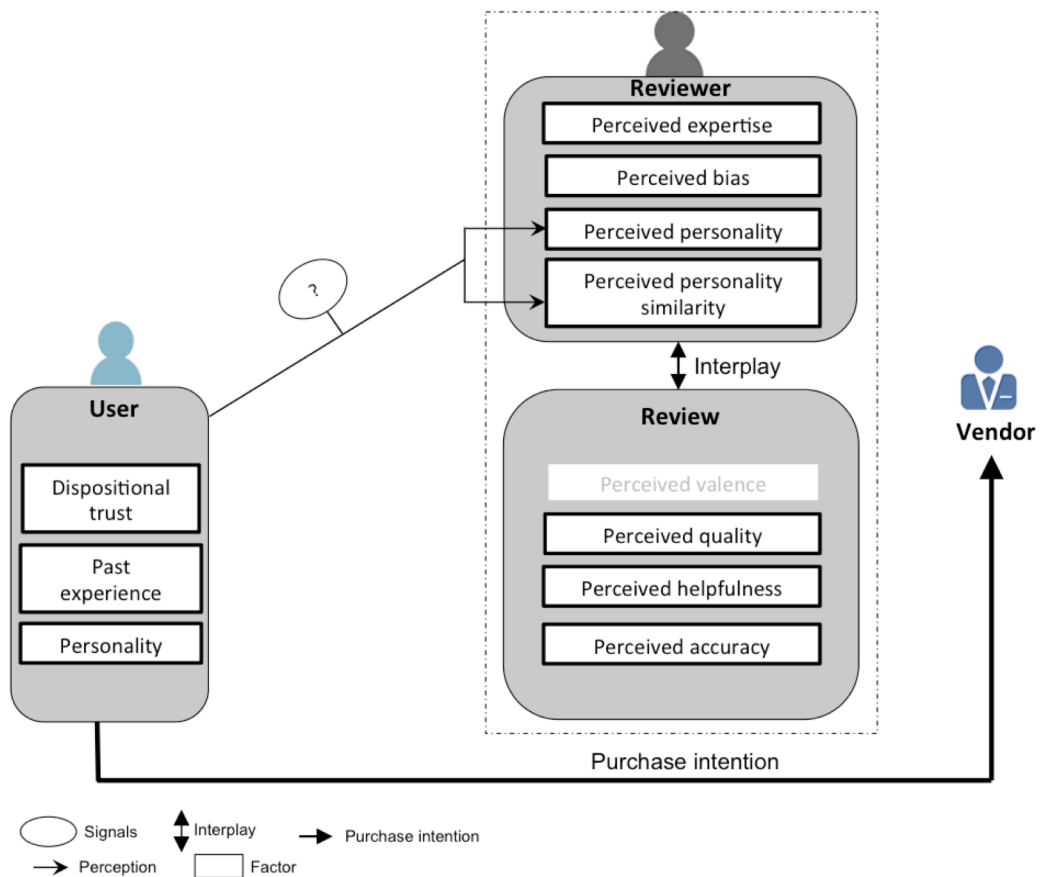


Figure 5.1: Overview of study 3 – investigating (i) signals that matter in the perception of personality (ii) how the perceived personality and personality similarity relate to trust in online reviews, trust factors of the review and reviewer and purchase intention and (iii) the role of the user background including the user own personality (Note: only objects in black font are investigated)

5.2 Methods

5.2.1 Participants

This study aimed to recruit users of the review website Yelp <www.Yelp.com>. Yelp was chosen because it is one of the most popular review websites. Participants were recruited by sending the study invitation to City

University London staff as well as students via email. The study was also advertised on Yelp, on the public messages page.

A total of 28 Yelp users took part in this study (15 female, 13 male, mean age of 38.6 years). All participants had profile pages on Yelp that showed their personal information such as profile photo, number of reviews posted on Yelp, and number of friends as well as showing their posted reviews. Figure 5.2 shows an example of a profile page on Yelp.

Adrian B.
London
47 Friends 66 Reviews 2 Photos
Elite 2013

Reviews
Sort by: Date

Blighty Coffee
££ · Coffee & Tea Shops
35-37 Blackstock Road
London N4 2JF
6/9/2015
3 check-ins

I can't believe I haven't written a review for this place yet! I've come three times and never left unhappy (okay, except that one time when they weren't serving breakfast any longer - but it was about 3pm). The food is INCREDIBLE! Do yourself a favour and order the Winston benedict - you get three different kinds of eggs benedict and they are ALL amazing. I mean, really really really amazing. Plus, they have iced coffee. That's important for an expat like me. Even better? Dog friendly. Come for the food, stay for the ceramics class, workspace, or get'er done atmosphere. I love this place!

Was this review ...?
Useful Funny Cool

1 Friend in Common
Max S. 9 0

About Adrian B.
Rating Distribution

Stars	Count
5 stars	15
4 stars	30
3 stars	10
2 stars	6
1 star	5

Review Votes
Useful 53
Funny 17
Cool 38

Stats
Tips 25
Review Updates 3
Bookmarks 153

Figure 5.2: Example of Yelp profile page

5.2.2 Study Design

This study followed a round robin design approach, which is a common method in social psychology of investigating interpersonal relationships between individuals (Selfhout et al., 2009; Selfhout et al., 2010; Barelds & Barelds-Dijkstra,

2007; Albright et al., 1988). In a round robin study, participants are divided into groups and within each group a participant serves both as the subject (i.e. rating others) and as the target (i.e. being rated by others). This means that participants within each group are required to rate one another. Therefore, each group in a round robin study must include at least two participants (Lashley & Kenny, 1998). In this study, the 28 participants were equally divided into seven groups in which each group included four participants. An essential condition of the study was the unfamiliarity of participants with one another within the groups. Thus, participants were allocated to groups in which the group members were completely unfamiliar with each other, i.e. zero acquaintance conditions. This is because familiar participants, such as friends, could rate each other favourably on personality and trust with no regard to the information available on the profile pages.

A round robin design was chosen because it allowed a naturalistic setting for this study in which users interacted with each other without any experimental manipulation. Although experimental studies help to control independent variables, unlike naturally occurring interactions, the generalizability of experimental studies is rather limited. Round robin design studies have therefore been suggested to increase the generalizability of findings (Warner et al., 1979).

This study collected quantitative data in the form of administered questionnaires and qualitative data in the form of thinking aloud. The questionnaires captured participants' background. The questionnaires also captured participants' perception of the reviewer's personality, trust factors of the review and reviewer, trust in reviews, and purchase intention based on profile pages. The qualitative data captured the interface signals from profile pages that were used by participants in their perception of the reviewer's personality.

5.2.3 Materials

5.2.3.1 Questionnaires

Two questionnaires were used in this study: *background questionnaire* and *perceived personality and trust factors questionnaire*. The following paragraphs explain how these questionnaires were designed and also the data collected from each questionnaire.

Background questionnaire

The background questionnaire captured participants' self-rating of dispositional trust, past experience of using Yelp reviews for assessing vendors' services, and the five personality traits (extraversion, conscientiousness, agreeableness, neuroticism, and openness to experience) (appendix C.2). The approach to measuring participants' dispositional trust and past experience were exactly the same as in the second study (chapter 4). Dispositional trust was measured based on four dimensions: integrity, benevolence, competence, and trusting stance. Each of these dimensions was measured using 7-point Likert scales and dispositional trust was calculated as the average value of the dimensions' ratings. This approach to measuring dispositional trust was taken directly from McKnight et al. (2002a). Past experience was measured by adapting three 7-point Likert scales from Pavouid and Gefen (2004) and then was calculated as the average value.

The approach to measuring the five personality traits of participants was taken directly from previous work (Gosling et al., 2003; Selfhout et al., 2009). Participants were asked to rate five bipolar items:

- Extraversion: *extraverted, enthusiastic* vs. *reserved, quiet*
- Agreeableness: *critical, quarrelsome* vs. *sympathetic, warm*

- Conscientiousness: *dependable, self-disciplined* vs. *disorganized, careless*
- Neuroticism: *anxious, easily upset* vs. *calm, emotionally stable*
- Openness to Experience: *open to new experiences, complex* vs. *conventional, uncreative)*

Each of these five bipolar items was rated on 7-point Likert scales ranging from 1 (extremely like the pair of adjectives on the left) to 7 (extremely like the pair of adjectives on the right). Using these scales meant that the high dimensions of the traits extraversion, conscientiousness, neuroticism and openness to experience were actually on the low side of the scale while the low dimensions of these traits were on the high side. Thus, prior to analysing the data, participants' self-ratings of these traits were reverse coded. In regard to agreeableness, the high dimensions were on the high side of the scale and low dimensions were on the low side of the scale.

Each participant was required to fill in a background questionnaire, resulting in 28 data sets of participants' self-rating of dispositional trust, past experience, and the five personality traits, with no missing data. These data were used to investigate how the user's background shapes trust in online reviews when making purchase decisions (RQ-4). Table 5.1 shows the minimum, maximum, mean, and standard deviation of participants' dispositional trust, past experience, and personality traits.

	Minimum	Maximum	Mean	Standard deviation
Dispositional trust	3.67	6.25	4.99	.65
Past experience	3.00	6.33	5.11	.89
Extraversion	3.00	7.00	5.18	1.57
Conscientiousness	2.00	7.00	5.61	1.42
Agreeableness	1.00	7.00	4.86	1.76
Neuroticism	1.00	6.00	3.32	1.63
Openness	3.00	7.00	6.32	.98

Table 5.1: Descriptive statistics of participants' background (Note: N = 28 for dispositional trust, paste experience and all personality traits)

Perceived personality and trust factors questionnaire

This questionnaire captured two sets of perceived factors. The first set was the perceived five personality traits of the reviewer. To measure the participant's perception of group members, each participant was required to rate the five personality traits of the three group members. This questionnaire used the same personality trait scales as the background questionnaire. Thus, participants' ratings of extraversion, conscientiousness, neuroticism, and openness were reverse coded (complete questionnaire shown in appendix C.4).

Each participant in this study was required to rate the three group members' five personality traits and there were seven groups in total, resulting in 84 data sets of perceived personality traits (4 participants \times 3 group members \times 7 groups). These data were used to investigate how the user perception of the reviewer's personality traits relates to trust in online reviews and purchase intention (RQ-1).

Afterwards, the participant was asked to rate seven factors: perceived quality, helpfulness, and accuracy of posted reviews, perceived reviewer's expertise and bias, trust in the reviews, and purchase intention, on 7-point Likert scales. The approaches

to measuring these factors were exactly the same as for the second study (chapter 4), following the approaches of previous work and using 7-point Likert scales ranging from 1 (strongly disagree) to 7 (strongly agree) (Lee et al., 2008; Ku et al., 2012; McKnight et al., 2002a; Sparks & Browning, 2011) (appendix C.4).

Each participant was required to rate these seven factors for every group member, resulting in 84 data sets for the seven factors (4 participants \times 3 group members \times 7 groups). These data were used to address RQ-1, -2, and -4. Table 5.2 shows the descriptive statistics of data collected in the perceived personality and trust factors questionnaire.

	Minimum	Maximum	Mean	Standard deviation
Extraversion	1	7	5.05	1.66
Conscientiousness	2	7	4.92	1.52
Agreeableness	1	7	5.05	1.48
Neuroticism	1	7	3.49	1.49
Openness	1	7	5.14	1.68
Quality of reviews	1.50	7.00	5.51	1.19
Helpfulness of reviews	1	7	5.35	1.43
Accuracy of reviews	2	7	4.95	1.28
Reviewer bias	1	6	2.56	1.45
Reviewer expertise	1	7	5.19	1.39
Trust in reviews	1.00	7.00	4.93	1.56
Purchase intention	1	7	5.00	1.74

Table 5.2: Descriptive statistics of data collected in the perceived personality and trust factors questionnaire (Note: N = 84 for all personality traits and trust factors)

5.2.4 Qualitative data

Qualitative data were captured from participants' verbalisations as they were justifying their ratings of the reviewers' personality traits. These data were video recorded and all the recordings were transcribed. These data were used to address RQ-3: "How do users employ interface signals in their perception of the reviewer's personality?"

5.2.5 Procedure

The same procedure was followed for all participants. Each participant attended a separate individual study session lasting approximately 30 minutes. The study sessions took place at City University London Interaction Lab. Prior to collecting data, the facilitator explained the procedure of the study, the time required to complete the study, and the data that needed to be provided by participants in the form of questionnaires and video recordings. The facilitator then obtained participants' signed consent to take part in the study (consent form shown in appendix C.1).

Afterwards, the participant was asked to fill in a background questionnaire. This questionnaire captured participants' demographics (age and gender), self-ratings of dispositional trust and past experience, and self-ratings of five personality traits: extraversion, conscientiousness, agreeableness, neuroticism, and openness to experience.

Then, the participant was shown Yelp profile pages of the other three group members. These profile pages were shown one at a time. The participant was first asked whether she is familiar with the reviewer. This was used as the first filter question. If the participant answered "yes", then the participant was asked to indicate

the type of familiarity: “family”, “relationship partner”, or “someone I know”. If the participant reported that the reviewer was “someone I know”, she was asked to describe the extent of familiarity on a 6-point Likert scale (1 = far acquaintance, 2 = acquaintance, 3 = close acquaintance, 4 = friend, 5 = close friend, 6 = best friend). This scale was taken from Selfhout et al. (2010) (shown in appendix C.3). All participants reported that they were unfamiliar with all others in the same group.

Then, the participant was asked to rate the reviewer on the five personality traits and then verbally justify the rating of the personality traits based on information available on the profile page. The participant was allowed to access only the main profile page (i.e. profile overview) but could freely scroll on the page. Finally, the participant was asked to rate the reviewer on seven factors: perceived quality, helpfulness, and accuracy of posted reviews, perceived reviewer’s expertise and bias, trust in the reviews, and purchase intention.

5.2.6 Data Analysis

5.2.6.1 Quantitative analysis

Assessing the degree of non-independence

The round robin design meant that the data was collected from *pairs* of individuals, i.e. dyads. Data collected from dyads can include non-independence, i.e. reciprocity within ratings collected from dyads. Non-independence of data has implications regarding the data analysis requiring that dyads, rather than individual participants, be treated as the unit of analysis (Judd, 2000; Lashley & Kenny, 1998).

Thus, prior to analysing the data, the degree of non-independence in the data was investigated. This was done by following the approach of Judd (2000) by applying two-way mixed intra-class correlation to the ratings collected from dyads.

Results of this analysis (Table 5.3) showed that the data collected from dyads did not include non-independence on any of the perceived personality traits and trust factors. This means that the dyads did not rate each other in a similar way on the personality traits and the trust factors. These results allowed individual responses to be used as the unit of analysis.

Perceived personality traits and trust factors captured from dyads	Intra-class correlation	Lower bound	Upper bound	F value	Significance
Extraversion	-.331	-1.067	.141	.754	.900
Conscientiousness	-.203	-.870	.224	.833	.796
Agreeableness	.242	-.173	.510	1.316	.106
Neuroticism	.227	-.198	.500	1.290	.124
Openness to new experience	.058	-.461	.392	1.061	.394
Quality of reviews	-.037	-.612	.331	.964	.565
Perceived helpfulness of reviews	-.469	-1.284	.053	.684	.957
Perceived accuracy of reviews	-.113	-.718	.279	.899	.686
Source bias	.034	-.498	.376	1.035	.438
Source expertise	.122	-.361	.433	1.138	.279
Trust in review	-.064	-.652	.313	.941	.609
Purchase intention	-.181	-.834	.238	.848	.772

Table 5.3: None-independence within dyads (Note: * $p < .05$, ** $p < .01$, *** $p < .001$, $N=84$ for all traits and factors, Number of items for all traits and factors = 2, 95% Confidence Interval of lower and upper bound)

Removing between participants variance

This study collected multiple data points from the same participants. Each participant rated the personality traits of three group members and also rated the three group members on the seven factors: perceived quality, helpfulness, and accuracy of reviews, perceived reviewer's expertise and bias, trust in reviews, and purchase

intention. This means that the collected data represented multiple observations nested within individuals, i.e. non-independent observations (Enders & Tofighi, 2007). Enders and Tofighi (2007) and Judd (2000) suggest that non-independent observations can cause between participant variance in the data which can lead to invalid results when applying standard statistical tests that assume the independence of the observations.

Between participants variance refers to the differences between participants in their tendencies in rating the dependent variable(s). A hypothetical example of between participants' variance is as follows. Suppose that participants A and B are required to rate three group members on trust. Participant A may have a tendency to rate others high on trust. Thus, participant A's ratings of her group members, on a 7-point Likert scale, range from 4 to 6 (group member 1 given a rating of 4, group member 2 given a rating of 5, and group member 3 given a rating of 6). In contrast, participant B might have a tendency to rate others low on trust. So her ratings of the same group members as participant A range from 2 to 4 (group member 1 given a rating of 2, group member 2 given a rating of 3, and group member 3 given a rating of 4). This difference, referred to as between participants variance, can lead to invalid results when applying standard statistical tests because most standard statistical tests assume independence of observations and therefore do not account for between participants variance.

To address the between participant variance, person mean centering, which is also referred to as person-level centering, must be applied to each participant's ratings (Enders & Tofighi, 2007). Person mean centering involves two steps. First, the mean value of each participant's ratings is calculated. Then, the individual ratings of the same participant are subtracted from the mean value. Table 5.4 shows ratings

of participants A and B (of the hypothetical example) before and after person mean centering.

	Participant A ratings before centering	Participant A ratings after centering	Participant B ratings before centering	Participant B ratings after centering
Group member 1	4	-1	2	-1
Group member 2	5	0	3	0
Group member 3	6	+1	4	+1

Table 5.4: Example of person mean centering

As shown in Table 5.4, the person mean centering removed the variance between participants A and B. Indeed, ratings of participants A and B became mediated around zero despite their different tendencies.

In regard to the data collected in this study, person mean centering was applied to participants' ratings of their group members' personalities and of the seven factors. This removed the between participants' variance in the collected data.

[Relationship between user perception of the reviewer's personality and user trust in online reviews when making purchase decisions \(RQ-1\)](#)

RQ-1 was addressed by applying bivariate Spearman's rho correlation to the person mean centred data collected from the personality and trust factors questionnaire. The analysis investigated the relationship between participants' ratings of the reviewer's personality traits and their ratings of the seven factors: perceived quality, helpfulness, and accuracy of reviews, perceived reviewer's expertise and bias, trust in online reviews, and purchase intention. This analysis involved 84 sets of data.

The non-parametric Spearman's correlation was chosen instead of the parametric Pearson correlation because some of the data of perceived personality traits and the seven factors were not normally distributed and therefore these data did

not meet the normal distribution assumption associated with the Pearson correlation. The distribution of data of perceived personality traits and the seven factors was tested by applying the Shapiro–Wilk test. Shapiro–Wilk tests the null hypothesis that the dependent variables are not normally distributed and therefore significant results indicate non-normality of data distribution. This test was applied to data of perceived personality and the seven factors after person-mean centering the data. The results showed that data on participants’ perception of the reviewer’s personality traits conscientiousness and agreeableness were not normally distributed. Also, data on participants’ perception of three factors, helpfulness of reviews, reviewer’s bias, and purchase intention, were not normally distributed. Table 5.5 shows the results of the distribution test.

Perceived personality traits and trust factors	Statistic	Significance
Perceived extraversion	0.977	0.139
Perceived conscientiousness	0.967	0.028*
Perceived agreeableness	0.960	0.010*
Perceived neuroticism	0.977	0.142
Perceived openness	0.974	0.088
Perceived reviews’ quality	0.983	0.342
Perceived reviews’ helpfulness	0.939	0.001**
Perceived reviews’ accuracy	0.974	0.097
Perceived reviewer bias	0.962	0.015*
Perceived reviewer expertise	0.973	0.075
Trust in reviews	0.983	0.370
Purchase intention	0.965	0.022*

Table 5.5: Results of normal distribution test of data of perceived reviewer personality traits and perceived trust factors (Note df = 84 for all perceived personality traits and trust factors; *p<.05, **p<.01, ***p<.001)

Relationship between user perception of the reviewer’s personality similarity to the user and user trust in online reviews and purchase decisions (RQ-2)

In order to address RQ-2, the reviewers’ perceived personality similarity was first measured. The approach to measuring the perceived personality similarities was taken directly from Selfhout et al. (2009): the absolute difference was calculated between the participant’s self-ratings of personality traits (captured in the background questionnaire) and the participant’s ratings of group members’ personality traits (captured in the personality and trust factor questionnaire), resulting in 84 data sets. Table 5.6 shows the minimum, maximum, mean, and standard deviation of perceived similarity in personality traits.

	Minimum	Maximum	Mean	Standard deviation
Extraversion	0.00	5.00	1.56	1.46
Conscientiousness	0.00	5.00	1.62	1.41
Agreeableness	0.00	4.00	1.50	1.25
Neuroticism	0.00	6.00	1.71	1.38
Openness	0.00	5.00	1.42	1.59

Table 5.6: Descriptive statistics of perceived similarity in personality traits (Note: N=84 for perceived similarity in all personality traits)

Data on perceived similarity in personality traits were person mean centered prior to conducting the analysis in order to remove the between participants variance. Then, bivariate Spearman’s rho correlation was applied to investigate the relationship between the perceived similarities in personality traits with participants’ ratings of the seven factors: perceived quality, helpfulness, and accuracy of reviews, perceived reviewer’s expertise and bias, trust in reviews, and purchase intention (these were captured in the perceived personality and trust factors questionnaire and involved 84 sets of data). The non-parametric Spearman correlation was applied instead of the parametric Pearson correlation because of the non-normal distribution of some of the data on participants’ ratings of some factors (shown previously in Table 5.5).

Relationship between the user background and user trust in online reviews when making purchase decisions (RQ-4)

RQ-4 was also addressed by applying bivariate Spearman's rho correlation. However, prior to data analysis, the average values of each participant's ratings of the seven factors were first calculated. This is because each participant rated three reviewers on the seven factors (84 data sets in total) while each participant had only one rating of personality traits, dispositional trust and past experience (28 data sets in total). Then, Spearman correlation was applied to investigate the way that participants' background related to their average ratings of perceived quality, helpfulness and accuracy of reviews, perceived reviewer's expertise and bias, trust in reviews, and purchase intention. This analysis involved 28 sets of data. The non-parametric Spearman correlation was again applied because of non-normal distribution of participants' past experiences, extraversion, conscientiousness, agreeableness, and neuroticism, and non-normal distribution of participants' average ratings of the quality and helpfulness of reviews (Table 5.7) as determined using the Shapiro–Wilk test.

	Statistic	Significance
Dispositional trust	0.988	0.980
Past experience	0.917	0.029*
Extraversion	0.840	0.001**
Conscientiousness	0.854	0.001**
Agreeableness	0.906	0.015*
Neuroticism	0.905	0.015*
Openness	0.690	0.000***
Quality	0.889	0.006**
Helpfulness	0.845	0.001**
Accuracy	0.977	0.784
Bias	0.965	0.460
Expertise	0.933	0.074
Trust	0.934	0.077
Purchase	0.966	0.480

Table 5.7: Results of normal distribution test of participants' background and their average ratings of trust factors (Note: $df = 28$ for participants' dispositional trust, past experience, personality traits, average ratings of perceived trust factors, average ratings of trust in reviews and purchase intention, * $p < .05$, ** $p < .01$, *** $p < .001$)

5.2.6.2 Qualitative analysis

The qualitative data collected from participants' verbalisation was broken down into units of analysis. Each unit referred to a single justification that included connection between one or more personality traits and one or more interface signals. This means that defining the unit of analysis required examining participants' verbalisations and identifying the justifications of perceived personality traits based on interface signals. This way of breaking down the data resulted in 218 units of analysis across all participants.

Figure 5.3 provides examples of two units of analysis that were obtained from one participant's verbalisation about the personality traits of a group member. As shown in Figure 5.3, the first unit of analysis referred to participant 4 justifying her

perception of participant 14's extraversion based on the membership level ("elite") and also based on the reviewer use of exclamation marks. This means the first unit of analysis included judgement of extraversion based on two interface signals, membership level and exclamation marks. The second unit of analysis refers to participant 4 justifying her perception of participant 14 as being dependable based on the high number of reviews posted by the reviewer. Thus, the second unit of analysis includes a connection between one personality trait, conscientiousness, with one interface signal, the high number of reviews posted by the reviewer.

P4 justifying extraversion and conscientiousness for P14:

"Well I see she is an elite as well which again is very helpful for me, yes extraverted, exclamation marks.

I would say she is dependable, on 3, I think there is a tendency but nothing strong to suggest that. She gives information that will be pretty handy for people so much appreciated. She has many reviews."

Figure 5.3: Example of two units of analysis (Note: blue refers to interface signals and green refers to personality traits)

Two coding schemes were developed to analyse the qualitative data and determine how the perception of personality traits related to interface signals (RQ-3). The first coding scheme was developed to capture participants' verbalisations that included personality traits, so this scheme included codes taken directly from previous measures of personality (Gosling et al., 2003; Selfhout et al., 2009). For example, the codes "extraverted" and "enthusiastic" were used to capture the participant's perception of the high dimension of extraversion. In contrast, the codes "quiet" and "reserved" were used to capture participant's perception of the reviewer being low on extraversion (Table 5.8).

Personality trait	Dimension	Example
Extraversion	High: extraverted, enthusiastic	P7: I think she is <i>extraverted</i> and super <i>enthusiastic</i> ...she is using a lot of exclamation marks
	Low: quiet, reserved	P23: I say she is <i>quiet</i> and <i>reserved</i> because she doesn't have a picture
Conscientiousness	High: dependable, self-discipline	P19: Dependable <i>definitely</i> and <i>self-disciplined</i> because again she writes well, there is attention to details
	Low: careless, disorganized	P24: I think she would be more like a <i>careless</i> person and <i>disorganized</i> ... looking her photo she is quite young
Agreeableness	High: warm, sympathetic	P26: Definitely <i>warm</i> and <i>sympathetic</i> because she is saying she "loves"
	Low: critical, quarrelsome	P19: I think she could be <i>critical</i> .
Neuroticism	High: anxious, easily upset	P12: I wouldn't say he is <i>anxious</i> definitely and he is not <i>easily upset</i> no ...
	Low: emotionally stable, calm	P6: I would say he is <i>emotionally stable</i> and <i>calm</i>
Openness to new experience	High: open to new experience, complex	P16: I think she is probably <i>open to new experiences</i> and <i>complex</i>
	Low: uncreative, conventional	P16: I think she is probably more <i>conventional</i>

Table 5.8: Personality traits code set

The second coding scheme was developed to capture participants' verbalisation that included interface signals. This coding scheme was developed based on the information available on the reviewer's profile page that was mentioned by participants when judging the reviewer's personality traits. This coding scheme included 19 codes in total (Table 5.9). The codes were then assigned to their respective types. For example, "smiley face shot" and "young age" were assigned to reviewer's identity, while "positive words" and "negative words" were assigned to review valence. The types of codes were then assigned to two broad categories: review-related and reviewer-related.

Applying the coding schemes shown in Tables 5.8 and 5.9 did not require interpretation because they were based on identifying keywords. Thus, no reliability check was conducted. The two coding schemes were applied to the units of analysis simultaneously in order to capture the connections between the personality traits and the interface signals. This means that that the analysis investigated the co-occurrences of codes from Table 5.8 with codes from Table 5.9. If the same code was mentioned more than once in a unit of analysis, only the first occurrence was coded.

Category	Type	Code	Example
Reviewer-related	Identity	Profile photo absence	P23: I say she is quiet and reserved because <i>she doesn't have a picture</i>
		Smiley face shot	P2: you can see by the <i>smile in the photo</i> she has an extraverted
		Young age	P1: she is quite <i>young</i> comparing to me
		Old age	P2: its because of the age, older ones are on the dependable side
	Level of Contribution	High number of reviews	P15: she has <i>many reviews</i> .
	Level of Community Relationships	High number of friends	P5: so too many friends and he has only been there for a short time and he has written 40 reviews
	Community Standing	Elite	P5: she has been <i>elite</i> for this year
Review-related	Type of services	Nightlife service	P13: he is kind of the person who is in the <i>club</i>
		Food service	P20: the whole <i>food market</i> bit is just a bit too much... he comes across quite
	Location of services	Area	P10: she is in <i>Soho</i> ... so it's a busy interesting area
		City	P2: So I'm looking at the address of the places, one is in <i>Portugal</i> here
	Valence	Positive words	P11: Just saying the words " <i>lovely</i> ", " <i>delicious</i> ", " <i>great atmosphere</i> "
		Negative words	P20: There are many negative words he is using he says <i>disappointing</i>
		1 star rating	P11: She has given quite few <i>1</i> and <i>2</i> stars ratings
		2 star rating	
	3 star rating	P9: he gives it <i>3 stars</i> its ok. So he is critical	
	Orthographic features	Presence of exclamation marks	P7: she is using <i>exclamation marks</i>
	Level of detail	Detailed information	P14: I think she is dependable because there is <i>lots of details</i>
Lack of details		P28: I'm afraid he is a bit careless ... <i>no detail</i>	

Table 5.9: Interface signals code set

5.3 Results

5.3.1 Relationship between User Perception of the Reviewer's Personality and User Trust in Online Reviews When Making Purchase Decisions (RQ-1)

Previous work by Mohammadi et al. (2013) has suggested that the perception of the reviewer's personality can relate to the reviewer's persuasiveness in the context of online movie reviews. In this respect, the perceived reviewer's personality traits of conscientiousness, agreeableness, neuroticism, and openness are suggested to be important. This study investigated the way that the perception of the reviewer's personality traits can relate to user trust in online reviews when purchasing services, such as from hotels and restaurants.

While participants' perception of all the personality traits of reviewers seemed to matter in their responses, the perceived personality traits seemed to vary in importance. The level of importance of the perceived reviewer's personality traits is reported based on the number of significant correlations of each perceived personality trait with perceived factors of the trustworthiness of the review and reviewer as well as with trust in the reviews and purchase intention. The level of importance is also reported based on the strength of the significant correlations, i.e. Spearman rho's r_s values.

The perceived personality trait that seems to matter the most based on participants' responses was conscientiousness. Participants' perception of this personality trait related to their trust in the reviews, their purchase intention, and their perception of the trustworthiness of the reviewers and the reviews. It seems that participants had more trust in the reviews ($r_s = .498, p < 0.000$) and also were more willing to make purchase decisions based on the reviews ($r_s = .440, p < 0.000$) when they perceived

high reviewer's conscientiousness (Table 5.10). The perceived reviewer's conscientiousness also seemed to relate to the perceived trustworthiness of the reviewer, particularly, the reviewer's expertise. Participants in this study reported higher reviewer's expertise when the reviewer was perceived as highly conscientious (i.e. dependable and self-disciplined) ($r_s = .455, p < 0.000$). Furthermore, the results showed that the reviewer's perceived conscientiousness and the perceived trustworthiness of the review were related. Participants' responses suggested that they perceived the reviews being higher quality ($r_s = .221, p = 0.043$) and more helpful ($r_s = .342, p = 0.001$) when the reviewer was perceived as highly conscientious.

		Reviewer's perceived personality traits				
		Extraversion	Conscientiousness	Agreeableness	Neuroticism	Openness
Review trustworthiness	Quality	-0.018 (0.874)	0.221* (0.043)	0.291** (0.007)	-0.280** (0.009)	0.142 (0.196)
	Helpfulness	-0.023 (0.838)	0.342** (0.001)	0.033 (0.768)	-0.277* (0.011)	0.090 (0.414)
	Accuracy	-0.072 (0.512)	0.198 (0.070)	0.181 (0.099)	-0.147 (0.183)	0.159 (0.148)
Reviewer trustworthiness	Bias	-0.204 (0.063)	0.101 (0.358)	0.146 (0.183)	0.113 (0.306)	-0.032 (0.772)
	Expertise	0.280** (0.010)	0.455*** (0.000)	0.090 (0.415)	-0.115 (0.296)	0.248* (0.023)
Outcome	Trust	0.132 (0.230)	0.498*** (0.000)	0.124 (0.259)	-0.401*** (0.000)	0.226* (0.039)
	Purchase	0.082 (0.460)	0.440*** (0.000)	0.115 (0.294)	-0.342** (0.001)	0.232* (0.034)

Table 5.10: Correlations between reviewer's perceived personality traits with trust factors, trust and purchase intention (Note: correlations are reported in Spearman rho r_s values and significance reported between brackets, * $p < .05$, ** $p < .01$, *** $p < .001$, $N=84$ for all correlations, significant correlations are indicated by bold font)

The perceived reviewer's neuroticism was the second most important personality trait. This reviewer's personality trait related to participants' trust in the reviews, purchase intention based on the reviews, and perception of the trustworthiness of the review. However, in contrast to perceived conscientiousness,

perceived neuroticism seemed to have a negative role. The perceived reviewer's high neuroticism, i.e. anxious and easily upset, was associated with low trust in the reviews ($r_s = -.401, p < 0.000$) and low purchase intention ($r_s = -.342, p < 0.000$). This means that participants had less trust in the reviews and were less likely to make a purchase decision based on reviews when the reviewer was perceived as highly neurotic. Furthermore, perceived reviewer's neuroticism was negatively related to the perceived quality ($r_s = -.280, p = 0.009$) and helpfulness ($r_s = -.277, p = 0.011$) of reviews, suggesting that reviews were seen as being low quality and less helpful when the reviewer was perceived as anxious and easily upset.

Third, perceived reviewer's openness also seemed to relate to participants' trust in the reviews and purchase intention, but to a lesser extent than perceived conscientiousness and neuroticism. Participants seemed to have more trust in the reviews ($r_s = .226, p = 0.039$) and were also more willing to make a purchase based on the review ($r_s = .232, p = 0.034$) when the reviewer was seen as open to new experiences. Furthermore, the perceived reviewer's openness was related to the perceived reviewer's expertise ($r_s = .248, p = 0.023$), meaning that reviewers who were perceived as open to new experience were also perceived as having high expertise. This could be because participants perceived reviewers who are open to new experience as more willing to try different services and therefore might be more knowledgeable.

The perceived reviewer's agreeableness and extraversion seemed to be the least important. Each of these perceived personality traits was related to participants' perception of one trust factor. Perceived reviewer's agreeableness related to the perceived review quality ($r_s = .291, p = 0.007$), suggesting that participants perceived reviews as higher quality when the reviewer was seen as warm and sympathetic

rather than when the reviewer was seen as critical and quarrelsome. In regard to perceived reviewer's extraversion, this personality trait was related to the perceived reviewer's expertise ($r_s = .280, p = 0.010$), meaning that reviewers who were seen as potentially social and outgoing were seen as more knowledgeable regarding services such as restaurants.

It is worth noting that none of the perceived reviewer's personality traits related to perceived reviewer's bias. All correlations between all perceived personality traits of the reviewer and perceived reviewer's bias were insignificant. This could be because the perception of bias is difficult and personality traits of the reviewer might not be enough to explain whether the reviewer is biased.

5.3.2 Relationship between User Perception of the Reviewer's Personality Similarity to the User and User Trust in Online Reviews When Making Purchase Decisions (RQ-2)

The existing literature, particularly within the recommender system field (Goldbeck, 2009; Ziegler & Goldbeck, 2007), suggests that there are significant relationships between particular forms of similarity, such as similarity in gender and taste, and trust. However, nothing is known about the relationship between personality similarity and trust on increasingly popular user-generated review systems. The perception of reviewer's personality similarity might influence the trust users place in online reviews, especially because perceived personality similarity has been suggested to influence real-life relationships that can include trust (Selfhout et al., 2009).

Participants' perception of similarity in three personality traits, conscientiousness, openness, and agreeableness, seemed to matter in their responses

(Table 5.11). Perceived similarity in conscientiousness was negatively related to the perceived reviewer's expertise ($r_s = -0.242, p = 0.026$) and to trust in the reviews ($r_s = -0.219, p = 0.045$). These results suggest that participants perceived the reviewer as of higher expertise and also had more trust in the reviews when the reviewer was perceived similar in terms of conscientiousness. These results suggest two points. On the one hand, participants who rated themselves high on conscientiousness (i.e. dependable and self-disciplined) perceived the reviewer as of higher expertise and had more trust when the reviewer was also perceived as highly conscientious. On the other hand, participants who rated themselves low on conscientiousness (careless and disorganised) perceived high reviewer's expertise and had more trust in the reviews when the reviewer was also perceived as having low conscientiousness. These results are interesting because they complement results reported in section 5.3.1. They imply that high perceived conscientiousness does not always relate to high trust and high perceived reviewer's expertise. Low perceived conscientiousness might also relate to high trust and high perceived expertise, but only for users who are also low on conscientiousness.

There were similar patterns regarding the perception of similarity in openness. Perceived similarity in openness was negatively related to participants' perception of reviewer's expertise ($r_s = -0.237, p = 0.030$) and perception of reviews' quality ($r_s = -0.240, p = 0.028$). When the reviewer was perceived similar in openness, participants perceived the reviewer as having high expertise and the reviews being higher quality. Once again, these results complement the results reported in section 5.3.1. They imply that high perceived reviewer's openness does not always lead to positive consequences. Indeed, low perceived reviewer's openness might also

increase the perceived trustworthiness of review and reviewer, but only for users who rate themselves as low on openness (i.e. conventional users).

		Reviewer similarity in personality traits				
		Extraversion	Conscientiousness	Agreeableness	Neuroticism	Openness
Review trustworthiness	Quality	-0.053 (0.629)	-0.134 (0.223)	0.311** (0.004)	-0.069 (0.536)	-.240* (0.028)
	Helpfulness	0.065 0.560	-0.057 (0.605)	0.101 (0.360)	-0.142 (0.196)	-0.078 (0.483)
	Accuracy	0.105 (0.342)	0.001 (0.995)	0.202 (0.066)	0.091 (0.410)	-0.169 (0.124)
Reviewer trustworthiness	Bias	0.000 (0.998)	-0.166 (0.131)	-0.161 (0.144)	0.034 (0.759)	-0.054 (0.627)
	Expertise	0.064 (0.566)	-0.242* (0.026)	0.066 (0.551)	-0.019 (0.863)	-0.237* 0.030
Outcome	Trust	0.014 (0.896)	-0.219* (0.045)	0.183 (0.095)	-0.012 (0.913)	-0.213 (0.052)
	Purchase	0.005 (0.961)	-0.115 (0.297)	0.270* (0.013)	-0.069 0.530	-0.206 (0.060)

Table 5.11: Correlations between perceived similarities in personality traits with trust factors, trust and purchase intention (Note: correlations are reported in Spearman rho r_s values and significance reported between brackets, * $p < .05$, ** $p < .01$, *** $p < .001$, $N=84$ for all correlations, significant correlations are indicated by bold font)

Unlike the perception of similarity in conscientiousness and openness, the perception of similarity in agreeableness was positively related to participants' responses. Perceived similarity in agreeableness was positively related to the perceived quality of reviews ($r_s = 0.311$, $p = 0.004$) and to purchase intention ($r_s = .270$, $p = 0.013$). At first glance, these results suggest that dissimilarity in agreeableness might have been associated with high perceived quality of reviews and high purchase intention, meaning that participants who rated themselves low on agreeableness (i.e. critical and quarrelsome) tended to perceive reviews as high quality and were more willing to make purchase decisions based on reviews when the reviewer was perceived as having high agreeableness (i.e. warm and sympathetic). In contrast, participants who rated themselves high on agreeableness tended to perceive reviews as high quality and were more willing to make a purchase decision based on

reviews when the reviewer was perceived as having low agreeableness. However, this interpretation contradicts results reported in section 5.3.1 which suggest that high perceived agreeableness was related to high perceived trustworthiness of reviews. Thus, an explanation could be drawn based on results related to both the perceived agreeableness and perceived similarity in agreeableness. It is possible that high perceived agreeableness led to the reviews being perceived as higher quality and also to higher purchase intention even by users who rated themselves low on agreeableness (i.e. dissimilar users in terms of agreeableness).

Taken together, the results show that the perceived reviewer's similarity in personality traits did not seem to greatly matter in trust compared to the perceived reviewer's personality traits. Perhaps determining personality similarity based on information on profile pages is not easy, unlike similarity in demographics and taste, which have been suggested to strongly influence trust (e.g. Ziegler & Goldbeck, 2007). Future work is warranted to further explore the role of perceived reviewer's personality similarity in trust.

5.3.3 User Perception of the Reviewer's Personality based on Interface Signals (RQ-3)

Previous work (e.g. Goldbeck et al., 2011; Back, 2010; Gao, 2013) has shown that information available on the user profile page on social networking sites such as Facebook can be used in predicting the user's personality. For example, the user's level of extraversion seems to be related to the number of friends: extraverted users tend to have a high number of friends. The user's level of openness to new experiences seems to relate to interests and hobbies listed on the profile page: users open to experiences tend to have a wide range of hobbies and interests. Despite these

findings, nothing is known about how users perceive personality based on information available on profile pages on user-generated review systems such as Yelp. Thus, this study investigated how participants perceived the reviewer's personality traits based on interface signals from profile pages. Table 5.12 shows the number of participants who mentioned a relationship between interface signals and perceived personality traits.

All participants justified at least one personality trait through an interface signal. There were substantial differences in how participants perceived personality traits. For example, participant 11 used only two types of interface signals in her perception of reviewer's personality, whereas participant 5 used seven types of signals. This means that participants relied to different extents on interface signals in their perception of personality. However, there were some strong patterns, for example, half of the participants (14 out of 28 participants) used positive words in their perception of agreeableness.

As shown in Table 5.12, there were two broad categories of signals in this study: review-related and reviewer-related. It seems that that review-related signals from the profile pages were more frequently used than reviewer-related signals in the perception of personality traits. For example, 14 participants mentioned a signal that related to reviews whereas only four participants used reviewer-related signals to assess the personality trait agreeableness.

Signal Categories	Signal Types	Signals	E	C	A	N	O
Reviewer-related	Identity	Profile photo absence	4	0	0	0	0
		Smiling in profile photo	5	0	4	4	0
		Young age	1	3	0	1	2
		Old age	1	1	0	1	0
	Level of contribution	High number of reviews	4	3	0	0	3
	Level of Community Relationships	High number of friends	2	2	0	0	0
	Community Standing	Elite	2	3	0	0	1
Review-related	Type of service	Nightlife	6	0	0	2	5
		Food	2	0	0	0	2
		Sports & Leisure service	0	2	0	0	2
	Service location	Area	0	0	0	0	2
		City	0	0	0	0	2
	Valence	Positive words	9	0	14	7	0
		Negative words	0	0	4	9	0
		1 star rating	0	0	4	0	0
		2 star rating	0	0	5	0	0
	Orthographic features	3 star rating	0	0	5	0	0
		Exclamation marks	6	0	0	0	0
	Level of detail	Detailed information	3	7	0	0	1
		Lack of details	2	5	0	0	2

Table 5.12: Number of participants mentioning interface signals in assessing Extraversion (E), Conscientiousness (C), Agreeableness (A), Neuroticism (N) and Openness to experience (O) personality traits

The analysis then investigated the way that participants used the types of signals in their perception of personality. Figure 5.4 shows the strength of relationships between the signal types and personality traits. Interesting patterns were observed in this analysis. First, some types of signals were unique in helping participants in their perception of a particular personality trait. For example, the location of the reviewed services was used only in the perception of the reviewer's openness to experience. Second, some types of signals seemed to matter in the perception of multiple personality traits. For instance, identity signals were used by participants in assessing

all five personality traits. The third and fourth patterns involve the strength of the relationships between each type of signal and personality traits. For example, signals related to review valence were used by 18 participants to judge agreeableness whereas only nine participants used valence signals in assessing neuroticism. This suggests that valence signals were more important in the perception of agreeableness than in the perception of neuroticism.

The results showed that five types of signals played important roles in the perception of personality. These types, in order of importance from most to least, were *review valence*, used by 21 participants across a range of personality traits; *type of services*, used by 14 participants; *reviewer's identity*, used by 13 participants; *review detail*, used by nine participants; and *orthographic features*, used by six participants. The following paragraphs describe the way participants used these types

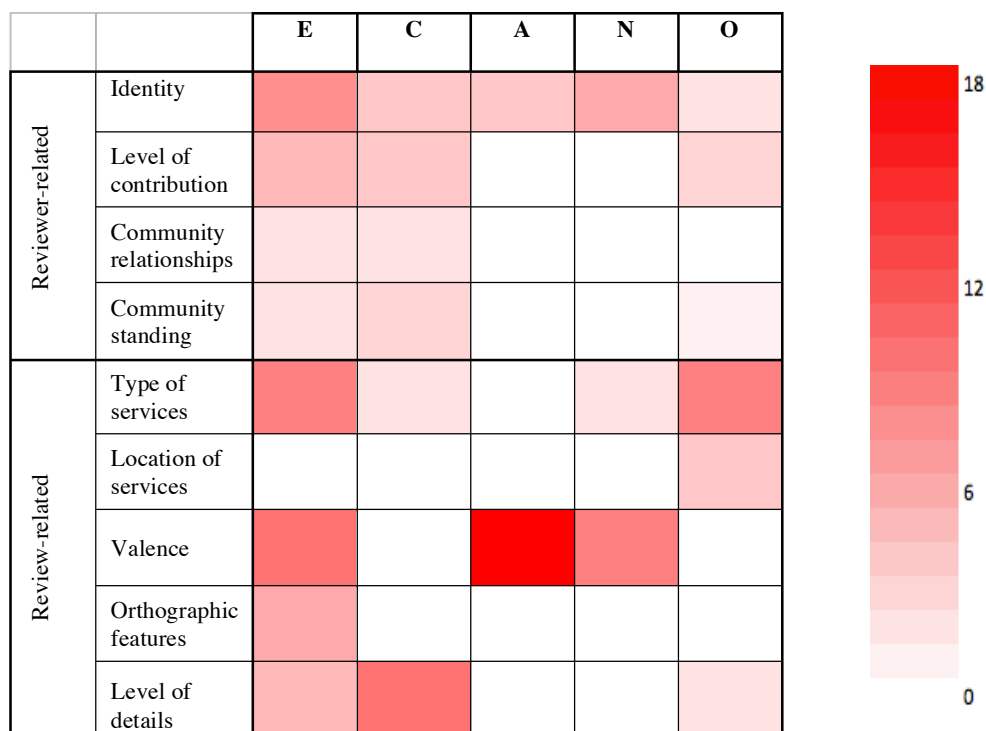


Figure 5.4: Heat map indicating strength of relationship between types of signals and personality traits. Red indicates a strong whereas white indicates a weak relationship. Strength of relationship is calculated based on number of participants who have used a signal type to justify a personality trait.

of signals in the assessment of personality.

Review valence

The valence of the review can be expressed by the use of positive and negative words, and the use of these words might give a clue to a user as to where on the scale of a personality trait a reviewer is. Thus, the analysis investigated how frequently participants mentioned valence signals at the low end and at the high end of a personality trait.

The results showed that participants associated positive words in a review with high extraversion and high agreeableness but low neuroticism. Nine participants mentioned that positive words led them to perceive reviewers as extraverted and enthusiastic. Similarly, 14 participants mentioned that positive words led them to perceive reviewers as warm and sympathetic. For example:

P7: "I think she is number 1 here extraverted and super enthusiastic even though her review is quite short she is using a lot of exclamation marks and using words like 'love', sharing with friends .

P12: "She is very warm and sympathetic I will give her a 7 because she is using very strong words like 'love' 'great' 'definitely go there again' , maybe because she is happy about the restaurant but she only talks about positives"

In contrast to positive words, negative words were less frequently used by participants in judging personality and used not at all for perceiving extraversion (Figure 5.5). It seemed that participants used negative words to perceive reviewers on the low side of the agreeableness but the high side of the neuroticism. For example,

nine participants mentioned that the use of negative words led them to perceive the reviewer as highly neurotic (i.e. anxious and easily upset):

P16: “I think she has a tendency to be upset and voice her opinion because she says ‘disappointing’ experiences she mentioned. She has a calm in her but not that calm”

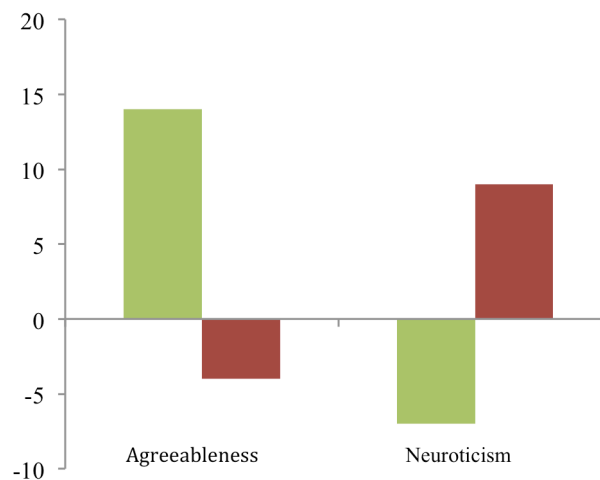


Figure 5.5: Positive words (green bars) used in the perception of high agreeableness and low neuroticism, negative words (red bars) used in the perception of low agreeableness but high neuroticism

Type of service

The type of services reviewed was the second most important signal type in the perception of the reviewer’s personality. Participants used type of services in their perception of two personality traits: extraversion and openness to experience. Six participants mentioned nightlife services (e.g. nightclub, bar, gig) when discussing their perception of the reviewer as extraverted and enthusiastic. A similar pattern was observed in regard to openness to experience: five participants mentioned nightlife service in relation to the reviewer being highly open to new experience.

In contrast to nightlife services, food services (e.g. market, supermarket) led two participants to perceive the reviewer as low on extraversion and openness to experience. For example:

P13: “ I think he is 2 because he is kind of the person who is in the club so he might be really extravert”

P15: “He is on 5 more quiet reserved because he didn’t like the look of the night club so he appeared to like more like quiet places like a market. So I got the feeling he didn’t like the initial impression of the place”

Reviewer’s identity

Signals that related to reviewer’s identity were used by participants in their perception of all the personality traits of the reviewer. However, identity signals were most important in the perception of two particular traits: extraversion and neuroticism. The profile photo of the reviewer seemed to communicate a lot of information about the reviewer’s identity, including facial expressions, age, and the presence of a photo in the first place.

A profile photo that showed a smiling reviewer was used by participants to perceive the reviewer as being highly extraverted but low on neuroticism. Five participants interpreted a smiling profile photo as evidence of the reviewer being extraverted and enthusiastic (i.e. high extraversion) and four participants interpreted the same signals as evidence for the reviewer being emotionally stable and calm (i.e. low neuroticism). For example:

P28: “Completely enthusiastic and extraverted, it’s the face in the profile picture, the openness of her smile the honesty the review is full of energy and she had a wonderful time”

P23: "He seems calm... He is smiling in the photo which is good and it's the arms make him look reserved but only slightly . It's a nice picture he looks quite relaxed in the picture"

The profile photo also indicated the perceived age of the reviewer. Perceived young age seemed to increase the perception of high extraversion but also high neuroticism. This means that participants in this study perceived young reviewers to be outgoing but also easily upset. In contrast, perceived old age seemed to have the opposite effect, leading participants to perceive the reviewer as low on extraversion and low on neuroticism.

The absence of a profile photo on the other hand seemed to trigger the perception of the reviewer being quiet and reserved (low extraversion), which was observed in four participants' responses. Often, participants seemed to consider the lack of a profile photo as a sign of the reviewer's unwillingness to reveal personal information and therefore to be potentially quiet and reserved.

Review detail

The level of detail in the reviews seemed to be particularly important in participants' perception of reviewer's conscientiousness. This was observed in seven participants' responses, in which they mentioned that detailed information in the review led them to perceive the reviewer as being dependable and self-disciplined (i.e. high conscientiousness). Lack of details had an opposite effect. Five participants mentioned that the lack of details led them to perceive the reviewer as careless and disorganized:

P19: “Dependable definitely and self-disciplined because again she writes well, there is attention to details, I don’t associate this kind of things to careless/disorganised person ”

P28: “I’m afraid he is a bit careless there is no information about the food there is no colour no details”

Orthographic features

Orthographic features, such as exclamation marks, seemed to have a unique role in participants’ perception of personality traits. Six participants mentioned exclamation marks in their assessment of only one personality trait: extraversion. In these instances, the presence of exclamation marks led participants to perceive the reviewer as being extraverted and enthusiastic (i.e. high on extraversion). These participants’ responses suggested that highly extraverted individuals tend to use exclamation marks when posting user-generated content. For example:

P7: “I think she is number 1 here extraverted and super enthusiastic even though her review is quite short she is using a lot of exclamation marks and using words like ‘love’, ‘sharing with friends’”

5.3.4 Relationship between User Background and User Trust in Online Reviews When Making Purchase Decisions (RQ4)

The user's own personality has been shown to influence the trust that a user places in online vendors (Lumsden & MacKay, 2006) and recommender systems (Goldbeck & Norris, 2013). Nevertheless, it is unknown how the user's own personality shapes trust in online reviews when making purchase decisions. Furthermore, the user's dispositional trust and past experience have been shown to influence trust in online vendors and purchase decision (McKnight et al., 2002a,b; Pavlou & Gefen, 2004), and therefore their effects can extend to user trust in online reviews when making purchase decisions. Accordingly, this study investigated the potential role of participants' background, including personality, dispositional trust and past experience, regarding their trust in online reviews and purchase intention.

Among the participants' own personality traits, extraversion seemed to have the most important role. Participants' level of extraversion, which referred to their tendency towards sociability and engagement with the external world (Halko & Lientz, 2010), was related to their perception of the trustworthiness of both the reviews and the reviewers, their trust in the reviews, and their purchase intention. There were significant relationships between participants' extraversion and the perceived quality ($r_s = 0.574, p = 0.001$), helpfulness ($r_s = 0.528, p = 0.004$), and accuracy ($r_s = 0.473, p = 0.011$) of reviews, perceived reviewer's expertise ($r_s = 0.386, p = 0.043$), trust in reviews ($r_s = 0.540, p = 0.003$), and purchase intention ($r_s = 0.550, p = 0.002$) (Table 5.13). These results suggest that highly extraverted participants tended to perceive higher levels of trustworthiness of reviews and reviewers, they tended to have more trust in the review, and they were more willing to make purchase decisions based on reviews. These results support previous work

(Lumsden & Mackay, 2006; Tan & Sutherland, 2004) suggesting that high level of user extraversion leads to high trust in online vendors.

Second, participants' level of neuroticism was also related to their responses. There were significant correlations between participants' level of neuroticism and the perceived accuracy of reviews ($r_s = 0.429, p = 0.023$), perceived reviewer's expertise ($r_s = 0.394, p = 0.038$), and trust in reviews ($r_s = 0.396, p = 0.037$). These results suggest that participants who rated themselves high on neuroticism (i.e. anxious, easily upset) perceived the reviews as more accurate, the reviewer's as having higher expertise, and had more trust in the reviews. These results were contrary to expectations as neuroticism describes "a tendency towards negative emotionality" (Halko & Lientz, 2010) and therefore might decrease trust, as suggested by Tan and Sutherland (2004). Nevertheless, it has been suggested that highly neurotic individuals are more likely to use the Internet and also their neuroticism can reflect negative emotionality in interacting with others in real life (Schrammel et al., 2009; Lopes et al., 2003). This might explain why participants with high neuroticism in this study had more trust in online reviews: they may prefer using reviews for assessing services such as restaurants rather than seeking recommendations from others in real life.

Third, participants' agreeableness, defined as "tendency towards altruism, trust and modesty as well as compassion and cooperativeness towards others" (Halko & Lientz, 2010) was related to participants' perception of only one trust factor, perceived accuracy of the review ($r_s = 0.425, p = 0.024$). Highly agreeable participants tended to perceive reviews as more accurate than participants who scored themselves low on agreeableness.

		Background						
		Dispositional trust	Past experience	Extraversion	Conscientiousness	Agreeableness	Neuroticism	Openness
Review trustworthiness	Quality	0.168 (0.391)	0.081 (0.683)	0.574** (0.001)	0.080 (0.684)	0.244 (0.210)	0.203 (0.300)	0.274 (0.158)
	Helpfulness	0.301 (0.120)	0.049 (0.805)	0.528** (0.004)	0.216 (0.270)	0.330 (0.086)	0.364 (0.057)	0.240 (0.219)
	Accuracy	0.293 (0.130)	-0.016 (0.937)	0.473* (0.011)	0.125 (0.526)	0.425* (0.024)	0.429* (0.023)	0.181 (0.356)
Reviewer trustworthiness	Bias	-0.312 (0.097)	-0.145 (0.463)	-0.319 (0.098)	0.164 (0.405)	-0.256 (0.189)	0.006 (0.974)	0.087 (0.660)
	Expertise	0.245 (0.208)	-0.216 (0.269)	0.386* (0.043)	0.159 (0.420)	0.187 (0.340)	0.394* (0.038)	0.219 (0.264)
Outcome	Trust	0.400* (0.035)	-0.095 (0.629)	0.540** (0.003)	0.191 (0.330)	0.235 (0.228)	0.396* (0.037)	0.298 (0.123)
	Purchase	0.347 (0.070)	0.118 (0.459)	0.550** (0.002)	0.125 (0.525)	0.169 (0.390)	0.347 (0.070)	0.223 (0.255)

Table 5.13: Correlations of participants' background with trust factors, trust and purchase intention (Note: correlations are reported in Spearman r_s values and significance reported between brackets, * $p < .05$, ** $p < .01$, *** $p < .001$, $N=28$ for all correlations, significant correlations are indicated by cells with bold font)

The results did not reveal any significant relationship between participants' conscientiousness and openness and perception of trustworthiness of the review and reviewer, or trust in the reviews and purchase intention. These results are contrary to previous work both from the eCommerce domain (Tan & Sutherland, 2004) and the recommender system domain (Goldbeck & Norris, 2013) that has suggested that the user's conscientiousness and openness can affect trust.

In addition to participant's personality traits, participants' dispositional trust seemed to have a significant role. There was a significant correlation between participants' dispositional trust and their ratings of trust in the reviews ($r_s = 0.400$, $p = 0.400$). Participants with high dispositional trust had higher trust in reviews than participants with low dispositional trust. This result supports the previous studies in this thesis (chapters 3 and 4), which suggested that dispositional trust is important

regarding trust in online reviews. It also extends previous work on user trust in online vendors (e.g. McKnight et al., 2002a,b), which has emphasized the role of dispositional trust in user trust in online vendors. Contrary to expectations, participants' past experience was not related to their trust in the reviews or their purchase intention. This could be because the majority of participants reported good previous experiences with using Yelp reviews (mean = 5.01).

5.4 Discussion

The findings of this study have important implications for future research into interface signals, personality, and trust in online reviews in the purchase decision-making process. They also have implications for building trust in systems that provide user-generated reviews.

This study represents the first attempt to better understand how user trust in online reviews is shaped, particularly when the reviewer's perceived personality is taken into account (RQ-1) (objective 2). It shows that user perception of the reviewer's personality traits has a significant role in the user perception of the trustworthiness of the review and the reviewer, trust in the reviews, and purchase intention. These perceived personality traits, from most to least important are perceived reviewer's conscientiousness, neuroticism, openness to experience, agreeableness, and extraversion. These findings build on previous work by Mohammadi et al. (2013), who suggested that the perceived reviewer's personality affects the persuasiveness of the reviewer in the context of online movie reviews; this was extended to user trust in reviews when purchasing services such as hotels and restaurants.

The perceived reviewer's personality similarity to the user is also found to be important in trust (RQ-2) (objective 2), but to a lesser extent than the perceived

reviewer's personality traits. This could be because personality similarity is hard to perceive based on interface signals. The findings show that perceived similarity in only two personality traits, conscientiousness and openness, have a significant role in user trust in online reviews when making purchase decisions. These findings build on two lines of previous work. First, they build on previous work from the recommender system literature (e.g. Goldbeck, 2009; Bonhard et al., 2006) that has emphasized that similarity, particularly in demographics and taste, influence trust. Second, they build on previous work from the social psychology literature (e.g. Selfhout et al., 2009) by showing that the effect of perceived personality similarity can extend to the online context, especially to user trust in online reviews.

This study extended studies 1 and 2 on signals that matter in trust in online reviews (RQ-3) (objective 1). There seem to be five types of interface signals that provide information about the reviewer's personality: signals that relate to the review valence, type of services reviewed, reviewer's identity, review details, and orthographic features. While some of these types of signals, such as review details and orthographic features, have been previously identified as important in trust (Kobayashi et al., 2015; Riasanow et al., 2015), this study clarified how these signals can matter in trust in a different way, by signalling the reviewer's personality, which in turn influences trust. Further work could help to uncover more interface signals and the ways in which they are employed by users in the perception of personality.

This study was the first to investigate the role of the user's personality in trust in online reviews (RQ-4) (objective 3). The user's level of extraversion and neuroticism seem to be particularly important. Previous work by Lumsden and MacKay (2006) and Tan and Sutherland (2004) suggests that high extraversion increases user trust in online vendors, and this was extended to trust in online reviews. High levels of user

neuroticism seems to be associated with high trust, which contradicts previous work by Tan and Sutherland (2004), who suggested that high neuroticism leads to lower trust. A possible explanation of high neuroticism leading to higher trust is that users with high neuroticism might prefer using online reviews for assessing vendors' services rather than seeking recommendations from others in real life, as their high level of neuroticism can reflect negative emotionality in interacting with others in real life. Future work is warranted to further investigate the role of the user's personality in trust in online reviews. In addition to the user's own personality, the results show that the user's dispositional trust seems to matter in user trust in online reviews. Users with high dispositional trust tend to have more trust in online reviews than users with low dispositional trust. This finding extends those of studies 1 and 2, which showed that dispositional trust can be important in trust in online reviews, and it extends previous work by McKnight et al. (2002a,b) suggesting that dispositional trust influences user trust in online vendors.

While this study makes several contributions, it is not without limitations. The results reported in this study, both quantitative and qualitative, were based on a small number of participants. Thus, a larger scale investigate could provide quantitative evidence to validate (i) the effects of interface signals on the perception of reviewer's personality, (ii) the relationship between perceived reviewer's personality and personality similarity to the user and trust in online reviews, and (iii) the way that user's background, especially the user's personality, shapes trust.

This study provides practical implications for building trust in systems that provide user-generated reviews. First, designers can better signal the reviewer's openness and extraversion by giving a direct visual signal of the *types* of services reviewed by the reviewer. Even though participants were able to see this information

by navigating through the reviews, providing a summary of the types of reviewed services on the reviewer's profile page could make it easier for users to perceive the reviewer's openness and extraversion. Second, because some signals are very important in communicating personality traits and thus have a role in trust, designers should encourage reviewers to provide this information. For example, profile photos are used in a variety of ways to assess the personality of reviewers, and even their absence communicates low extraversion.

6 DISCUSSION AND CONCLUSIONS

6.1 Summary of the Research

The growing number of systems that provide user-generated reviews, such as TripAdvisor and Yelp, has changed the way users interact with vendors, particularly unfamiliar vendors. Users are increasingly searching for reviews about vendors written by others prior to making purchase decisions (Liu et al., 2008; Riasanow et al., 2015; Kobayashi et al., 2015). However, users might be uncertain how much to trust reviews because most users are not familiar with reviewers and reviews might not be credible. Thus, it is becoming increasingly important to understand which reviews are trusted by users and why.

This PhD research has advanced the knowledge regarding what lead users to trust online reviews when making purchase decisions. To do so, it investigated three research objectives in three empirical studies. Two of the studies were lab-based and collected qualitative and quantitative data; one study was online and collected quantitative data. Table 6.1 provides an overview of the research objectives, the studies that addressed the objectives, the research questions of each study as well as the contributions.

Objective	Study	Research question	Contributions
Objective 1: To investigate interface signals that matter in user trust in online reviews when making purchase decisions	1	RQ-1: What interface signals affect user trust in online reviews?	<ul style="list-style-type: none"> - User trust in reviews is influenced by both review- and reviewer-related signals. Overall, review-related signals seem to be more important than reviewer-related signals. - Trust in reviews is influenced by new signals not considered before: <i>community opinions about the review</i> and <i>user-generated photos</i> (review-related); reviewer's <i>city & country</i>, similarity to user in terms of <i>characteristics</i> and <i>satisfaction level</i> (reviewer-related).
		RQ-2: How do users employ interface signals when perceiving the trustworthiness of the review and the reviewer?	<ul style="list-style-type: none"> - Review trustworthiness is perceived based on signals that relate not only to the review but also to the reviewer, and similarly the reviewer's trustworthiness. - The review-related signals <i>details</i> and <i>positive words</i> are used in combination in the perception of the review and reviewer's trustworthiness.
	2	RQ-1: How do review valence, <i>online community opinions about the review</i> , and <i>user-generated photos</i> influence user trust in online reviews when making purchase decisions?	<ul style="list-style-type: none"> - Positive <i>community opinions</i> increase the perceived trustworthiness of the review, particularly the perceived helpfulness in contrast to negative <i>community opinions</i>. - The presence of a <i>user-generated photo</i> can decrease the perceived trustworthiness of the review and reviewer. This could be because users might view photos as means to manipulate their trust or because the photos that were used in the study were perceived to be negative.
	3	RQ-3: How do users employ interface signals in their perception of the reviewer's personality?	<ul style="list-style-type: none"> - Five types of interface signals (<i>review valence</i>, <i>type of services reviewed</i>, <i>reviewer's identity</i>, <i>review details</i> and <i>orthographic features</i>) matter in the perception of personality. - Signals of <i>review valence</i>, <i>type of services reviewed</i>, <i>reviewer's identity</i> and <i>review details</i> are used in the perception of multiple personality traits. <i>Orthographic features</i> are used in the perception of extraversion only.
Objective 2: To investigate the perceived review- and reviewer-related factors that influence user trust in online reviews when making purchase decisions, and the interplay	1	RQ-4: How does the user perception of the review quality and the reviewer's expertise and bias influence the perception of the review helpfulness and accuracy and trust in the review?	<ul style="list-style-type: none"> - Perceived review quality seems to positively influence the perceived helpfulness, accuracy and trust in the review - The perceived reviewer's expertise and bias do not seem to have much effect compared to perceived review quality. Possibly because perceived review quality is more important.
		RQ-5: How does the user perception of the review helpfulness and accuracy influence trust in the review?	<ul style="list-style-type: none"> - Both perceived review helpfulness and accuracy seem to positively influence trust in the review
	2	RQ-1: How do <i>review valence</i> , online community opinions about the review, and user-generated photos influence user trust in online reviews when making purchase decisions?	<ul style="list-style-type: none"> - Positive reviews seem to increase the perceived trustworthiness of review and reviewer, trust in the review and purchase intention, in contrast to negative reviews.

between these factors		RQ-3: How do the influential factors on trust relate to one another, to trust in online reviews, and to purchase intention?	<ul style="list-style-type: none"> - The perceived review quality and helpfulness seem to be most related to the perceived reviewer's expertise, and the perceived review accuracy seems to be most related to perceived reviewer's bias. - Factors of the perceived review trustworthiness particularly perceived quality and helpfulness seem to be most important in trust. - The perceived trustworthiness of the review and reviewer are related to purchase intention but these relationships might be mediated by trust in the review
	3	RQ-1: How does the perceived reviewer's personality relate to users' trust in online reviews when making purchase decisions?	The perceived reviewer's personality seem to play an important role in the user perception of both the review and reviewer's trustworthiness, trust in the review and purchase intention. The most important perceived personality trait in trust in conscientiousness. Followed by perceived neuroticism and openness. The perceived agreeableness and extraversion seem to be the least important.
		RQ-2: How does a user's perception of <i>similarity</i> of a reviewer's personality to their own relate to users' trust in online reviews when making purchase decisions?	The perceived reviewer's similarity in conscientiousness and openness can increase the perceived trustworthiness of the review and reviewer, trust in the review and purchase intention.
Objective 3: To investigate the way that a user's background shapes user trust in online reviews when making purchase decisions	1	RQ-3: How does a user's dispositional trust affect the use of interface signals?	Users with low dispositional trust tend to be critical in interpreting signals of the reviewer's background (i.e. city & country) as signals of trust while users with high dispositional trust are more swayed by the community's positive opinions about the reviewer.
	2	RQ-2: How does a user's background in the forms of dispositional trust and past experience shape trust in online reviews when making purchase decisions?	<ul style="list-style-type: none"> - Users with high dispositional trust tend to perceive reviews as being more trustworthy (i.e. higher quality) than users with low dispositional trust - Users with positive past experience are more likely to make purchase decisions based on reviews than users with negative past experience.
	3	RQ-4: How does the user's background in the form of personality, dispositional trust and past experience shape trust in online reviews when making purchase decisions?	<ul style="list-style-type: none"> - Highly extraverted and neurotic users tend to perceive the reviews and reviewers more trustworthy, have more trust in the reviews and are more likely to make a purchase based on reviews than users who are low on extraversion and neuroticism. - Users with high dispositional trust have more trust in reviews than users with low dispositional trust.

Table 6.1: Overview of research objectives, studies that addressed research objectives, research questions and findings

6.2 Towards a Framework of User Trust on Systems that Provide User-Generated Reviews

Findings of this research point the way towards a framework that explains user trust on systems that provide user-generated reviews (figure 6.1). The framework demonstrates the review-related and reviewer-related signals and perceived factors

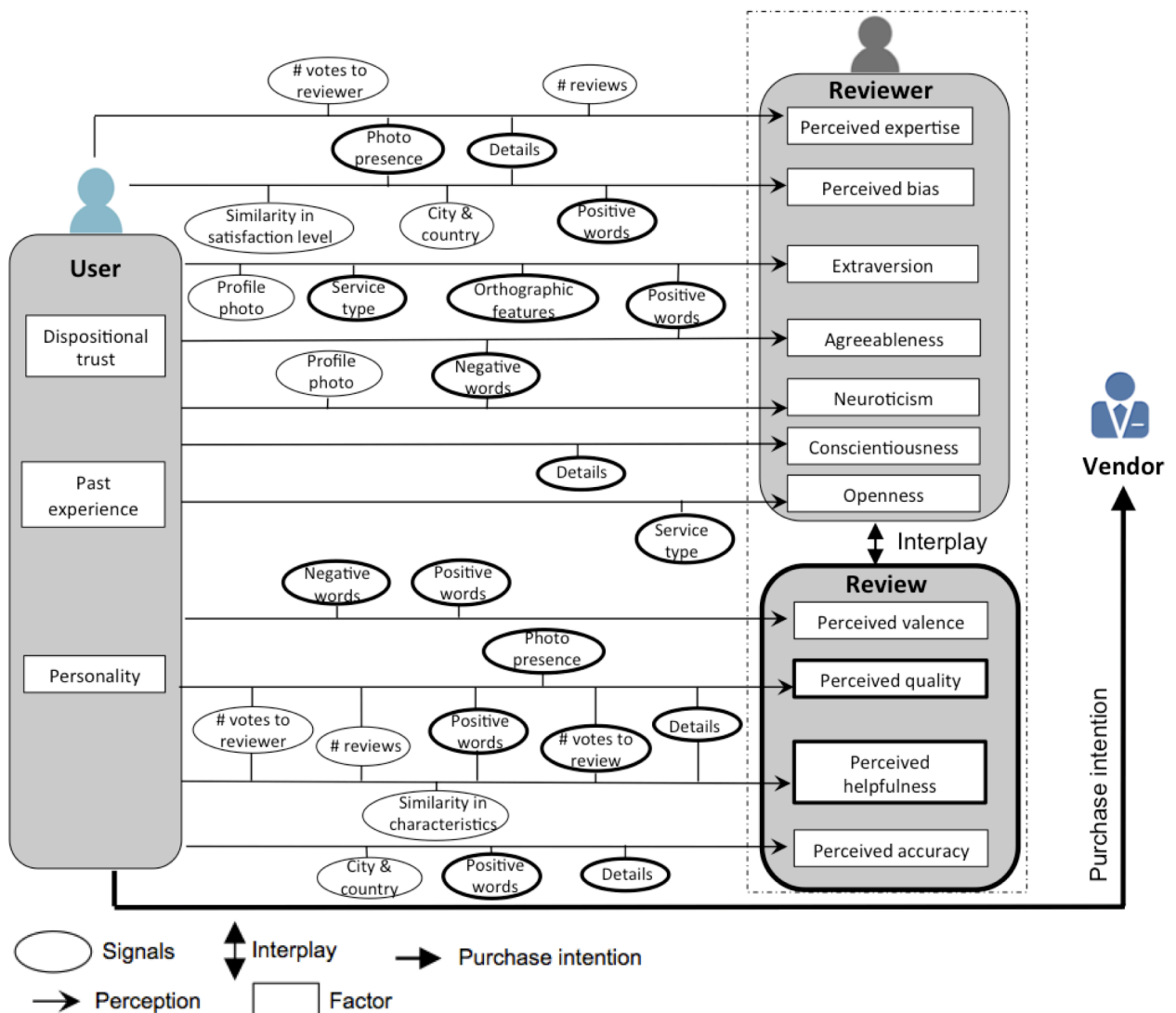


Figure 6.1: Framework of user trust on systems that provide user-generated reviews (Note: review-related signals and factors are bordered with bold font to indicate that these were more important than signals and factors of the reviewer)

that can influence user trust in online reviews, the aspects of the user background that shape user trust in online reviews and finally, how the user's trust relationship with the vendor (in the form of purchase intention) is changing on systems that provide user-generated reviews. Overall, the framework has four components.

First, **user trust in online reviews is mostly affected by review-related signals and factors**. In regard to the role of review-related signals in user trust in online reviews, studies 1, 2 and 3 showed that users employ signals of the review more than signals of the reviewers not only when deciding to trust the reviews, but also in their perception of factors of the review and reviewer that influence trust. Indeed, study 2 suggested that even when reviewer-related information is lacking, users tend to use review-related signals in their perception of the trustworthiness of both the reviewer and the reviewer. This was further supported by the results of study 3, which showed that users tend to rely mostly on review-related signals for assessing the reviewer's personality traits that matter in trust. Overall, this research identified seven review-related signals that affect user trust in online reviews. These signals are the *details* included in the review and *positive words* (studies 1 and 3), *community opinions about the review* indicated by the votes given to the review and the *presence of user-generated photo* alongside the review (studies 1 and 2), *negative words* (study 3), *exclamation marks* and *type of services reviewed* (study 3) (figure 6.2).

Furthermore, user perception of factors of the review seems to be more important in trust than the perception of factors of the reviewer. This is based on the findings of study 1 and 2 in which participants' perception of the trustworthiness of the review, especially the perceived review quality and helpfulness, seemed to be most associated with trust (figure 6.2). This in turn implies that user trust in a review is most affected by aspects of the review itself.

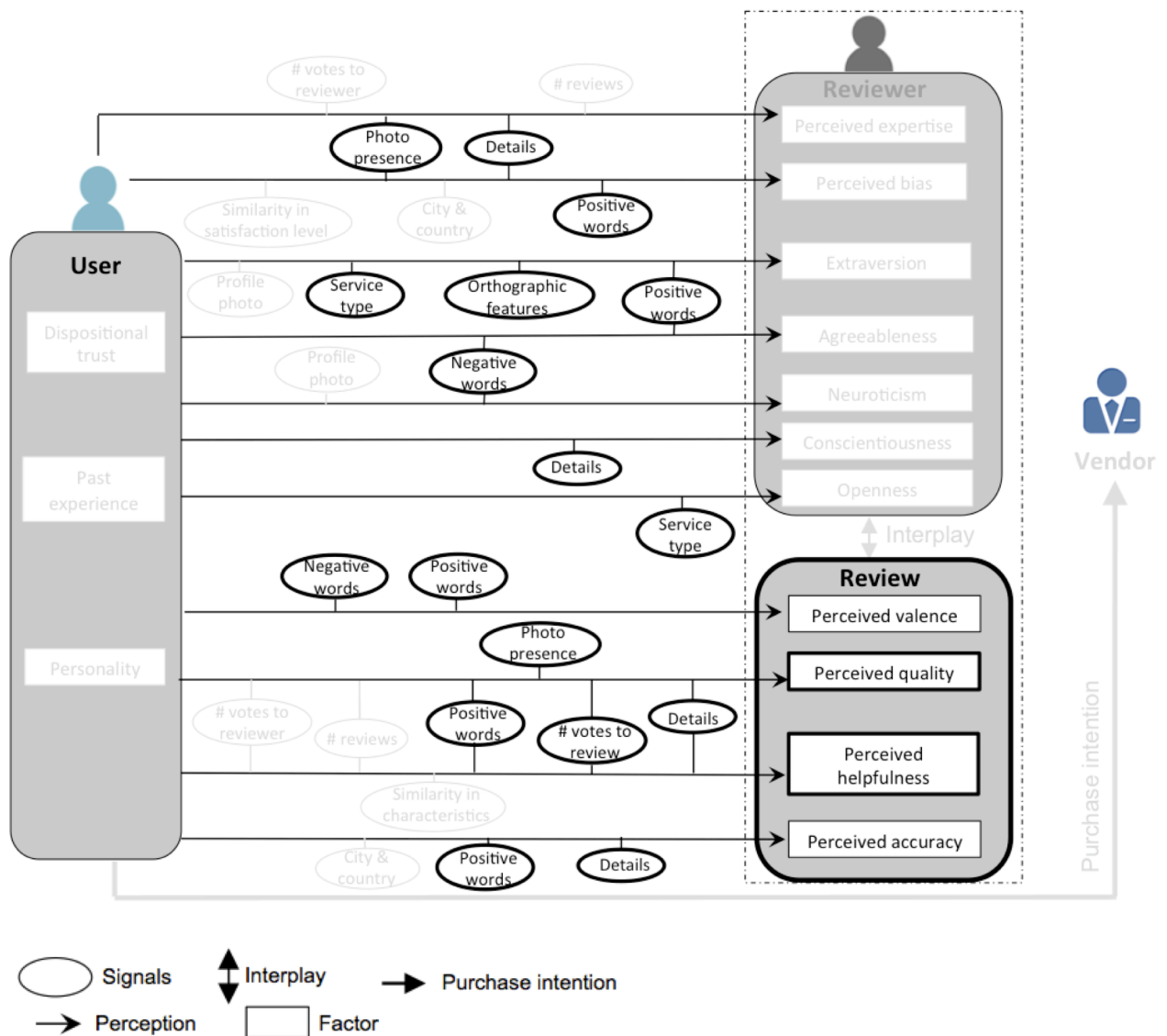


Figure 6.2: Framework of user trust on systems that provide user-generated reviews - user trust in the reviews is mostly affected by signals and factors of the review

Second, **user trust in reviews is mediated by reviewer-related signals and factors.** This was demonstrated throughout the three studies reported in this thesis. Studies 1 and 3 have shown that users employ signals that are related to the reviewer when perceiving factors of the review and also when deciding to trust the reviews. In this respect, four signals seem to be particularly important. These signals are the *total number of reviews posted by the reviewer* (studies 1 and 3), the *total number of*

helpful votes given to the reviewer and the reviewer's city & country (study 1), and finally, the reviewer's profile photo (study 3). Signals of the reviewer's similarity to the user in terms of *characteristics* and *satisfaction level* can also play a role in user trust, suggesting that users tend to depend on reviews that are posted by others similar to them (study 1) (figure 6.3).

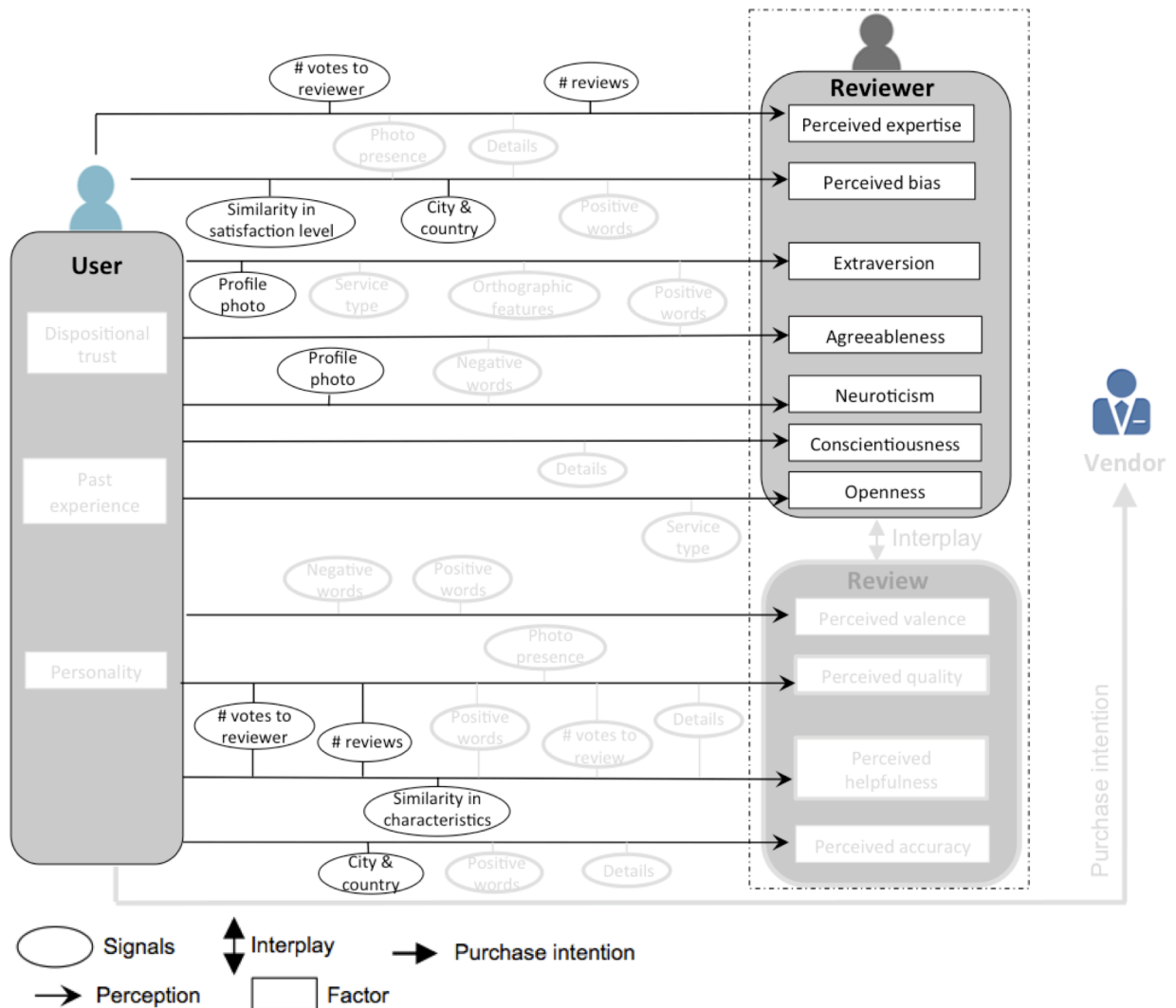


Figure 6.3: Framework of user trust on systems that provide user-generated reviews - user trust in reviews is mediated by signals and factors of the reviewer

Furthermore, studies 2 and 3 have shown that user perception of a number of reviewer-related factors matter in the establishment of trust in online reviews. In study 2, the perception of trustworthiness of the reviewer (i.e. expertise and bias) was

shown to be significantly related to trust in the review – meaning that users are likely to trust the review when the reviewer is perceived as trustworthy. Important to note here is that the relationship between factors of the reviewer's trustworthiness with trust were weaker than the relationship between factors of the review's trustworthiness with trust. Study 3 added that user perception of the reviewer's personality and personality similarity are significantly related to trust in online reviews (figure 6.3).

Third, the **user's own background has a significant role in shaping trust in online reviews**. The three studies conducted in this PhD research have shown that the user's own background shapes trust in online reviews in different ways, both directly and indirectly. The user's dispositional trust has been shown to influence the use of reviewer-related signals as trust signals in which low dispositional trust can lead to a critical approach towards interpreting signals of the reviewer's background, particularly the reviewer's *city & country*. In contrast, users with high dispositional trust seem to be more swayed by the community's positive opinions about the reviewer (i.e. helpful votes given to the reviewer) (study 1). Study 2 added that dispositional trust is related to the perception of the trustworthiness of review, particularly the perceived review quality. Users with high dispositional trust tend to perceive reviews as more trustworthy compared to users with low dispositional trust (figure 6.4).

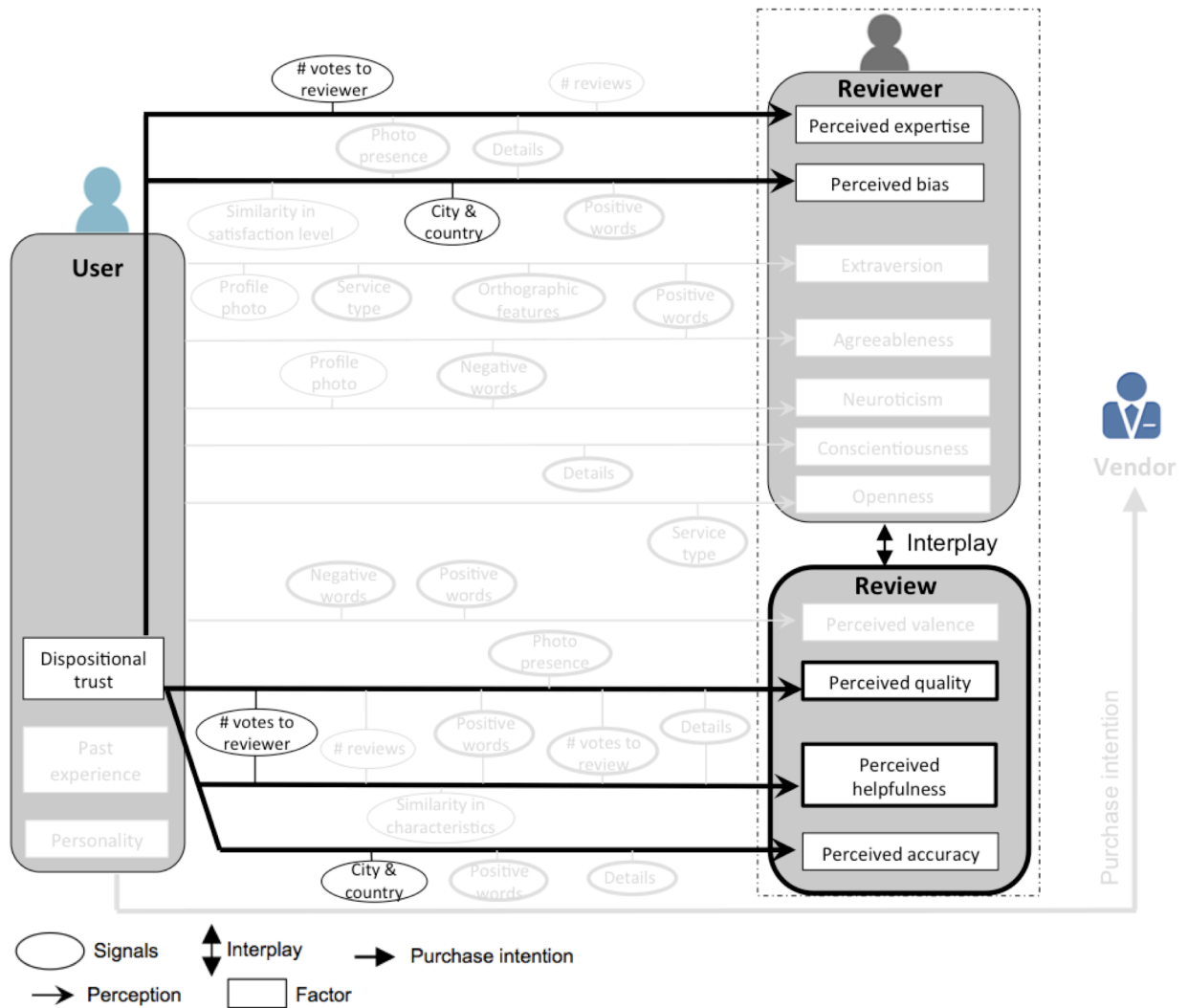


Figure 6.4: Framework of user trust on systems that provide user-generated reviews - effects of the user's dispositional trust

In addition to the dispositional trust, the users' personality traits, particularly the level of extraversion, neuroticism and agreeableness, have been shown to be related to the perception of trustworthiness of the review and reviewer (study 3). Users with high levels of extraversion, neuroticism and agreeableness tend to perceive the reviews and reviewers as being more trustworthy (figure 6.5).

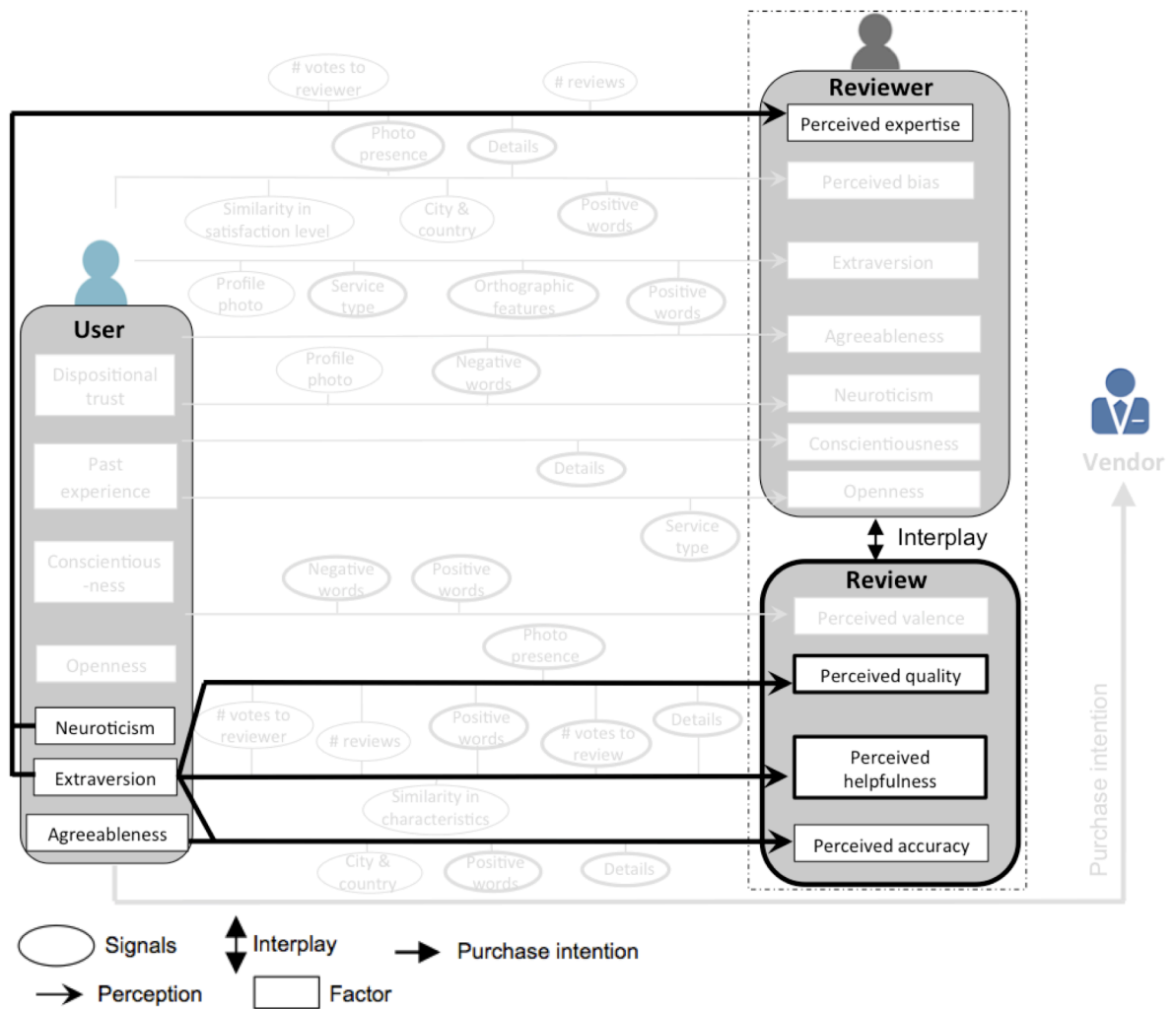


Figure 6.5: Framework of user trust on systems that provide user-generated reviews - effects of the user's own personality

Fourth, **user trust in vendors is affected by the user's own background, the review and the reviewer.** While this research did not directly investigate user trust in vendors, it investigated the user's intention to purchase the vendor's services. This can indicate the user trust in vendors because users are likely to make purchases from vendors they trust (e.g. McKnight et al., 2002a).

Among aspects of the user background, the user's past experience of using online reviews (study 2) and the user's personality – particularly extraversion and neuroticism (study 3) – were shown to be related with the user purchase intention. Users with positive past experience and with high level of extraversion and

neuroticism are more willing to purchase services based on online reviews (figure 6.6).

Study 2 suggested that user purchase intention could be affected by the review. This is because factors of the review – perceived review valence, quality, helpfulness and accuracy – were significantly related to purchase intention. Users are likely to make a purchase decision based on positive reviews and also when reviews are perceived to be as high quality, helpful and accurate. Furthermore, studies 2 and 3 suggested that user purchase intention can be affected by the reviewer. In study 2, the

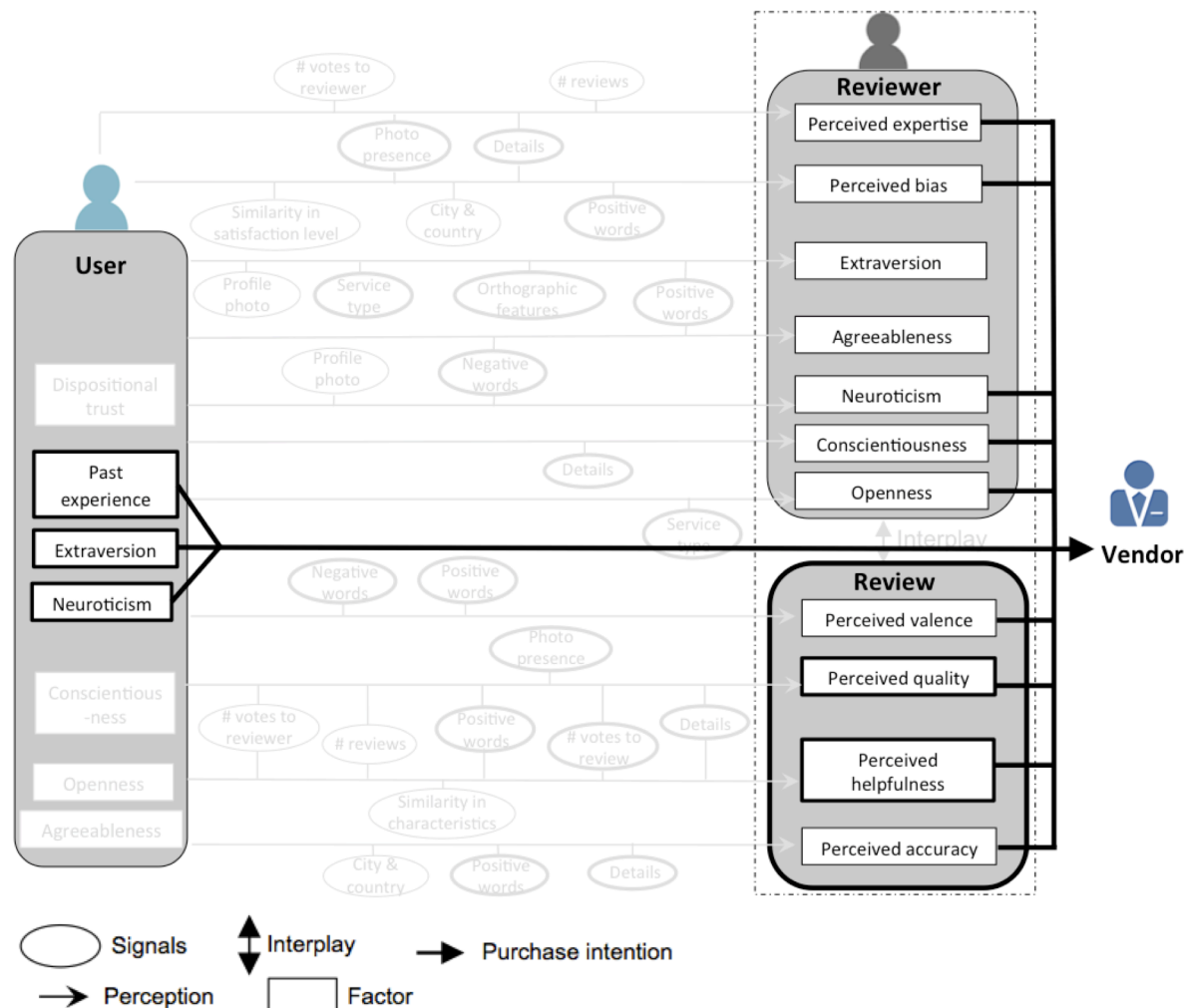


Figure 6.6: Framework of user trust on systems that provide user-generated review - role of the user's background, review and reviewer in user purchase intention

perceived trustworthiness of the reviewer was shown to be related to the purchase intention. Users were more willing to make a purchase decision based on the review when the reviewer was perceived as being trustworthy – that is the reviewer being perceived as having high expertise and low on bias (figure 6.6). Study 3 suggested that the perceived reviewer’s personality traits can also affect the user’s purchase intention. Users seemed to be more willing to make a purchase decision based on the reviews when the reviewers were perceived as high on conscientiousness and openness but low on neuroticism (figure 6.6).

The proposed framework is of high relevance to researchers who investigate user trust in online reviews (e.g. Kobayashi et al., 2015; Riasanow et al., 2015; Ku et al., 2012; Lee et al., 2008) because it shows how different review-related and reviewer-related signals and factors affect trust. It is also relevant to researchers who investigate the effects of the perception of personality (e.g. Mohammadi et al., 2015; Selfhout et al., 2009) by showing how that work can be extended to the context of online reviews. Third, the framework is beneficial to researchers who investigate user trust in online vendors (e.g. McKnight et al., 2002a; Lumsden & MacKay, 2006) because it shows how the user–vendor trust relationship is changing on increasingly popular systems that provide user-generated reviews.

6.3 Practical Implications

In addition to the framework proposed, findings of this research provide design implications for designers of systems that provide user-generated reviews that can support user trust in online review. Overall, it seems that users employ different interface signals most of which are review-related when deciding to trust reviews. Thus, revealing more information about the review can support users in trusting reviews. In addition, signals of the reviewer also seem to be important in trust

suggesting that user trust in the review is mediated by the reviewer. The following paragraphs discuss the design recommendations that are based on the findings of this research.

First, **transparency in signaling the community opinions about reviews**. Study 1 suggested that the community's positive opinions might not be enough for users to assess the review trustworthiness and to establish trust in online reviews. This was complemented by study 2 which showed that the community positive opinions increases the perceived trustworthiness of the review while the community negative opinions decreases the perceived trustworthiness of the review. Thus, it is important to signal the community's both positive and negative opinions in the interface.

Second, **providing objective evidence of the review in the form of user-generated photo**. The findings of study 1 suggested that users perceived user-generated photos as objective evidence of the information given in the review and therefore photos can better help them with trusting the reviews. Study 2 showed that the presence of a user-generated photo alongside the review has a significant effect not only on the perceived trustworthiness of the review, but also the reviewer. While these effects were negative – meaning that the presence of a photo decreased the perceived trustworthiness – this could have been because of the types of photos used in study 2. In all cases, photos seem to have an important role in trust as they provide additional visual information.

Third, **providing direct signals of bias**. While study 1 showed that users tend to use various signals in their perception of the reviewer's bias, determining whether the reviewer is biased still seems difficult. Designers could help users by providing more direct signals possibly by providing signals that prove the purchase transactions.

Fourth, **providing a direct visual signal of the types of services reviewed.** While participant in study 3 were able to find this information by navigating through the reviews posted by the reviewer, providing a summary of the services reviewed can better help users in perceiving the reviewer's level of extraversion and openness which in turn matter in user trust in online reviews.

Fifth, **encouraging users to provide profile photos.** Study 3 showed that users tend to employ profile photos in the perception of various personality traits of the reviewer that matter in trust.

6.4 Limitations and Future Work

Even though the research reported here suggests that user trust in online reviews when making purchase decisions can be influenced by a variety of review-related and reviewer-related factors perceived through interface signals, and that the user background can play a part in the establishment of trust, it is not without limitations. There are five main limitations associated with the findings of this research. These limitations are related to (i) the subjective measure of trust (ii) not distinguishing between symptoms and symbols of trustworthiness (iii) not taking into account new factors and also new levels of factors that have been investigated (iv) generalizability of the framework to other contexts of online reviews and finally (v) generalizability of the framework to other types of user online behaviour.

First, in all the studies conducted in this research, trust was measured subjectively, by asking participants to rate their own trust. A complementary approach could be to employ an objective measure of trust, such as observing purchase under financial risk, as suggested by Riegelsberger et al. (2005) and Grabner- Kräuter and Kaluscha (2003).

Second, this research has explored what signals of the interface can influence user trust in online reviews and the perception of trustworthiness, but it did not distinguish between symptoms and symbols of trustworthiness. Research into signals of trust in online reviews could benefit from Riegelsberger et al.'s (2005) framework of trust in mediated transactions by identifying whether the signals that matter in trust in online reviews are categorised as symptoms or symbols. This could provide insights into the reliability of the signals and eventually could be used to better support user trust.

Third, future work could benefit from taking into account new factors and also new levels of factors that have been investigated. This research has not taken into account the quantity of reviews, i.e. the number of reviews about a vendor. It has been suggested that users read multiple reviews and therefore the quantity of reviews can affect their trust in the reviews and also their purchase intention (Lee et al., 2008). Also, more levels of the investigated factors need to be considered. For instance, review valence might be neutral rather than positive or negative. A neutral review refers to the reviewer describing positive *and* negative aspects of the service. Previous work by Kobayashi et al. (2015) shows that neutral reviews are perceived as the most credible; therefore, this needs to be considered in future work.

Fourth, it is important to be cautious about the generalizability of the proposed framework to other contexts of online reviews. This is because the studies conducted in the course of this research have focused on user trust in online reviews about services, particularly hotels and restaurants, and this leads to limitations regarding the generalizability of the framework. Sun et al. (2011) suggests that physical products (e.g. cell phones) are associated with tangible and technical specifications, thus making it easier for users to quantify the product parameters and this can potentially

affect trust in the reviews. Thus, future work should consider physical products and find out which interface signals and factors affect trust. Furthermore, it would be interesting to investigate whether the findings are valid for user trust in reviews about services that include a higher level of risk such as health-related services (i.e. hospitals and clinics). These two lines of future work would help to better understand how user trust in online reviews is shaped in different domains and whether the framework proposed in this thesis can be generalised to systems that provide reviews about different products and services.

Fifth, the research presented here represents first step towards understanding the relationship between the perception of personality and trust online. While these findings are within the context of online reviews and therefore they may not apply in other contexts, the findings can still provide insights to understand different types of users' online behaviour such as findings gaming partners or online dating. The findings could serve as a basis to formulate hypotheses about which interface signals matter in the perception of particular personality traits and the effects of this perception on user behaviour. For instance, users who are perceived as highly extraverted, conscientious and low in neuroticism might be more trusted and therefore might be more likely to be chosen as gaming partners or potential dating partners.

6.5 Final Comments

The research undertaken for this thesis investigated user trust on increasingly popular systems that provide user-generated reviews. In doing so, this research revealed the complexity of trust. It showed that in order to understand how user trust in online reviews is formed, different types of indicators have to be taken into account. These indicators relate not only to the reviews and the source of the reviews but also to the users themselves. This research enriched the understanding of trust in

online reviews by showing how these indicators interact with one another and lead to the establishment of trust. While this could represent a substantial theoretical contribution and have important practical implications for designers of systems like TripAdvisor and Yelp, the drawbacks should also be highlighted. Investigating the indicators of user trust not only develops a better understanding of users' online behaviour, but it could also provide insights to untrustworthy actors, such as untrustworthy reviewers, to deceive users (Briggs et al., 2002). Thus, research on trust in online reviews need to investigate how users perceive untrustworthy reviews and find out ways to help users in detecting untrustworthy reviews and reviewers.

The research reported in this thesis suggests that the rise of user-generated content, particularly user-generated reviews, is changing the user trust relationship with vendors. This trust relationship is becoming mediated not only by trust in the review but also by trust in the reviewer. Thus, models of user trust in online vendors should integrate the roles of the review and the reviewer. User trust in vendors could be eroded if a user does not trust the review and the reviewer, or, more positively, trust in the review and the reviewer could increase user trust in the vendor.

6.6 Chapter Summary

This chapter provided a summary of the research at hand. In doing so, it restated the research objectives, the studies that addressed the objectives as well as the research questions and findings of each study (section 6.1). Section 6.2 presented a framework of user trust in online reviews which shows the review-related and reviewer-related signals and factors that influence trust, the role of the user's own background in shaping trust and the changing trust relationship between user and vendor on systems that provide user-generated reviews. This was followed by section 6.3 which reviewed the design implications that can better support user trust in online

reviews. Section 6.4 discussed the limitations of the research and pointed further work to address the limitations and finally, section 6.5 concluded with final comments.

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Appendices

Appendix A: First Study

A.1: Constructed Reviews for First Study

Study 1 manipulated 8 reviews into high and low review quality, high and low reviewer's expertise and high and low reviewer's bias (2 x 2 x 2). Table A.1 shows the reviews and the manipulated factors followed by the interface that presented the reviews (figure A.1). Note that the reviews were presented in a different order to each participant to avoid any confounding order effect.

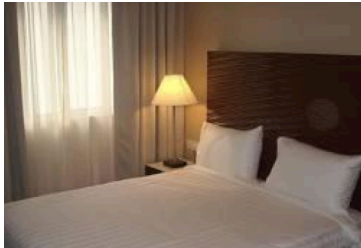
Review	Review quality	Reviewer expertise	Reviewer bias
Good hotel	Low	Low	Low
Nice one	Low	Low	High
Worth it, go for it	Low	High	Low
Awesome	Low	High	High
Good value for money	High	Low	Low
Nice place to stay	High	Low	High
Faultless hotel	High	High	Low
Beautiful experience	High	High	High

Table A.1: Reviews and manipulated factors in the first study

Luminous Hotel

199 Jalan Bukit Bintang, Kuala Lumpur 55100, Malaysia

 [Hotel website](#)  [E-mail hotel](#)  [Hotel amenities](#)






[Professional photos](#)



[Traveller photos](#)

[See which rooms travellers prefer](#)

Show the lowest price for this hotel*

Check In  Check Out  Adults 

[Show Prices](#)

- | | |
|--|---|
| <input checked="" type="checkbox"/> Booking.com | <input checked="" type="checkbox"/> Expedia.co.uk |
| <input checked="" type="checkbox"/> agoda.co.uk | <input checked="" type="checkbox"/> Octopus.com |
| <input checked="" type="checkbox"/> EasyToBook.com | <input checked="" type="checkbox"/> Hotels.com |
| <input checked="" type="checkbox"/> Venere.com | <input checked="" type="checkbox"/> ebookers.com |

reviews sorted by [Date](#)  [Rating](#)

[English first](#) 



[Jakob29](#)

London, UK

1 review

"Good Hotel"

Reviewed 31 August 2012

Stayed here for the last 4 nights of our honeymoon and we liked it. We went to 4 other destinations during our honeymoon and KL was the last stop. Because it was late when we got there we headed down to the CC for a drink and grab something. It was like living back again in the 80's!! People smoking and questioning Euro-pop. We have to say it was a good experience to be in KL and we had nice time. We found many touristic places, we consider the prices in KL not too high. There are some shopping malls in KL which are big and there are different brands. Overall, it was a good experience and we enjoyed it. We recommend the Luminous as one of the good hotels.

Was this review helpful? [Yes](#)



Lucas

Leon, France
Reviewer



3 Reviews

“Nice One”

Reviewed 24 August 2012

We stayed in the Luminous hotel August 7-9. We cannot imagine anything better than this fantastic hotel. We have to say the Luminous is amazing. We were impressed by many great things and we had a lovely experience. The location is the best. Nearby there are new malls in KL where all kinds of food options are available. Ofcourse if your stomach is brave enough, you may try the hawker stalls on Jalan Alor, It is the best I had. Watch out, Avoid the TGI Fridays. It has to be the worst part of the franchise on the planet. They will not make you happy and you will be very shocked. Safe to say... We will never use them again. Anyway, we had nice time and stay at this hotel.

Was this review helpful? Yes



Havo

Amman, Jordan
Senior Contributor



41 reviews



Review in 25 cities



35 helpful votes

“Worth it, Go for it”

Reviewed 23 July 2012

I travelled to KL many times before but this time it was my first at the luminous hotel. Stayed only for 2 nights for a business trip. I arrived at the hotel quite late since my flight was cancelled. Surprisingly, the hotel has some good advantages. There is a big mall nearby called Berjaya mall with any type of food for average price. You can find in KL food markets like night food market in Bukit Bintang. I saw shuttle bus stops in different places in the city. A few days prior to my arrival I used my credit card somewhere and banks being banks put a hold on my card. I was concerned about this problem as I only discovered 1 day before. Luckily my bank issue was sorted quickly and I enjoyed my stay.

Was this review helpful? Yes



Apo

Malaysia
Top Contributor



32 reviews



Review in 47 cities



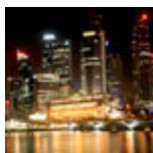
18 helpful votes

“Awesome”

Reviewed 5 August 2012

Dear Travelers! If you are going to choose this awesome hotel for your stay upon your visit to Kuala Lumpur, I would say go for it. You'll have a great hospitality by the best staff. One staff who impressed me was a lady in the reception. She was dealing in a lovely way with the guests. Every morning I passed through the reception, I would stop by to speak to her. I was full of questions and I wanted to know many things about Kuala Lumpur. During my conversation I came to know that she was a foreigner from Nepal working there. I was surprised and realized why the hotel had chosen her to become their staff leaving the local people behind. She is worth becoming a manager someday. I highly recommend this hotel.

Was this review helpful? Yes



[Solo](#)

Geneva, Switzerland
Senior Reviewer



4 reviews



Review in 2 cities



1 helpful votes

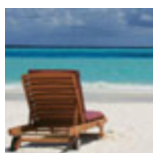
“Good value for money”

Reviewed 25 July 2012

2 people found this review helpful

There were positive points in this hotel which made us extend our stay for 2 more nights. Clean rooms, friendly staff, good food, generous breakfast including a variety of western and eastern food, best location. Most important the 2 interconnected lovely rooms that we booked (1106 - 1107) were classy decorated, bright and nicely overlooking the main street. The rooms are exactly perfect for two adults, I assume they would be small if you try to fit an extra bed. The hotel is 3 minutes drive to city centre and the petronas. And 10 minutes to the Pavillion shopping mall, where you can find many exclusive brands under one roof. My kids and I loved the Luminous

Was this review helpful? Yes



[Belind22](#)

Malaysia
2 reviews

“Nice place to stay”

Reviewed 20 July 2012

3 people found this review helpful

I stayed at this hotel with a friend. This hotel is fantastic. There is everything you need and even more. Beds are super comfortable. Our room was very big with super clean bathroom. We were surprised since it was only a basic room but it was far from basic, there was everything necessary. Breakfast was a lovely buffet style and the hot food changed daily, it was a mixture of western and asian food. The room service staff were never late. That was amazing. The hotel is a short walking distance (2 minutes) to public transport and nearby the lovely Kuala Lumpur park and petronas towers. The staff made our stay more than fantastic. I highly recommend this hotel.

Was this review helpful? Yes



[Dldo](#)

Kiev, Ukraine
Senior Contributor



47 reviews



Reviews in 20 cities



29 helpful votes

“Faultless hotel”

Reviewed 5 July 2012

4 people found this review helpful

This hotel is one which does everything well. It is located in what must be the busiest part of the city, nearby Bukit Bintang, surrounded by shopping malls, food outlets, fashion stores and good restaurants. The staff are polite, accommodating and helpful. The breakfast buffet is delicious and the rooms are pleasant and comfortable, with clean furniture and a desk and small sitting area. I would not rate the hotel as great in any special way - it is really what one expects a good hotel establishment to be - and it can be recommended to any traveller, business or leisure, as likely to provide everything he or she could want, in the right place with the right price.

Was this review helpful? Yes



Suzi

Ankara, Turkey
Senior Contributor



27 reviews



Reviews in 19 cities



20 helpful votes

“Beautiful experience”

Reviewed 3 July 2012

5 people found this review helpful

I and my husband stayed here for 3 nights. The lobby was great, we were impressed by the staff friendliness from reception, room service and waiters. Our room was amazing, good size, clean and bed was more than comfortable, the bathroom is very big.. Breakfast every morning was awesome. It is strategically located, Close to a huge mall called The Pavilion Mall. There's also a grocery in inside the mall and a lot of restaurants. Nearby the Luminous, there is the JW Marriott where all the high end stores are located. but if you want their local shops, walk a little and you will see Sungwei Plaza. We must say we had a lovely stay at the Luminous. We recommend this hotel as one of the best

Was this review helpful?

Figure A.1: Constructed reviews presented in the first study

A.2: Consent form



School of Informatics
Centre of Human-Computer Interaction Design
“Consent to be a Research Subject”

Information Sheet

Introduction

This research study is being conducted by *Dara Sherwani* as part of MPhil / PhD research programme. The research aims at investigating internet users’ behaviour towards reviews posted on online communities. The document at hand is called *informed consent form*. You are kindly asked to read all information stated in this document and take the required time to make your decision. If you do not clearly understand any word and/or part of this document, please ask the facilitator (Dara Sherwani) for clarification.

Procedure

The experiment is divided into 3 parts which take approximately 30 minutes in total:

- 1- **Initial questionnaire:** you will be asked to fill in an initial questionnaire consisting of 8 questions, including demographics.
- 2- **Video recorded think aloud session:** you will be given a scenario and requested to interact with a paper-based prototype. This part includes 8 steps. During each step, you will be asked to read a single review and verbalise your

thoughts simultaneously. The facilitator will remind you to keep on thinking aloud if you become silent. At the end of each step, you will be required to fill in an interval questionnaire consisting of 3 questions.

- 3- **Additional comments:** you will be given the chance to add relevant comments at the end of the experiment.

Decision to Participate

Please note that participating in this research study is completely voluntary. There should be no pressure on you to take part in this study. You can withdraw your participation at any time.

There are no direct benefits to you. However, your participation is considered very crucial because it will help to progress the research and to propose new findings in the investigated research area. Moreover, there are no expected and anticipated risks from taking part in this research study.

Authorisation to Use and Disclose Information

All data and information which you will provide through taking part in this research study will be kept confidential and your name will be anonymised. The only persons who will access and view the obtained data, information and video recordings are Dara Sherwani and his academic supervisors. Publication(s) could be made from this research; however, your name and video recording will not be included or attached with publication(s).

Contact details

If you have any inquiry about how to do any part of this research study, please contact the first academic supervisor Simone Stumpf via email (Simone.Stumpf.1@city.ac.uk).

Informed Consent Form

I hereby agree my voluntary participation and willingness to be a research subject.

I understand that Mr. Dara Sherwani will take notes and record my behaviour during the session.

I also agree to fill in the proposed questionnaires in order to take part in this research study and furthermore, may add relevant comments at the end of the experiment.

Participant's name: _____

Participant's signature: _____

Date: _____

Facilitator: Dara Sherwani

Facilitator's signature: _____

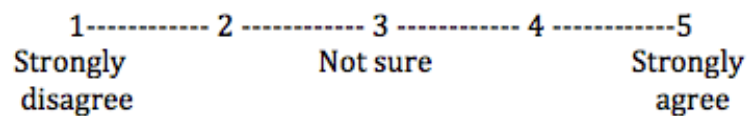
Date: _____

A.3: Trust factors questionnaire

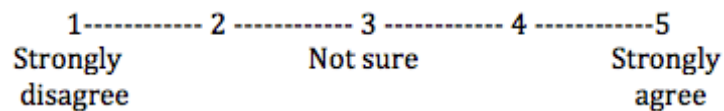
Study 1 captured participants' ratings of six factors. This questionnaire included three parts. The first part captured the perceived review quality based on measuring four dimensions: perceived understandability, sufficiency, relevance and reliability. It also captured ratings of perceived helpfulness and accuracy of reviews. The second part of this questionnaire captured the perceived reviewer's expertise and bias and finally the third part captured participants' trust in the reviews.

1. What do you think about the review?

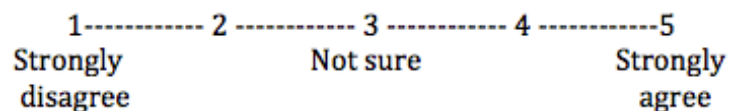
a. The review is relevant for assessing the hotel



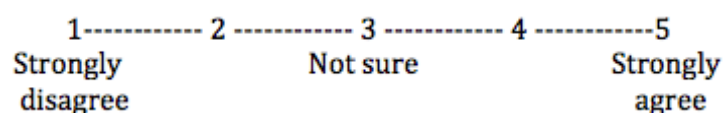
b. I understand the review easily.



c. The review contains enough details about the hotel.



d. I can depend on the review for assessing the hotel.



e. I believe the review is helpful.

1-----2-----3-----4-----5
Strongly Not sure Strongly
disagree agree

f. I believe the review provides accurate information.

1-----2-----3-----4-----5
Strongly Not sure Strongly
disagree agree

2.) *What do you think about the reviewer?*

a. The reviewer is knowledgeable about hotels services.

1-----2-----3-----4-----5
Strongly Not sure Strongly
disagree agree

b. The reviewer is flattering.

1-----2-----3-----4-----5
Strongly Not sure Strongly
disagree agree

3. How do you feel about the following statement?

a. I would feel comfortable depending on the review for assessing the hotel.

1-----2-----3-----4-----5
 Strongly Not sure Strongly
 disagree agree

A.3: Test of classification approach (Wilcoxon test output)

Data of participants' ratings of perceived review quality, reviewer's expertise and bias were used to test the manipulation approaches of these factors. The effects of these factors' manipulation on participants' ratings were investigated using Wilcoxon test. Tables A.2 to A.4 report complete results of this analysis.

Conditions	N	Mean	Std. Deviation	Minimum	Maximum
High quality	64	4.4766	.45800	3.75	5.00
Low quality	64	2.1797	.47449	1.00	3.25
High expertise	64	4.297	.5543	3.0	5.0
Low expertise	64	1.656	.5968	1.0	3.0
High bias	64	4.437	.6140	3.0	5.0
Low bias	64	1.750	.6667	1.0	3.0

Table A.2: Descriptive of participants' ratings in high and low review quality conditions, high and low reviewer's expertise conditions and high and low reviewer's bias conditions

	N	Mean Rank	Sum of Ranks	
Low quality – High quality	Negative Ranks	64 ^a	32.50	2080.00
	Positive Ranks	0 ^b	.00	.00
	Ties	0 ^c		
	Total	64		
Low expertise – High expertise	Negative Ranks	63 ^d	32.00	2016.00
	Positive Ranks	0 ^e	.00	.00
	Ties	1 ^f		
	Total	64		
Low bias- High bias	Negative Ranks	64 ^g	32.50	2080.00
	Positive Ranks	0 ^h	.00	.00
	Ties	0 ⁱ		
	Total	64		

- a. Quality-Low < Quality-High
- b. Quality-Low > Quality-High
- c. Quality-Low = Quality-High
- d. Expertise-low < Expertise-high
- e. Expertise-low > Expertise-high
- f. Expertise-low = Expertise-high
- g. Bias-Low < Bias-High
- h. Bias-Low > Bias-High
- i. Bias-Low = Bias-High

Table A.3: Ranks of participants' ratings in high and low review quality conditions, high and low reviewer's expertise conditions and high and low reviewer's bias conditions

	Low quality – High quality	Low Expertise – High expertise	Low Bias- High bias
Z	-6.976 ^b	-6.994 ^b	-7.055 ^b
Asymp. Sig. (2-tailed)	.000	.000	.000

- a. Wilcoxon Signed Ranks Test
- b. Based on positive ranks.

Table A.4: Test statistics

Appendix B: Second study

B.1: Review valence and review quality test

A positive and a negative review were constructed in study 2. Prior to the main study, these two reviews were tested to (i) validate the classification of review valence and (ii) ensure that the reviews were similar in terms of perceived quality. The questionnaire (B.1.1) included two parts. The first part tested the valence of the reviews and the second part tested the perceived quality of the review. The perceived quality was tested by asking participants to rate four dimensions: understandability, sufficiency, relevance and reliability and review quality was calculated as the average value of the dimensions' ratings.

B.1.1: Questionnaire

1. Based on the review, please choose the one of the following options

The reviewer had a good experience with the restaurant

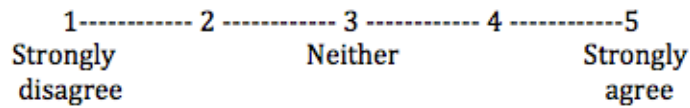
The reviewer had a bad experience with the restaurant

2. Please rate each of the following

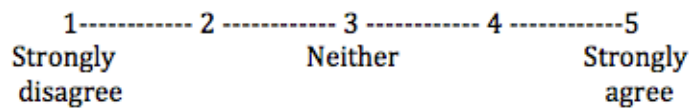
- The review is easy to understand

1-----2-----3-----4-----5
Strongly Neither Strongly
disagree agree

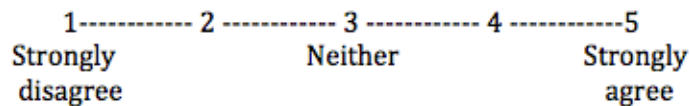
- The review is informative



- The review is relevant for assessing the service



- The review presents a justified point of view



B.1.2: Results of review valence and quality test

Review valence

%100 of participants (20 participants) assigned to positive review condition chose the option “the reviewer had a **good** experience with the service”. Also, %100 of participants assigned to negative review condition chose “the reviewer had a **bad** experience with the service”

Review quality (XLStat output)

The statistical equivalence between the positive review perceived quality and negative review perceived quality was tested by applying XLStat to participants ratings of the positive review quality and the negative review quality.

XLSTAT 2014.6.03 - TOST (Equivalence test) - on 21/12/2014 at 13:43:46

Sample 1: Workbook = Pre-test-results-2.xlsx / Sheet = Sheet2 / Range = Sheet2!\$A\$1:\$A\$21 / 20 rows and 1 column

Sample 2: Workbook = Pre-test-results-2.xlsx / Sheet = Sheet2 / Range = Sheet2!\$B\$1:\$B\$21 / 20 rows and 1 column

Hypothesized difference (D): 0

Lower bound: -0.4

Upper bound: 0.4

Significance level (%): 5

Population variances for the t-test: Assume equality

Table B.1 shows the summary of participants' ratings of the positive review and negative review quality. Followed by table B.2 which shows that the difference between the positive review perceived quality and negative review perceived quality ranged from (-0.394) to (0.194) (90% confidence) (with a threshold difference of 0.4). Finally, table B.3 reports the p value of 0.047 of equivalence - suggesting that the positive review and negative review were statistically equivalence in terms of perceived quality.

Variable	Observations	Obs. with missing data	Obs. Without missing data	Minimum	Maximum	Mean	Standard deviation
Negative review quality	20	0	20	3.25	4.75	3.9625	0.356
Positive review quality	20	0	20	2.25	5.00	4.0625	0.692

Table B.1: Statics summary of equivalence test

Test	Value
Lower bound (TOST)	-0.400
Lower bound (90 %)	-0.394
Upper bound (90 %)	0.194
Upper bound (TOST)	0.400
Test interpretation	Equivalent

Table B.2: TOST equivalence test (output-1)

Test	Difference	t	t(Critical value)	DF	alpha	p-value
Upper	-0.100	1.723	1.686	38.000	0.050	0.047
Lower	-0.100	-2.872	-1.686	38.000	0.050	0.003
Total				38.000	0.050	0.047

Table B.3: TOST equivalence test (output-2)

B.2: Photos test

In order to choose positive and negative photos of food and atmosphere in study 2, a test was conducted with a total of 20 photos (10 food photos and 10 atmosphere photos). This test included two conditions: food photos and atmosphere photos.

B.2.1: Food photos

24 participants rated 10 pizza photos on dimensions of perceived food quality. These dimensions were perceived visual appearance, tastiness, freshness and healthiness. Perceived food quality was then calculate das the average vale of the dimensions' ratings.

B.2.1.1: Questionnaire

Please rate each of the following statements:

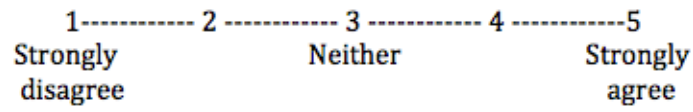
- Food is visually appealing

1-----2-----3-----4-----5
Strongly Neither Strongly
disagree agree

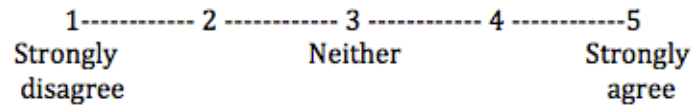
- Food looks tasty

1-----2-----3-----4-----5
Strongly Neither Strongly
disagree agree

- Food looks fresh



- Food looks healthy



B.2.1.2: Tested Food photos

Figure B.1 to B.10 show the 10 pizza photos that were included in the test, with the mean value of perceived food quality for each photo.



Figure B.1: Food photo 1 (mean perceived food quality =2.92)



Figure B.2: Food photo 2 (mean quality =2.69)



Figure B.3: Food photo 3 (mean quality = 3.18)
(Note: photo chosen for positive food photo condition)



Figure B.4: Food photo 4 (mean quality = 2.31)



Figure B.5: Food photo 5 (mean quality = 2.58)



Figure B.6: Food photo 6 (mean quality = 2.52)



Figure B.7: Food photo 7 (mean quality = 2.33)



Figure B.8: Food photo 8 (mean quality = 2.18)
(Note: photo chosen for negative food photo condition)



Figure B.9: Food photo 9 (mean quality = 2.62)



Figure B.10: Food photo 10 (mean quality = 2.68)

B.2.1.3: Test of statistical difference in perceived food quality between positive food photo and negative food photo

A paired sample T-test was applied to participants' responses of the chosen positive food photo (figure B.3) and the negative food photo (figure B.8), using Microsoft excel 2011. The results of this test showed that the chosen photos differed statistically in the perceived food quality ($p < 0.01$) (table B.4)

Conditions	Difference in perceived food quality (P value)	Statistical significance
Photos 3 & 8	0.000367918	Difference in perceived food quality

Table B.4: T-test result of difference between chosen positive food photo and negative photo in perceived food quality

B.2.2 Atmosphere photos

24 participants rated 10 atmosphere photos on dimensions of perceived atmosphere. These dimensions were perceived setting, colours used inside the restaurant, lighting and interior design. Perceived atmosphere was then calculate das the average value of the dimensions' ratings.

B.2.2.1 Questionnaire

Please rate each of the following statements:

- The restaurant setting would allow me to move around easily.

1-----2-----3-----4-----5
Strongly disagree Neither Strongly agree

- Colours used inside the restaurant creates a pleasing atmosphere.

1-----2-----3-----4-----5
Strongly disagree Neither Strongly agree

- Lighting inside the restaurant creates a comfortable atmosphere.

1-----2-----3-----4-----5
Strongly disagree Neither Strongly agree

- The interior design is visually appealing.

1-----2-----3-----4-----5
Strongly disagree Neither Strongly agree

B.2.2.2 Atmosphere photos

Figure B.11 to B.20 show 10 photos of restaurant atmosphere that were included in the test, with the mean value of perceived atmosphere



Figure B.11: Atmosphere photo 1 (mean atmosphere quality =2.51) (Note: photo chosen for positive atmosphere photo condition)

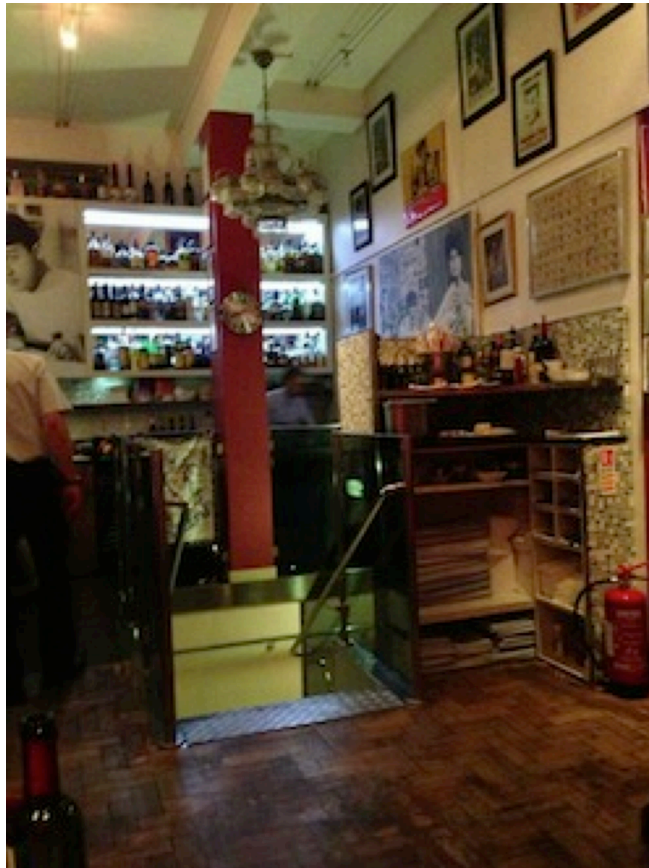


Figure B.12: Atmosphere photo 2 (mean atmosphere quality = 2.68)



Figure B.13: Atmosphere photo 3 (mean atmosphere quality = 2.95)



Figure B.14: Atmosphere photo 4 (mean atmosphere quality = 3.73) (Note: Photo chosen for positive atmosphere photo)



Figure B.15: Atmosphere photo 5 (mean atmosphere quality =3.65)



Figure B.16: Atmosphere photo 6 (mean atmosphere quality = 3.15)



Figure B.17: Atmosphere photo 7 (mean atmosphere quality = 2.86)



Figure B.18: Atmosphere photo 8 (mean atmosphere quality = 2.94)



Figure B.19: Atmosphere photo 9 (mean atmosphere quality =3.47)



Figure B.20: Atmosphere photo 10 (mean atmosphere quality = 3.33)

B.2.2.3: Test of statistical difference in perceived food quality between positive food photo and negative food photo

A paired sample T-test was applied to participants’ responses of the chosen positive atmosphere photo (figure B.11) and the negative atmosphere photo (figure B.14), using Microsoft excel 2011. The results of this test showed that the chosen photos differed statistically in the perceived food quality ($p < 0.05$) (table B.4)

Conditions	Difference in perceived atmosphere (P value)	Statistical significance
Photos 1 & 4	0.042112469	Difference in perceived atmosphere

Table B.5: T-test result of difference between chosen positive food photo and negative photo in perceived food quality

B.3: Introduction page



CITY UNIVERSITY
LONDON

Centre for Human Computer Interaction Design

You are invited to participate in this survey about online reviews. The survey aims at investigating the way Internet users evaluate online reviews and it will take up to 10 minutes to complete.

Your participation is completely voluntary and **you have to be 18 years old or more** in order to participate.

All data that you will provide will be kept confidential. Access to data will be restricted to the researcher, *Dara Sherwani*, and his academic supervisors; *Dr. Simone Stumpf* and *Stephanie Wilson*.

Thank you for taking part in this survey, your participation is very important!

Dara Sherwani

PhD Candidate in HCI Design

Email: dara.sherwani.1@city.ac.uk

B.4: Background questionnaire

Participants in study 2 were required to fill in a background questionnaire. This questionnaire included four questions. The first part captured participants demographics. The second part captured participants' dispositional trust. Participants were required to rate four dimensions: integrity, competence, benevolence and trust stance. Each of these dimensions was measured using four 7-point Likert scales. Dispositional trust was calculated as the average value of the dimensions' ratings. The third part included a filter question about participants' past experience and fourth part included three 7-point Likert scales of past experience and past experience was calculated as the average value.

1. Age: _____

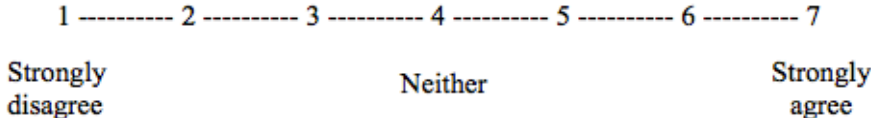
Gender: Female
 Male

2. Please rate each of the following statements?

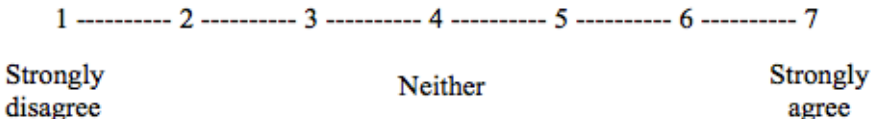
- In general, people really do care about the well-being of others.

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7
Strongly disagree Neither Strongly agree

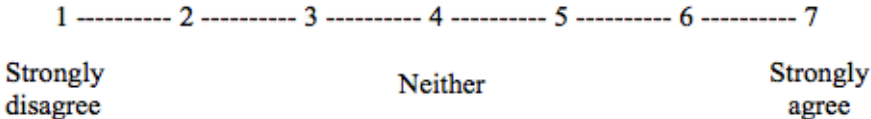
- The typical person is sincerely concerned about the problems of others.



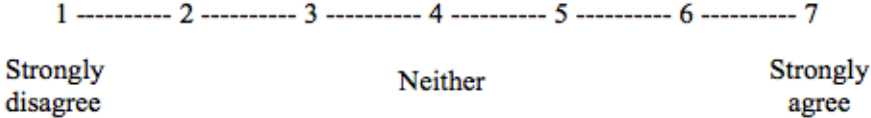
- Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.



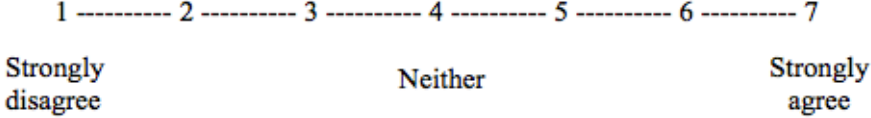
- In general, most folks keep their promises



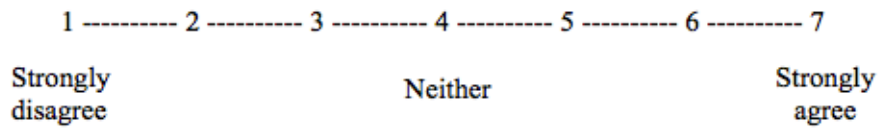
- I think people generally try to back up their words with their actions



- Most people are honest in their dealings with others



- My typical approach is to trust new acquaintances until they prove I should not trust them



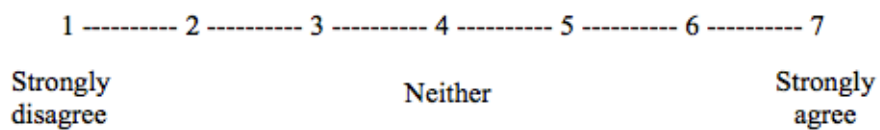
3. Have you ever used online reviews for assessing a product or service prior to making a purchase decision?

- Yes
- No

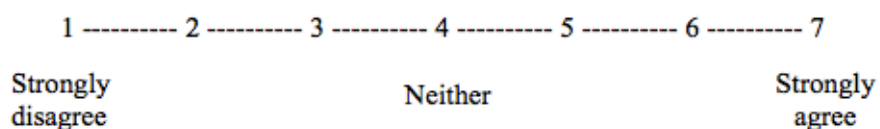
If you choose YES, please answer question 5 and if you choose NO, you can proceed to second questionnaire.

4. Please rate each of the following statements:

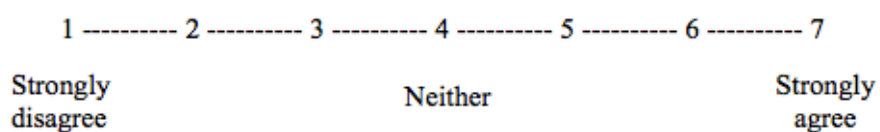
- My past experience of using online reviews is positive



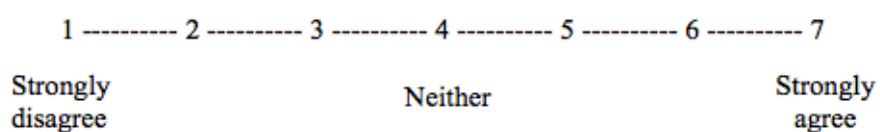
- In the past, I purchased excellent products/services based on online reviews



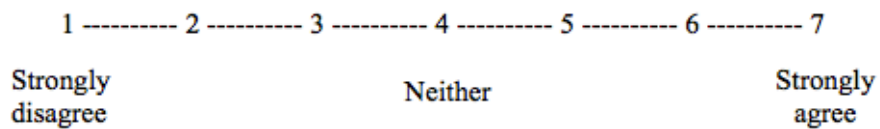
- The review is relevant for assessing the restaurant



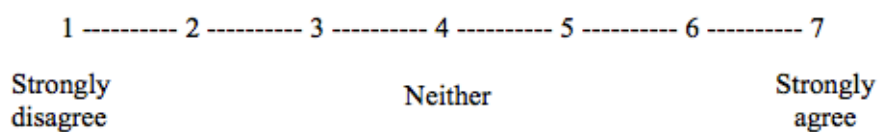
- The review represents a justified point of view



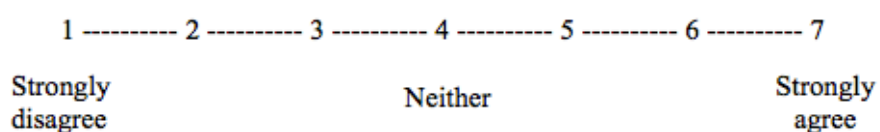
- This review is helpful.



- This review is accurate.



- This review is untruthful.



B.6.1: Effects of review valence

Dependent variable	Review valence	N	Mean rank
Review quality	negative	390	375.42
	positive	409	423.44
	Total	799	
Review helpfulness	negative	390	378.77
	positive	409	420.24
	Total	799	
Review accuracy	negative	390	395.68
	positive	409	404.12
	Total	799	
Reviewer bias	negative	390	422.18
	positive	409	378.85
	Total	799	
Reviewer expertise	negative	390	388.02
	positive	409	411.42
	Total	799	
Trust in review	negative	390	381.59
	positive	409	417.56
	Total	799	
Purchase intention	negative	390	326.90
	positive	409	469.70
	Total	799	

Table B.6: Effects of review valence – ranks

	Review quality	Review helpfulness	Review accuracy	Reviewer bias	Reviewer expertise	Trust in review	Purchase intention
Chi-square	8.865	7.839	.369	9.764	2.387	4.908	83.161
df	1	1	1	1	1	1	1
Asymp. Sig	.003	.005	.544	.002	.122	.027	.000

Table B.7: Effects of review valence - test statistics

B.6.2: Effects of community opinions

Independent variable	Community opinions	N	Mean rank
Review quality	2:8	157	355.67
	3:7	164	403.78
	5:5	162	407.48
	6:4	160	408.66
	9:1	156	424.00
	Total	799	
Review helpfulness	2:8	157	361.09
	3:7	164	377.85
	5:5	162	417.47
	6:4	160	406.47
	9:1	156	437.66
	Total	799	
Review accuracy	2:8	157	390.07
	3:7	164	382.15
	5:5	162	379.09
	6:4	160	416.47
	9:1	156	433.59
	Total	799	
Reviewer bias	2:8	157	449.64
	3:7	164	395.10
	5:5	162	386.80
	6:4	160	391.93
	9:1	156	428.36
	Total	799	
Reviewer expertise	2:8	157	403.05
	3:7	164	391.02
	5:5	162	386.80
	6:4	160	391.93
	9:1	156	428.36
	Total	799	
Trust in review	2:8	157	369.13
	3:7	164	381.36
	5:5	162	425.14
	6:4	160	393.79
	9:1	156	430.93
	Total	799	
Purchase intention	2:8	157	373.73
	3:7	164	389.68
	5:5	162	384.81
	6:4	160	432.49
	9:1	156	419.73
	Total	799	

Table B.8: Effects of community opinions - ranks

	Review quality	Review helpfulness	Review accuracy	Reviewer bias	Reviewer expertise	Trust in review	Purchase intention
Chi-square	8.122	13.600	9.286	13.530	3.902	8.826	8.025
df	4	4	4	4	4	4	4
Asymp.Sig	.087	.009	.054	.529	.419	.066	.091

Table B.9: Effects of community opinions - statistics

B.6.3: Effects of photo presence

Dependent variable	Photo presence	N	Mean ranks
Review quality	Absent	164	437.02
	Present	635	390.44
	Total	799	
Review helpfulness	Absent	164	412.42
	Present	635	396.79
	Total	799	
Review accuracy	Absent	164	406.13
	Present	635	398.42
	Total	799	
Reviewer bias	Absent	164	367.26
	Present	635	408.46
	Total	799	
Reviewer expertise	Absent	164	437.46
	Present	635	390.33
	Total	799	
Trust in review	Absent	164	422.17
	Present	635	394.27
	Total	799	
Purchase intention	Absent	164	418.88
	Present	635	395.13
	Total	799	

Table B.10: Effects of photo presence - ranks

	Review quality	Review helpfulness	Review accuracy	Reviewer bias	Reviewer expertise	Trust in review	Purchase intention
Chi-square	5.446	.727	.201	5.760	6.320	1.927	1.502
df	1	1	1	1	1	1	1
Asymp.Sig	.020	.394	.654	.016	.012	.165	.220

Table B.11: Effects of photo presence - statistics

B.6.4: Effects of photo type

Dependent variable	Photo type	N	Mean rank
Review quality	Food	317	321.54
	Atmosphere	317	313.46
	Total	634	
Review helpfulness	Food	317	320.50
	Atmosphere	317	314.50
	Total	634	
Review accuracy	Food	317	319.67
	Atmosphere	317	315.33
	Total	634	
Reviewer bias	Food	317	312.47
	Atmosphere	317	322.53
	Total	634	
Reviewer expertise	Food	317	321.05
	Atmosphere	317	313.95
	Total	634	
Trust in review	Food	317	322.82
	Atmosphere	317	312.18
	Total	634	
Purchase intention	Food	317	316.17
	Atmosphere	317	318.83
	Total	634	

Table B.12: Effects of photo presence – ranks

	Review quality	Review helpfulness	Review accuracy	Reviewer bias	Reviewer expertise	Trust in review	Purchase intention
Chi-square	.316	.207	.121	.677	.278	.541	.036
df	1	1	1	1	1	1	1
Asymp.Sig	.574	.649	.728	.411	.598	.462	.849

Table B.13: Effects of photo presence - statistics

B.6.5: Effects of photo valence

Dependent variable	Photo valence	N	Mean rank
Review quality	Negative	322	319.64
	Positive	313	316.32
	Total	635	
Review helpfulness	Negative	322	317.74
	Positive	313	318.27
	Total	635	
Review accuracy	Negative	322	318.17
	Positive	313	317.82
	Total	635	
Reviewer bias	Negative	322	310.38
	Positive	313	325.84
	Total	635	
Reviewer expertise	Negative	322	304.70
	Positive	313	315.84
	Total	635	
Trust in review	Negative	322	328.88
	Positive	313	306.81
	Total	635	
Purchase intention	Negative	322	325.28
	Positive	313	310.51
	Total	635	

Table B.14: Effects of photo valence - ranks

	Review quality	Review helpfulness	Review accuracy	Reviewer bias	Reviewer expertise	Trust in review	Purchase intention
Chi-square	.053	.002	.001	1.590	4.010	2.325	1.119
df	1	1	1	1	1	1	1
Asymp.Sig	.818	.968	.977	.207	.226	.127	.290

Table B.15: Effects of photo valence - statistics

Appendix C: Third study

C.1: Consent form



Centre of Human-Computer Interaction Design “Consent to be a Research Subject”

Information Sheet

Introduction

This research study is being conducted by *Dara Sherwani* as part of PhD research programme. The research aims at investigating the way users assess one another on systems that provide user-generated reviews such as Yelp. The document at hand is called *informed consent form*. You are kindly asked to read all information stated in this document and take the required time to make your decision. If you do not clearly understand any word and/or part of this document, please ask the facilitator (Dara Sherwani) for clarification.

Procedure

The experiment is divided into 2 parts which take approximately 30 minutes in total:

- 1- **Back questionnaire:** you will be asked to fill in a background questionnaire consisting of 4 questions, including demographics.
- 2- **Video recorded think aloud:** you will be shown profile pages of three other users. For each profile page, you will be required to assess five traits and also think aloud to justify your assessment. The facilitator will remind you to keep on thinking aloud if you become silent. At the end of each profile assessment, you will be required to fill in a questionnaire.

- 3- **Additional comments:** you will be given the chance to add relevant comments at the end of the experiment.

Decision to Participate

Please note that participating in this research study is completely voluntary. There should be no pressure on you to take part in this study. You can withdraw your participation at any time.

You will be given a voucher as a gift for your complete participation. There are no expected and anticipated risks from taking part in this study.

Authorisation to Use and Disclose Information

All data and information which you will provide through taking part in this research study will be kept confidential and your name will be anonymised. The only persons who will access and view the obtained data, information and video recordings are Dara Sherwani and his academic supervisors. Publication(s) could be made from this research; however, your name and video recording will not be included or attached with publication(s).

Contact details

If you have any inquiry about how to do any part of this research study, please contact the first academic supervisor Simone Stumpf via email (Simone.Stumpf.1@city.ac.uk).

Informed Consent Form

I hereby agree my participation and willingness to be a research subject.

I understand that Mr. Dara Sherwani will take notes and record me during the session.

I also agree to fill in the proposed questionnaires in order to take part in this research study and furthermore, may add relevant comments at the end of the experiment.

Participant's name: _____

Participant's signature: _____

Date: _____

Facilitator: Dara Sherwani

Facilitator's signature: _____

Date: _____

C.2: Background questionnaire

Each participant in study 3 was required to fill in a background questionnaire prior to the main task. The questionnaire captured participants' demographics (part 1). It also captured their dispositional trust (part 2), past experience (part 3) and finally their personality traits (part 4).

1. Age: _____

Gender: Female
 Male

2. Please rate each of the following statements?

- In general, people really do care about the well-being of others:

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7
Strongly disagree Neither Strongly agree

- The typical person is sincerely concerned about the problems of others:

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7
Strongly disagree Neither Strongly agree

- Most of the time, people care enough to try to be helpful, rather than just looking out for themselves:

4. Which of the following adjectives describe you best?

**Extraverted,
Enthusiastic**

VS

**Quiet,
Reserved**

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

**Extremely
like the pair
on the left**

Neither

**Extremely
like the pair
on the right**

**Dependable,
Self-disciplined**

VS

**Careless,
Disorganised**

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

**Extremely
like the pair
on the left**

Neither

**Extremely
like the pair
on the right**

**Critical,
Quarrelsome**

VS

**Warm,
Sympathic**

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

Extremely
like the pair
on the left

Neither

Extremely
like the pair
on the right

**Anxious,
Easily upset**

VS

**Emotionally
stable,**

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

Extremely
like the pair
on the left

Neither

Extremely
like the pair
on the right

Open to new
experiences,

VS

Uncreative,
Conventional

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

Extremely
like the pair
on the left

Neither

Extremely
like the pair
on the right

C.3: Familiarity check

An essential condition of study 3 referred to the unfamiliarity of participants with one another in the groups. Thus, prior participants were asked to give feedback about their familiarity with group members to ensure that participants who were allocated to the same groups were completely unfamiliar, i.e. zero acquaintance condition.

Do you know this person?

- Yes
- No

If you answer “no”, please proceed to main task

How does this person relate to you?

- Family
- Relationship partner
- Someone I know

If you choose “someone I know”, please answer the next question.

Please describe your relationship to this person by choosing the appropriate option below?

Far acquaintance	Acquaintance	Close acquaintance	Friend	Close friend	Best friend

C.4: Perceived personality and trust factors questionnaire

Participants were asked to fill in a perceived personality and trust factors questionnaire for every group member. The first part of this questionnaire captured participants' perception of five personality traits. The second part captured their perception of 7 factors: perceived quality, helpfulness and accuracy of reviews, perceived reviewer's expertise and bias as well as trust in the reviews and purchase intention.

1. Which of the following adjectives best describe this person?

Extraverted, Enthusiastic	VS	Quiet, Reserved
1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7		
Extremely like the pair on the left	Neither	Extremely like the pair on the right

- Please justify your rating based on the profile page:

**Dependable,
Self-disciplined**

VS

**Careless,
Disorganised**

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

**Extremely
like the pair
on the left**

Neither

**Extremely
like the pair
on the right**

- Please justify your rating based on the profile page:

**Critical,
Quarrelsome**

VS

**Warm,
Sympathetic**

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

Extremely
like the pair
on the left

Neither

Extremely
like the pair
on the right

- Please justify your rating based on the profile page:

**Anxious,
Easily upset**

VS

**Emotionally
stable,**

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

**Extremely
like the pair
on the left**

Neither

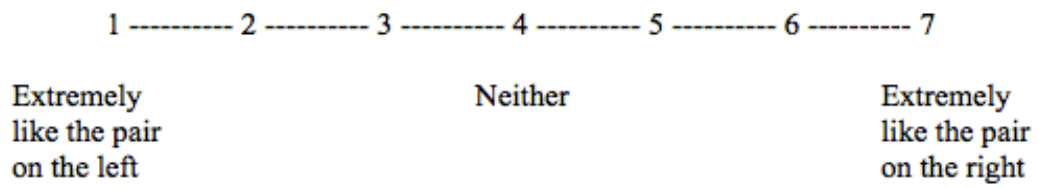
**Extremely
like the pair
on the right**

- Please justify your rating based on the profile page:

**Open to new
experiences,**

VS

**Uncreative,
Conventional**



- Please justify your rating based on the profile page:

