Master's thesis

An eye-tracking study on what receives attention in e-mails in an intercultural context

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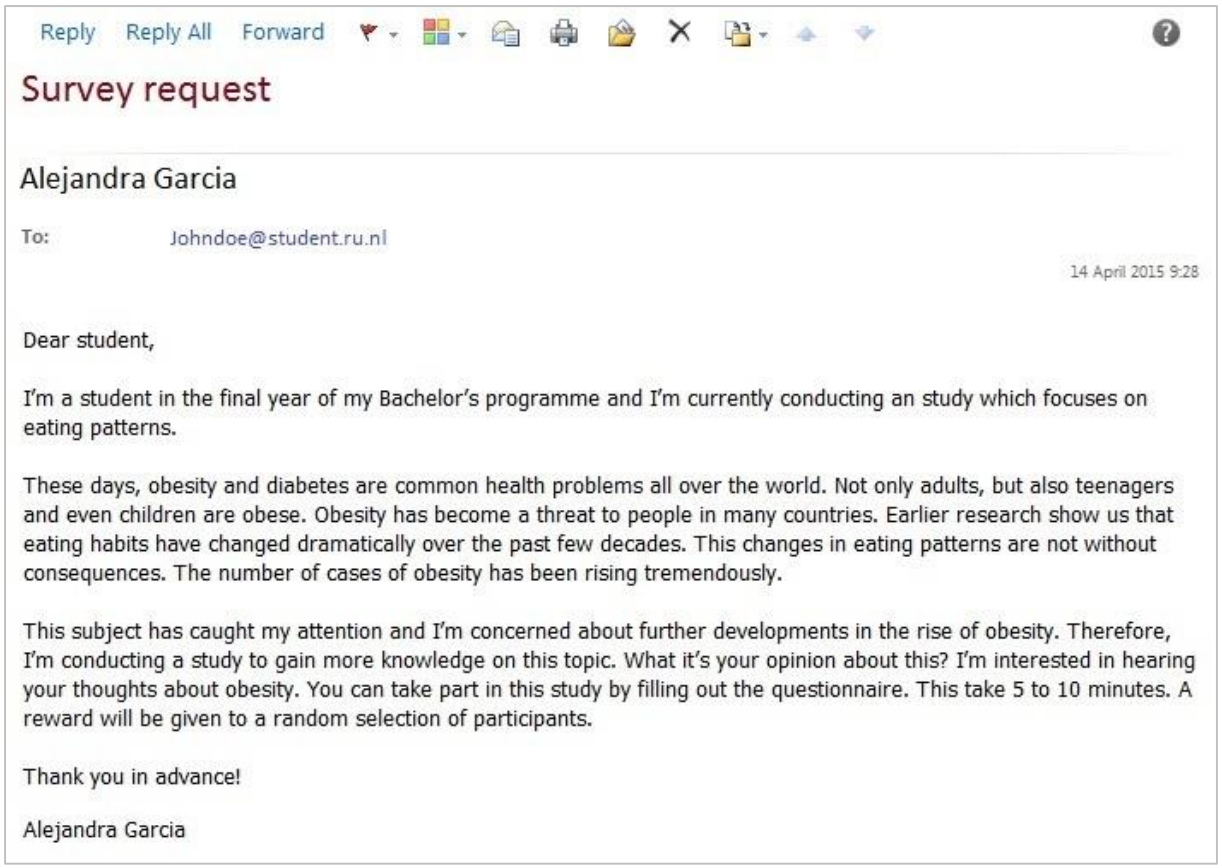
1. Abstract

There have already been some studies exploring the importance of errors in native/non-native speakers of English' e-mails, but the effect of grammatical errors and nationality of the writer on the non-native reader's behavioural intention, attitude towards the text and author evaluation has yet to be examined. Furthermore, this type of research has not yet been combined with an eye-tracking methodology which examines if errors or the sender actually draw attention in e-mails. This study focused on the effects of these variables in a persuasive English text on the non-native readers' in a 2 x 2 between-subject design, with interest areas as within subject factor. A total of 55 participants were asked to participate in an eye-tracking experiment where they read one of four versions of a text and afterwards filled out a questionnaire. The effects found were that most time was spent on reading the paragraphs, but the sender and recipient in particular drew attention, whereas the date did not draw attention at all. Moreover, it was found that for those who perceived errors in the text, in the Spanish version they fixated on the sender more often than in the British version, whereas in the British version they fixated on the first error more often than in the Spanish version. This may have been due to the non-nativeness of the participants, who may have doubted themselves when they saw an error in the British version, and double checked it. This doubt may have been taken away in the Spanish version when they saw that it was a non-native sender. No significant effects were found for the behavioural intention, attitude towards the text and author evaluation, but this may have been due to a small sample-size. Therefore, further research is required to examine these effects.

2. Introduction

2.1 General background

Nowadays where the internet and multinational companies are part of everyday lives, there is a need for ways to communicate between different cultures or languages, e.g. through a common language like English (Lüdi, 2013). This causes that e-mails like the one in Figure 1 are becoming more and more common. This e-mail is sent by a non-native speaker of English and contains multiple grammatical errors (i.e. “an study”, “research show us”, “this changes”, "what it's your opinion", and “This take 5 to 10 minutes”). But the question remains to what extent readers notice these errors in an e-mail. Does it matter whether the sender is a native or non-native speaker of English? The question is: how do these factors affect the reader’s perception of the e-mail and the author?



Reply Reply All Forward

Survey request

Alejandra Garcia

To: Johndoe@student.ru.nl

14 April 2015 9:28

Dear student,

I'm a student in the final year of my Bachelor's programme and I'm currently conducting an study which focuses on eating patterns.

These days, obesity and diabetes are common health problems all over the world. Not only adults, but also teenagers and even children are obese. Obesity has become a threat to people in many countries. Earlier research show us that eating habits have changed dramatically over the past few decades. This changes in eating patterns are not without consequences. The number of cases of obesity has been rising tremendously.

This subject has caught my attention and I'm concerned about further developments in the rise of obesity. Therefore, I'm conducting a study to gain more knowledge on this topic. What it's your opinion about this? I'm interested in hearing your thoughts about obesity. You can take part in this study by filling out the questionnaire. This take 5 to 10 minutes. A reward will be given to a random selection of participants.

Thank you in advance!

Alejandra Garcia

Figure 1. Example of an e-mail by a non-native author (adapted from Rietbergen, 2014)

2.2 Intercultural communication

As the main focus of the current research will be on e-mails in an intercultural communication context, there are several elements to consider as receiving attention in these e-mails. One of them is the sender of the e-mail. The language expectancy theory by Burgoon and Miller (1985) states that readers have certain expectations and bias based on the author of a certain text. This would mean that the author of a text may influence the overall attitude of the reader towards the text and author. The Spanish nationality, for example, is known for their relatively moderate proficiency in English (English Proficiency Index, n.d.). Therefore the prediction would be that the expectations readers have of a native person's English proficiency are higher than those they have of a Spanish person. Furthermore, Vignovic and Thompson (2010) found that most negative perceptions about technical language violations were reduced when native speakers of English participants were told that the writer was a non-native speaker of English. Moreover, The Radboud University Bachelor's thesis by Rietbergen (n.d.) found that the English proficiency of a Swedish writer of an e-mail was estimated higher by non-native readers than the English proficiency of a Mexican writer of an e-mail. However, not all participants could guess correctly where the author was from, so this may indicate that they didn't focus or even notice the author's name. Therefore it might be interesting to see whether the name of the author of a letter actually receives attention and especially whether the

nationality of the sender (native/non-native speaker of English) influences the attitudes of the reader towards the e-mail and sender.

Moreover, there may be a relation between the sender of an e-mail and the reader's reaction to their errors. Johnson and VanBrackle (2012) for example found that there was linguistic discrimination against errors typically made by African American English writers and a leniency for errors made by ESL writers. This may mean that the expectations for a non-native speaker of English are lower than for a native speaker of English.

Errors may or may not be noticed by the reader and may therefore also influence the overall attitude of the reader towards the text or author. The review done by Rifkin and Roberts (2008) showed that there have been many studies on native speakers of English' evaluation of non-native speakers' texts. In these studies the main aim seemed to be to find out which types of errors are considered most severe and disrupt the native speakers' ability to understand the non-native speaker's message. However, not much research has yet been done for non-native speakers of English reading native/non-native English e-mails.

One of the studies that did focus on whether errors in a text affect the non-native readers' attitudes towards author and text is the one by van Meurs, Planken and Maria (submitted). They found no actual effect of errors in a text, but did find a weak effect of perceived error on text attractiveness and the author's trustworthiness, friendliness and competence. Another similar study by Kloet, Renkema and Van Wijk (2003) found that a text with a few errors does not affect evaluations as long as the errors are incidental. These errors may be perceived as untidiness and can therefore be forgiven by most readers. Jansen (2010), however, found that errors that are systematically repeated throughout a text do have a significant negative effect on the attitudes towards the text and author, and on the behavioural intention.

The Radboud University Bachelor's thesis by Rietbergen (n.d.) also focused on this particular topic and examined whether the nationality of the sender (non-native speaker of English), the error density and/or the types of errors had any effect on the non-native readers' attitude towards the text, author evaluation and behavioural intention. The 302 participants in that study were asked to read an e-mail carefully and afterwards answer questions in a questionnaire. In that sample it was found that authors that had made grammatical errors were rated significantly less competent than authors that had made no errors. Also the texts with grammatical errors were rated significantly less comprehensible than the texts without errors. There were no significant differences found between formulation errors and no errors, or between formulation errors and grammatical errors.

In the study by Rietbergen (n.d.), however, no eye tracking device was used, so it could not be researched whether readers actually noticed the errors in the text or not. Therefore it may be interesting to see whether readers notice errors in the text and how this affects their attitude towards the author and towards the text itself. For this current research only text versions containing grammatical errors or no errors will be used, because the previous research did not find significant differences for formulation errors.

2.3 What draws attention

Much research has been done on what draws attention in specific text genres from online and offline media (e.g by Holmqvist, Holsanova, Barthelson & Lundqvist, 2003; Sutcliffe & Namoune, 2007; 2008; Domzal, Hunt, & Kernan, 1995; Rayner, Miller & Rotello, 2008). Reading from different media can influence the way you read a text (Liu, 2005). This may mean that from one source you may notice when a text contains errors and from another you may not. Possibly, a reader will read an actual letter differently than an e-mail (such as the one in Figure 1), because it comes from a different medium. It has been found that technology and texts online change the reading behavior compared to offline sources so that less time is spent on in-depth reading and concentrated reading, and more on browsing and scanning, keyword spotting, one-time reading, non-linear reading and reading more selectively (Liu, 2005). Since online sources are still quite new and not much research has been done on reading behaviour in e-mails, this will be the subject of the current study.

Some research has been done on e-mails before, e.g. by Clark, Ruthven, Holt, Song and Watt (2014) and by Pfeiffer, Kauer, and Roth (2014). Clark et al. (2014) used an eye tracking device to analyse scan paths to highlight the ways in which people view the features of genres. They examined cues in e-mails to find out which elements gave people clues on what genre the e-mail was. They examined the scan paths and fixation durations to see what cues were most important. The scanpaths revealed that genres of e-mail (e.g. newsletters, or spam) could be recognized by form (titles, bold text, etc.) and purpose, and in particular by structural formatting and layout cues, using certain strategies of scanning and skimming (found through the methodology of Campbell & Maglio (2001) and Buscher, Dengel, van Elst, and Mittag (2008), slightly modified). In that way the research on e-mails done by Clark et al. (2014) has a completely different focus than this current study, since the current study will not focus so much on the structure or lay out of the e-mails, but more on the actual content and how this is perceived by the readers. This has so yet to be examined and will therefore be part of the current study.

2.4 Eye tracking

For this type of research on what draws attention to e.g. e-mails, an eye tracking device is often used, because, as stated by Wedel and Pieters (2008), eye tracking is a complementary method to

attitude research that is not intrusive in observing behaviour, and it can therefore add to existing research. Pfeiffer, Theuerling, and Kauer (2013) set up a model that looked at how people react to a call to action and used a combination of qualitative and quantitative questions as well as eye tracking to test this model. They used a within-subject design experiment with three versions of a German e-mail, one of which was authentic, the other two were phishing mails. Unfortunately, their main question of whether people could recognize phishing e-mails could not be answered, because their sample of only ten participants was too small.

Eye tracking methods are often combined with additional questionnaires or interviews, for example in the research by Pfeiffer, Kauer and Röth (2014) who elaborated on the research done by Pfeiffer, Theuerling, and Kauer (2013) and investigated the ability of recipients to identify fraudulent e-mails. However, this study only reported the findings of the interviews because of restrictions in the length of the article. They found that several factors play a role, some of which are: content, visual and linguistic aspects (i.e. spelling and grammar errors and poor language overall), and also technical aspects like the sender address (i.e. when the sender seems dubious they will identify it as fishing e-mails more often). Since the authors decided to keep the eye tracking part out of their article, the actual parts that received attention are yet to be distinguished. Whether the readers actually fixated on the errors in the text and the sender more often/ longer has not yet been examined and is therefore part of this current study.

For research on the text genre e-mails there is much that is to be discovered. Most researchers have yet to include an eye tracking device in their methods of research to identify which elements attract attention, for example in intercultural communications. Many focal points in e-mails have not been identified and evaluated yet, e.g. whether the sender of a certain e-mail actually draws the attention and whether this affects the attitudes towards the e-mail and towards the sender. Would it matter if the sender of an e-mail is a native or non-native speaker? Do readers notice this and do they notice possible errors in a text as well? And if they notice these details, does it affect their attitude towards the e-mail or the author?

2.5 Research focus

Taking both the variables “errors” and “sender of the e-mail” into account, the current study will focus on the following research question:

RQ: What is the effect of the presence of errors in a native or non-native e-mail on reader’s perception of the e-mail and sender?

To further specify this research question, separate sub-questions were formulated for the two variables. The variable “sender of the e-mail” has led to the following sub-questions:

SQ1: Does the native/ non-native sender of an e-mail attract attention and for how long?

SQ2: What is the effect of the nationality of the sender of an e-mail on non-native readers' behavioural intention, attitude towards the text, and author evaluation?

SQ3: Is there a relation between attention and the effect of the sender of an e-mail on the non-native readers' behavioural intention, attitude towards the text, and author evaluation?

The variable "errors" has led to the following research questions:

SQ4: Do grammatical errors in an e-mail attract attention, and for how long?

SQ5: What is the effect of grammatical errors in an e-mail on non-native readers' behavioural intention, attitude towards the text, and author evaluation?

SQ6: Is there a relation between attention and the effect of grammatical errors on the non-native readers' behavioraul intention, attitude towards the text and author evaluation?

For the interaction between nationality of the author and errors these sub-questions were formulated:

SQ7: Is there an interaction between grammatical errors and nationality of the author in attention?

SQ8: Is there an interaction between grammatical errors and nationality of the sender of an e-mail for the non-native readers' behavioural intention, attitude towards the text, and author evaluation?

SQ9: Is there a relation between the interaction between grammatical errors and nationality of the author in attention and the interaction between grammatical errors and nationality of the author for the non-native readers' behavioural intention, attitude towards the text, and author evaluation?

This research would contribute to existing theory as it gives insights in what the fixations points are in e-mails intended for intercultural communication. It also intends to give insights in whether these points affect the overall attitude towards the author or the text. Practically the results of this study may indicate what practices to use or avoid when using e-mail as a medium for intercultural communication.

3. Method

An experiment was conducted to examine the effect of the presence of errors in a native or non-native email on the reader's perception of the e-mail and sender.

3.1 Design

The experiment had a 2(grammatical errors/no errors) x 2 (native/non-native author) between-subject design. Furthermore there are 13 Interest Areas (IA's) that are within-subject factors, of which only 9 were included in the statistical analysis, as some IA's included multiple other and were therefore left out of the analysis. All participants saw only one version of the same English e-mail. In total four different versions of the same e-mail were constructed, one containing grammatical errors and one without errors with a native author (British), and the same two versions with a non-native author (Spanish).

3.2 Materials

For this study, four versions of the same e-mail were constructed. Two of these e-mails were signed by a non-native English (Spanish) name: one containing grammatical errors, and one that does not contain any errors. The other two versions were signed by a native English name: again one containing grammatical errors and one containing no errors.

The names of these two authors were selected carefully by choosing five first names + surnames that are very common in Spain and five first names + surnames that are very common in the UK (See Appendix A). A pre-test was done with five respondents using questionnaires to find out whether they could guess the nationality of this name correctly, how sure they were of their answer, and whether they had any associations with these names. The English name and Spanish name with the most correct guesses, the highest certainty of answers, and the least associations were selected to be used as an author of the e-mail in this study. With the British name being recognised as an English speaker 100% of the time, and as a Brit 60% of the time with a certainty of 3.6 (7 point semantic differential), and no associations, Hannah Griffiths was the most suitable name. For the Spanish name, the most suitable name is Alejandra García, because it was correctly recognised as a Spanish speaker 100% of the time and as a Spanish nationality 80% of the time (certainty of 3.8), and only had one association being that some Spanish soccer players also have that last name.

The e-mails used in this study were modified from the e-mails used in the Bachelor's thesis by Rietbergen (n.d.). The errors in these e-mails were collected from native speakers of Spanish who wrote an e-mail in English following instructions in their own language (translated and back translated from English by a native speaker). This method was chosen to find common authentic errors made by non-native speakers of English with a moderate proficiency in English and of the

same nationality as the fictive author of the e-mail used in this study. The instructions given to these native speakers of Spanish and the original texts written by them are included in the appendices of this study (See Appendix B and C). The texts that were used for this experiment were constructed so that the errors fit into the text. The versions with errors each contained five grammatical errors, e.g. "an study" instead of "a study". All four versions of the text used in the study are included in the appendices (See Appendix D).

3.3 Participants

In total 61 people participated in this study, of which 6 trials were deleted because the data was drifted too far away from the stimulus area. All participants were native speakers of Dutch with the Dutch nationality. In total 41.8% were male and the mean age of all participants was 23.55 (*SD* = 5.2) and ranged between 19 and 56. Only higher educated people were asked to participate in this study, so for educational level, 81.8% of the participants were either student or graduated from university and the other 18.2% was either student or graduated from HBO. Participants were asked to rate their own English language proficiency and they perceived this on average as a 5.3 (*SD* = .89) on a 7-point Likert scale (1 being very poor and 7 being excellent).

A Chi-square test showed no significant differences between versions for gender (χ^2 (3) = .49, p = .92) or for educational level (χ^2 (3) = 3.04, p = .39). A one-way ANOVA showed no significant differences in age between the different versions (F(3, 51) < 1). A one-way ANOVA showed no significant differences in perceived English proficiency between the different versions (F(3, 51) = 2.10, p = .11).

3.4 Instruments

A head-mounted eye-tracker (the EyeLink II by SR Research) was used to record the eye-movements of the participants. The present study will differentiate three factors of attention based on participants' eye-movements: first fixation, proportion fixation duration, number of fixations, and number of returned views. First fixation is the very first interest area that the participants fixate on when they first get to see the e-mail. Proportion fixation duration are the percentage of time spent on a certain element or word and number of fixations is the total number of fixations on a certain element or word respectively. Returned views are how often the participant returns to a certain interest area after fixating somewhere else. In total, 13 interest areas were constructed: Above E-mail, To, Date, Paragraph 1, Paragraph 2, Paragraph 3, Error 1, Error2, Error 3, Error 4, Error 5, Thanks, and Sender. Thanks and Sender were so close to each other, that for the analyses, these two were considered as one: Sender.

The constructs in the questionnaire will measure the behavioural intention, and the participants' attitude towards the e-mail and towards the author of the e-mail. The scales used to measure these

variables were based on Bayard, Weatherall, Gallois, and Pittam (2001), Gerritsen, Gijsbers, Korzilius and van Meurs (2000), van der Haagen (1998), van Meurs, Planken and Maria (submitted), and Munro, Derwing and Morton (2006).

The first part of the questionnaire posed questions on the behavioural intention of the participants. This part consisted of three seven-point Likert scales:

1. "This e-mail makes me want to learn more about the study."
2. "This e-mail has persuaded me to take part in the study."
3. "This e-mail has persuaded me to encourage friends and family to take part in the study."

The reliability of the scale was good ($\alpha = .73$).

The second part of the questionnaire measured the attitude towards the e-mail on the dimensions comprehensibility and attractiveness. The comprehensibility of the text was measured with six seven-point semantic differentials: "easy", "obvious", "well-formulated", "well-structured", "simple", and "clear". The reliability of the scale was good ($\alpha = .82$).

Next, the attractiveness of the text was measured through the six seven-point semantic differentials: "pleasant", "fascinating", "nice to read", "attractive", "interesting", and "not annoying". The reliability of the scale was excellent ($\alpha = .91$).

The third part of the questionnaire examined the attitude towards the author on the dimensions affection and competence. Affection towards the author was tested with six seven-point semantic differentials: "likeable", "considerate", "nice", "friendly", "sympathetic", and "polite". The reliability of the scale was good ($\alpha = .89$).

Competence of the author was tested using eight seven-point semantic differentials: "well-educated", "well-developed", "authoritative", "intelligent", "reliable", "competent", "ambitious", and "hard working". The reliability of the scale was good ($\alpha = .87$).

Four seven-point Likert scales were used to see how severe participants rate errors in a text. The reliability of this scale was good ($\alpha = .76$).

Participants were then asked to guess the nationality of the author of the e-mail and to rate the average English proficiency of someone of that nationality. This was done through four seven-point semantic differentials estimating the ability to read, speak, listen and write in English based on Hammer, Wiseman, Rasmussen, and Bruschke (1998) and Luna, Ringberg, and Peracchio (2008). The reliability of this scale was good ($\alpha = .90$). Furthermore, they were asked if they had seen any errors in the text and, if yes, which ones. Out of the 55 participants, only eight said they perceived

errors in the text, of whom seven actually read an e-mail containing errors and one read an e-mail containing no errors. The other 47 participants said they did not perceive any errors in the text, of whom 21 participants actually did read an e-mail containing errors. As a sample size of only eight participants is very small, marginally significant results were also reported. To end this part of the questionnaire, they were asked if they have dyslexia themselves, because if they do, this may mean that they cannot tell if there are errors in a text.

To end the questionnaire, some demographics of the participants were asked, including their age, gender and educational level. Furthermore they were asked to assess their own English language proficiency through four items estimating their own ability to read, speak, listen and write in English. This was done by four seven-point semantic differentials ('very bad-very well') based on Hammer, Wiseman, Rasmussen, and Bruschke (1998) and Luna, Ringberg, and Peracchio (2008). The reliability of this scale was good ($\alpha = .76$).

3.5 Procedure

This experiment was part of another eyetracking experiment. Participants in this study were either approached individually, through social media, or through the SONA research system of the Radboud University to partake in this study. Before starting the experiment the participant was randomly assigned to one of the four conditions and was seated in front of a computer screen in a fixed chair, so they would all sit at the same distance from the screen.

The screen showed them a brief introduction to the experiment and gave instructions of what they were supposed to do. The researcher gave the participant the chance to ask questions before starting the experiment. This ensured that the participants knew what was expected of them. When the participant indicated that he or she was ready, the eye tracking device was mounted on top of their head and the cameras were adjusted until they were in the right position. Then the cameras were calibrated and a test stimulus was shown to get the participant used to the experiment, the eye tracker, and to make sure that the eye tracker was calibrated accordingly. Afterwards the participant, again, got the chance to pose questions and when everything was adjusted the way it should be, the cameras were calibrated again and the participants conducted the actual experiment. The instruction question was shown for 9 seconds after which the participant got to read the e-mail. When done reading, the participants clicked the mouse to end the experiment and the eye tracker was taken off their heads.

They were led to another table where they could fill out the online questionnaire. The participants were asked to answer with their initial response and not to change answers later on. The participants were not told beforehand that this research project was about error/author evaluation, so that will

not have clouded their judgement. When they finished the questionnaire they were thanked for their participation and they had the chance to partake in the raffle of four times €10,- and one time €20,-.

4. Results Daphne Rietbergen

4.1 Eye tracking results

For the variables Number of fixations, Proportion Fixation duration and Number of returned views, Mauchly's test of Sphericity was significant ($p < .05$) and therefore this assumption was violated. In all three cases, $\varepsilon<.75$, so all ANOVA's are reported with the Greenhouse-Geisser correction.

4.1.1 First fixation

Table 1 shows the first fixations of the participants for nationality per interest area.

Table 1. First fixations per interest area as a factor of nationality.

	Nationality		
Interest Area	**British**	**Spanish**	**Total**
No interest area	3	1	4
Above e-mail	2	0	2
To	1	6	7
Date	0	0	0
Sender	0	0	0
Error1	0	1	1
Error2	0	0	0
Error3	1	0	1
Error4	0	0	0
Error5	0	0	0
Paragraph 1	14	11	25
Paragraph 2	9	5	14
Paragraph 3	0	1	1

A Chi square test for interest area and nationality of the author showed no significant relation for the first fixation between the interest areas and the nationality of the author (χ^2 (7) = 13.18, p = .07).

Table 2 shows the first fixations of the participants for errors per interest area.

Table 2. First fixations per interest area as a factor of errors.

	Errors		
Interest Area	**No errors**	**Errors**	**Total**
No interest area	0	4	4
Above e-mail	0	2	2
To	4	3	7
Date	0	0	0
Sender	0	0	0
Error1	1	0	1
Error2	0	0	0
Error3	1	0	1
Error4	0	0	0
Error5	0	0	0
Paragraph 1	13	12	25
Paragraph 2	6	8	14
Paragraph 3	1	0	1

A Chi square test for interest areas and presence of errors in the text also showed no significant for relation for first fixation between the interest areas and errors (χ^2 (7) = 9.33, p = .23).

4.1.2 Number of fixations

Table 3 shows only the Means and Standard Deviations for number of fixations as a function of the interest area, since this was the only factor with significant results. For the complete Means and Standard Deviations for number of fixations as a function of the interest area, nationality and errors, see Appendix E, Table E1 (p. 38). There are only nine interest areas in this table, because the interest areas paragraph 1, 2, and 3 contained the other interest areas and are therefore left out of the following analyses together with the fixations that didn't fall within an interest are.

Table 3. Means and Standard Deviations for Number of fixations as a function of the interest area.

		Number of fixations	
Interest area	***M***	***SD***	***N***
Above e-mail	2.56	3.52	55
To	6.45	5.92	55
Sender	10.40	8.97	55
Date	0.64	1.37	55
Error1	1.98	2.24	55
Error2	2.53	2.57	55
Error 3	3.11	2.88	55
Error 4	1.96	2.03	55
Error 5	1.91	2.47	55

A repeated measures analysis for Number of fixations with interest areas (9 levels) as within subject factor and nationality of the author (2 levels) and errors (2 levels) as between subject factors showed a significant effect for interest areas (F(2.19, 111.46) = 27.00, p < .001), but not for nationality of the

author ($F(1, 51) < 1$) or errors ($F(1, 51) < 1$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) = 1.65$, $p = .20$), nor for interest areas and nationality ($F(2.19, 111.46) < 1$), interest areas and errors ($F(2.19, 111.46) < 1$), or for interest areas, errors and nationality ($F(2.19, 111.46) < 1$).

Pairwise comparison for the main effect of interest areas showed that the interest area Above e-mail ($M = 2.56$, $SD = 3.52$) was fixated on significantly less often than on the interest areas To ($M = 6.45$, $SD = 5.92$) and Sender ($M = 10.40$, $SD = 8.97$) and significantly more often than on the interest area Date ($M = 0.64$, $SD = 1.37$) (Bonferroni correction, $p < .05$). The interest areas To ($M = 6.45$, $SD = 5.92$) and Sender ($M = 10.40$, $SD = 8.97$) were looked at significantly more often than all the other interest areas (Bonferroni correction, $p < .05$). Date ($M = 0.64$, $SD = 1.37$) was looked at significantly less often than all other interest areas apart from Error 5 ($M = 1.91$, $SD = 2.47$) (Bonferroni correction, $p < .05$). In general this shows us that To and Sender were fixated on the most often and Date was fixated on the least often.

4.1.3 Number of fixations combined with perceived errors

Since no main effect or interaction effect was found for the variable errors, the effects of perceived errors (Did the subject notice any errors? Yes n=8, No n=47) were also analysed. For the complete Means and Standard Deviations for the number of fixations as a function of the interest area, nationality and perceived errors, see Appendix E, Table E2 (p. 39).

A repeated measures analysis for Number of fixations with interest areas (9 levels) as within subject factor and nationality of the author (2 levels) and perceived errors (2 levels) as between subject factors showed a significant effect for interest areas ($F(2.32,118.11) = 19.36$, $p < .001$), and a significant interaction effect between interest areas and nationality ($F(2.32,118.11) = 2.91$, $p = .051$). These effects were qualified by a significant interaction effect between interest areas, nationality, and perceived errors ($F(2.32,118.11) = 4.83$, $p = .007$). The differences for the interaction between interest areas and nationality were only found amongst the participants that actually perceived errors ($F(2.15,12.93) = 3.90$, $p = .045$). The differences for the interaction between interest areas and nationality were not significant amongst the participants that did not perceive any errors ($F(2.24,100.86) < 1$). Table 4 shows the Means and Standard Deviations for number of fixations as a function of interest area and nationality, for the participants that perceived errors in the text.

Table 4. Means and Standard Deviations for Number of fixations as a function of the Interest area and Nationality, for the participants that perceived errors in the text.

		Number of fixations		
Interest area	**Nationality**	***M***	***SD***	***N***
Above e-mail	British	5.40	3.58	5
	Spanish	3.33	5.77	3
To	British	12.20	9.15	5
	Spanish	3.00	3.61	3
Sender	British	7.00	6.75	5
	Spanish	21.33	10.79	3
Date	British	0.00	0.00	5
	Spanish	0.00	0.00	3
Error1	British	4.20	3.27	5
	Spanish	0.33	0.58	3
Error2	British	3.60	4.83	5
	Spanish	1.00	1.73	3
Error 3	British	5.20	4.09	5
	Spanish	2.00	1.73	3
Error 4	British	2.20	2.05	5
	Spanish	2.00	1.00	3
Error 5	British	1.60	2.07	5
	Spanish	1.33	0.58	3

The marginally significant differences between the two nationalities were only found for the interest areas Sender ($F(1,6) = 5.57$, $p = .056$) and Error1 ($F(1,6) = 3.87$, $p = .097$). No significant differences were found for the other seven interest areas: Above e-mail ($F(4,3) = 2.06$, $p = .289$), To ($F(1,6) = 2.64$, $p = .155$), Date ($F(1,6) < 1$), Error2 ($F(1,6) < 1$), Error3 ($F(1,6) = 1.58$, $p = .255$), Error4 ($F(1,6) < 1$), and Error5 ($F(1,6) < 1$). The participants that perceived errors in the text fixated on the sender significantly more often in the Spanish versions ($M = 21.33$, $SD = 10.69$) than in the British versions ($M = 7.00$, $SD = 6.75$). Furthermore, the participants that perceived errors in the text fixated on error1 significantly more often in the British version ($M = 4.20$, $SD = 3.27$) than in the Spanish version ($M = 0.33$, $SD = 0.58$).

4.1.4 Proportion fixation duration

Table 5 shows the Means and Standard Deviations for Proportion fixation duration as a function of the interest area, since this was the only factor with significant results. For the complete Means and Standard Deviations for Proportion fixation duration as a function of the interest area, nationality and errors, see Appendix E, Table E3 (p.40).

Table 5. Means and Standard Deviations for Proportion fixation duration as a function of the interest area.

	Proportion fixation duration		
Interest area	***M***	***SD***	***N***
Above e-mail	.013	.017	55
To	.032	.028	55
Sender	.053	.041	55
Date	.003	.007	55
Error1	.010	.012	55
Error2	.013	.012	55
Error 3	.016	.014	55
Error 4	.010	.010	55
Error 5	.011	.015	55

A repeated measures analysis for proportion fixation duration with interest areas (9 levels) as within subject factor and nationality of the author (2 levels) and errors (2 levels) as between subject factors showed a significant main effect for interest areas ($F(2.23, 113.95) = 30.46$, $p < .001$), but not for nationality of the author ($F(1, 51) < 1$) or errors ($F(1, 51) < 1$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) < 1$), nor for interest areas and nationality ($F(2.23, 113.95) < 1$), interest areas and errors ($F(2.23, 113.95) < 1$), or for interest areas, errors and nationality ($F(2.23, 113.95) < 1$).

Pair wise comparison for the main effect of interest areas showed that the interest areas To (M = .032, SD = .028) and Sender (M = .053, SD = .041) were looked at significantly more per cent of the time than the seven other interest areas: Above e-mail (M = .013, SD = .017), Date (M = .003, SD = .007) , Error 1 (M = .010, SD = .012), Error 2 (M = .013, SD = .012), Error 3 (M = .012, SD = .010), Error 4 (M = .010, SD = .010), and Error 5 (M = .011, SD = .015) (Bonferroni correction, $p < .05$). The interest area Date (M = .003, SD = .007) was looked at significantly less per cent of the time than the other interest areas, except for Error5 (M = .011, SD = .015) (Bonferroni correction, $p < .05$).

In general this shows us that To and Sender were the interest areas that were fixated on the most percentage of the time and Date was the interest area that was looked at the least percentage of time. For proportion fixation duration an extra analysis of the perceived errors did not give any new information or additional significant effects, so this analysis is not reported here.

As can be seen in Table 5 not a lot of time was spent in these nine interest areas, so to clarify what the participants were fixating on the rest of the time, Table 6 shows the percentage of time that was fixated on the paragraphs that contained the errors. Because these paragraphs included other interest areas that were of interest to this study, they were left out of the analyses.

Table 6. Means and Standard Deviations for Proportion fixation duration as a function of the paragraphs.

			Proportion fixation duration		
Interest area	**Nationality**	**Errors**	***M***	***SD***	***N***
Paragraph1	British	No errors	.214	.170	14
(containing		Errors	.170	.128	16
error 1 and 2)	Spanish	No errors	.229	.143	12
		Errors	.190	.112	13
	Total	Total	.199	.138	55
Paragraph2	British	No errors	.308	.066	14
(containing		Errors	.339	.109	16
error 3 and 4)	Spanish	No errors	.303	.106	12
		Errors	.316	.083	13
	Total	Total	.318	.091	55
Paragraph3	British	No errors	.266	.155	14
(containing		Errors	.253	.146	16
error 5)	Spanish	No errors	.256	.113	12
		Errors	.305	.121	13
	Total	Total	.269	.134	55

4.1.5 Number of returned views

Table 7 shows the Means and Standard Deviations for the number of returned views as a function of the interest area, since this was the only factor with significant results. For the complete Means and Standard Deviations for number of returned views as a function of the interest area, nationality and errors, see Appendix E, Table E4 (p.41).

Table 7. Means and Standard Deviations for the number of times one returned to a certain interest area as a function of the interest area.

		Number of returned views	
Interest area	***M***	***SD***	***N***
Above e-mail	1.15	1.41	13
To	3.07	2.87	55
Sender	4.87	3.83	55
Date	0.42	0.88	55
Error1	1.64	1.81	55
Error2	2.13	1.99	55
Error 3	2.76	2.46	55
Error 4	1.78	1.79	55
Error 5	1.76	2.25	55

A repeated measures analysis for number of returned views with interest areas (9 levels) as within subject factor and nationality of the author (2 levels) and errors (2 levels) as between subject factors showed a significant main effect for interest areas ($F(3.36,171.33) = 16.22$, $p < .001$), but not for nationality of the author ($F(1, 51) < 1$) or errors ($F(1, 51) < 1$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) = 3.04$, $p = .09$), nor for interest areas and nationality

($F(3.36,171.33) < 1$), interest areas and errors ($F(3.36,171.33) < 1$), or for interest areas, errors and nationality ($F(3.36,171.33) < 1$).

Pairwise comparison for the main effect of interest areas showed that the interest area Date (M = 0.42, SD = 0.88) was returned to significantly less often than all other interest areas: Above e-mail (M = 1.33, SD = 1.60), To (M = 3.07, SD = 2.87), Sender (M = 4.87, SD = 3.83), Error 1 (M = 1.64, SD = 1.81), Error 2 (M = 2.13, SD = 1.99), Error 3 (M = 2.76, SD = 2.46), Error 4 (M = 1.78, SD = 1.79), and Error 5 (M = 1.76, SD = 2.25) (Bonferroni correction, $p < .05$). To (M = 3.07, SD = 2.87) was returned to significantly more often than Error 1 (M = 1.64, SD = 1.81) and Above e-mail (M = 1.33, SD = 1.60) (Bonferroni correction, $p < .05$). Furthermore, Sender (M = 4.87, SD = 3.83) was returned to significantly more often than most other interest areas, except for To (M = 3.07, SD = 2.87) and Error 3 (M = 2.76, SD = 2.46).

In general these results show us that Date was returned to the least often and that Sender and To were returned to the most often compared to the other interest areas.

4.1.6 Number of returned views combined with perceived errors

Since no main effect or interaction effect was found for the number of returned views for the variable errors, the effects of perceived errors were also analysed. For the complete Means and Standard Deviations for the number of returned views as a function of the interest area, nationality and perceived errors, see Appendix E, Table E5 (p.42).

A repeated measures analysis for number of returned views with interest areas (9 levels) as within subject factor and nationality of the author (2 levels) and perceived errors (2 levels) as between subject factors showed a significant effect for interest areas ($F(3.59,183.15) = 12.62$, $p < .001$), and a significant interaction effect between interest areas and nationality ($F(3.59,183.15) = 2.92$, p = .027). These effects were qualified by a significant triple interaction between interest areas, nationality, and perceived errors ($F(3.59,183.15) = 4.97$, p = .001). The differences for the interaction between interest areas and nationality were only found amongst the participants that actually perceived errors ($F(2.17,13.04) = 3.64$, $p = .053$). The differences for the interaction between interest areas and nationality were not significant amongst the participants that did not perceive any errors ($F(3.89,175.39) = 1.48$, $p = .212$). Table 8 shows the Means and Standard Deviations for number of returned views as a function of interest area and nationality, for the participants that perceived errors in the text.

Table 8. Means and Standard Deviations for number of returned views as a function of the Interest area and Nationality, for the participants that perceived errors in the text.

		Number of fixations		
Interest area	**Nationality**	***M***	***SD***	***N***
Above e-mail	British	3.60	2.07	5
	Spanish	0.67	1.16	3
To	British	6.40	4.93	5
	Spanish	2.33	2.52	3
Sender	British	3.00	2.35	5
	Spanish	10.33	4.73	3
Date	British	0.00	0.00	5
	Spanish	0.00	0.00	3
Error1	British	3.60	2.30	5
	Spanish	0.33	0.58	3
Error2	British	3.00	3.54	5
	Spanish	1.00	1.73	3
Error 3	British	4.40	3.29	5
	Spanish	2.00	1.73	3
Error 4	British	2.00	1.87	5
	Spanish	1.67	1.15	3
Error 5	British	1.40	1.67	5
	Spanish	1.33	0.58	3

The marginally significant differences between the two nationalities were only found for the interest areas Above e-mail ($F(1,6) = 4.87$, p=.069), Sender ($F(1,6) = 9.08$, p =.024), and Error1 ($F(1,6) = 5.49$, p =.058). No significant differences were found for the other seven interest areas: To ($F(1,6) = 1.69$, p =.241), Date ($F(1,6) < 1$), Error2 ($F(1,6) < 1$), Error3 ($F(1,6) = 1.32$, p =.295), Error4 ($F(1,6) < 1$), and Error5 ($F(1,6) < 1$). The participants that perceived errors in the text returned to the interest area Above significantly more often in the British versions (M = 3.60, SD = 2.07) than in the Spanish versions (M = 0.67, SD = 1.16). The participants that perceived errors in the text returned to the interest area Sender significantly more often in the Spanish versions (M = 10.33, SD = 4.73) than in the British versions (M = 7.00, SD = 2.35). Furthermore, the participants that perceived errors in the text returned error1 significantly more often in the British version (M = 3.60, SD = 2.30) than in the Spanish version (M = 0.33, SD = 0.58).

4.1.7 Eye tracking combined with other variables

To check whether age and gender had any effect on the looking behaviour of the participants, a few additional repeated measures analyses were conducted.

A repeated measures analysis for number of fixations with interest areas as within subject factor and gender and age as between subject factors showed a significant effect for interest areas ($F(2.13, 74.67) = 12.44$, $p < .001$) as expected, since this effect was found earlier too, but not for age ($F(1, 35) < 1$) or gender ($F(1, 35) < 1$). Furthermore, no interaction effect was found between gender and age

($F(7, 35) = 1.62$, p = .20), nor for interest areas and age ($F(23.47, 74.67) < 1$), interest areas and gender ($F(2.13, 74.67) < 1$), or for interest areas, age and gender ($F(14.94, 74.67) < 1$). This means that age and gender had no significant effects on the number of fixations.

A repeated measures analysis for the number of returned views with interest areas as within subject factor and gender and age as between subject factors showed a significant effect for interest areas ($F(3.22, 112.63) = 7.56$, $p < .05$) as expected, since this effect was found earlier too, but not for age ($F(1, 35) < 1$) or gender ($F(1, 35) < 1$). Furthermore, no interaction effect was found between gender and age ($F(7, 35) = 1.54$, p = .19), nor for interest areas and age ($F(35.40, 112.63) < 1$), interest areas and gender ($F(3.73, 112.63) < 1$), or for interest areas, age and gender ($F(22.53, 112.63) < 1$). This means that age and gender had no significant effects on the number of returned views.

A repeated measures analysis for proportion fixation duration with interest areas as within subject factor and gender and age as between subject factors showed a significant effect for interest areas ($F(1.99, 69.57) = 16.99$, $p < .001$) as expected, since this effect was found earlier too, but not for age ($F(11, 35) = 1.24$, $p = .30$) or gender ($F(1, 35) = 1.15$, $p = .29$). Furthermore, no interaction effect was found between gender and age ($F(7, 35) <1$), nor for interest areas and age ($F(21.87, 69.57) < 1$), interest areas and gender ($F(1.99, 69.57) = 1.13$, $p = .33$), or for interest areas, age and gender ($F(13.91, 69.57) < 1$). This means that age and gender also had no significant effects on proportion fixation duration.

4.2 Behavioural intention

Table 7 shows the participants' behavioural intention of acting on the request in the letter as a function of nationality of the author and errors.

Table 7. The behavioural intention of the participants as a function of the author's nationality and errors (seven-point Likert scale, 1 = low intention, 7 = high intention).

		Behavioural intention		
Nationality	**Errors**	***M***	***SD***	***N***
British	No errors	3.86	.90	14
	Errors	3.92	1.09	16
Spanish	No errors	3.28	1.23	12
	Errors	3.38	1.36	13

A two-way ANOVA on behavioural intention with the factors nationality of the author and errors showed no significant main effects for nationality ($F(1, 51) = 3.18$, $p = .08$) or errors ($F(1, 51) < 1$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) < 1$).

4.3 Attitude towards the e-mail

4.3.1 Comprehensibility

Table 8 shows the comprehensibility of the e-mail as a function of nationality of the author and errors.

Table 8. The comprehensibility of the e-mail as a function of the author's nationality and errors (seven-point Likert scale, 1 = low, 7 = high).

		Comprehensibility		
Nationality	**Errors**	***M***	***SD***	***N***
British	No errors	5.17	.69	14
	Errors	5.26	.98	16
Spanish	No errors	4.72	1.09	12
	Errors	5.28	.68	13

A two-way ANOVA on comprehensibility with the factors nationality of the author and errors showed no significant main effects for nationality ($F(1, 51) < 1$) or errors ($F(1, 51) = 1.88$, $p = .18$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) < 1$).

4.3.2 Attractiveness

Table 9 shows the attractiveness of the e-mail as a function of nationality of the author and errors.

Table 9. The attractiveness of the e-mail as a function of the author's nationality and errors (seven-point Likert scale, 1 = low, 7 = high).

		Attractiveness		
Nationality	**Errors**	***M***	***SD***	***N***
British	No errors	4.83	.68	14
	Errors	4.58	1.17	16
Spanish	No errors	4.26	1.15	12
	Errors	4.24	1.25	13

A two-way ANOVA on attractiveness with the factors nationality of the author and errors showed no significant main effects for nationality ($F(1, 51) = 2.41$, $p = .13$) or errors ($F(1, 51) < 1$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) < 1$).

4.4 Attitude towards the author

4.4.1 Affection

Table 10 shows the affection towards the author as a function of nationality of the author and errors.

Table 10. The affection towards the author as a function of the author's nationality and errors (seven-point Likert scale, 1 = low, 7 = high).

		Affection		
Nationality	**Errors**	***M***	***SD***	***N***
British	No errors	4.84	.62	14
	Errors	4.93	.94	16
Spanish	No errors	4.75	.90	12
	Errors	5.23	.73	13

A two-way ANOVA on attractiveness with the factors nationality of the author and errors showed no significant main effects for nationality ($F(1, 51) < 1$) or errors ($F(1, 51) = 1.69$, $p = .20$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) < 1$).

4.4.2 Competence

Table 11 shows the perceived confidence of the author as a function of nationality of the author and errors.

Table 11. The perceived confidence of the author as a function of the author's nationality and errors (seven-point Likert scale, 1 = low, 7 = high).

		Competence		
Nationality	**Errors**	***M***	***SD***	***N***
British	No errors	4.83	.60	14
	Errors	4.81	.94	16
Spanish	No errors	4.52	.62	12
	Errors	5.01	.68	13

A two-way ANOVA on competence with the factors nationality of the author and errors showed no significant main effects for nationality ($F(1, 51) < 1$) or errors ($F(1, 51) = 1.39$, $p = .24$). Furthermore, no interaction effect was found between nationality and errors ($F(1, 51) = 1.56$, $p = .22$).

5. Conclusion/Discussion Daphne Rietbergen

5.1 Findings and previous research

5.1.1 Reviewing of the research questions

This study has attempted to find the effects of errors and the nationality of the author in a persuasive English e-mail on the non-native readers' viewing behaviour, behavioural intention, attitude towards the e-mail, and author evaluation. Therefore the following research question and nine sub-questions were posed:

RQ: What is the effect of the presence of errors in a native or non-native e-mail on reader's perception of the e-mail and sender?

SQ1: Does the native/ non-native sender of an e-mail attract attention and for how long?

SQ2: What is the effect of the nationality of the sender of an e-mail on non-native readers' behavioural intention, attitude towards the text, and author evaluation?

SQ3: Is there a relation between attention and the effect of the sender of an e-mail on the non-native readers' behavioural intention, attitude towards the text, and author evaluation?

SQ4: Do grammatical errors in an e-mail attract attention, and for how long?

SQ5: What is the effect of grammatical errors in an e-mail on non-native readers' behavioural intention, attitude towards the text, and author evaluation?

SQ6: Is there a relation between attention and the effect of grammatical errors on the non-native readers' behavioural intention, attitude towards the text and author evaluation?

SQ7: Is there an interaction between grammatical errors and nationality of the author in attention?

SQ8: Is there an interaction between grammatical errors and nationality of the sender of an e-mail for the non-native readers' behavioural intention, attitude towards the text, and author evaluation?

SQ9: Is there a relation between the interaction between grammatical errors and nationality of the author in attention and the interaction between grammatical errors and nationality of the author for the non-native readers' behavioural intention, attitude towards the text, and author evaluation?

5.1.2 Attention in e-mails

To see what attracts attention in the e-mail, the interest areas were analysed on the first fixation, the number of fixations, the number of returned views and the proportion fixation duration. Of course, most of the time was spent on the reading of the e-mail in paragraphs. However, for the analyses the paragraphs were not included as interest areas, simply because the other interest areas were much

smaller. For first fixation, no significant results were found, but for number of fixations, number of returned views and the proportion fixation duration it was found that the interest areas To and Sender were looked at most often, returned to most often and had the highest proportion of time spent on them, whereas the interest area Date was looked at least often, returned to least often and had the lowest proportion of time spent on it. This means that both the sender and the recipient attract attention in an e-mail, whereas date attracts the least attention.

The errors in the text did not seem to attract significantly more or less attention than the other interest areas. To see whether the perception of errors in a text had any effect on the viewing behaviour of the participants, analyses were performed with perceived errors (yes or no). It was found that there was an interaction effect between perceived errors and nationality of the sender for fixation areas. These analyses showed that for number of fixations and number of returned views, the participants who had perceived (n = 8) errors in the text fixated on the sender more often and returned to it more often in the version with a Spanish author than in the version with a British author. Furthermore, it was found for number of fixations and number of returned views that the participants who had perceived errors in the text fixated on Error1 more often in the version with the British author than in the version with the Spanish author. Also, it was found that participants who perceived errors in the text returned to the interest area Above E-mail more often in the British version than in the Spanish version. Such an effect could be expected based on the theory, since van Meurs, Planken and Maria (submitted) also found a weak significant effect of perceived errors on the text attractiveness and the attitude towards the author. This might imply that the fixating behaviour of the participant is different when the participants perceived errors, which is shown by these results.

So to answer subquestions 1, 4, and 7:

Based on the results of this study, we could say that the native/non-native sender of an e-mail does attract attention, whereas errors do not attract more attention than other parts of the e-mail. The interaction between nationality of the author and errors only exists for participants who perceived errors in the text. This made participants fixate on the sender more often in the versions with the non-native sender and fixate on the first error more often in the versions of the native writer.

5.1.3 Effects on behavioural intention, attitude towards the e-mail and author evaluation

Other than in the study by Rietbergen (2014) no significant results were found for behavioural intention, attitude towards the e-mail or author evaluation. This may have been due to the task that was given beforehand, which asked the participants to consider, while reading the e-mail, if they wanted to comply with the request in the e-mail. In Rietbergen (2014) the participants were only

asked to read the e-mail carefully without having an extra task. The bias that would have been expected based on the language expectancy theory by Burgoon and Miller (1985) was not evident in this study. It would be expected based on the study by Vignovic and Thompson (2010) that for the versions with errors the native author/text would be rated lower than the non-native author, but there was no proof for that in this current study. This may be due to too few errors in the text, as has been found by Renkema and van Wijk (2003). The errors in this text are not repeated systematically like in Jansen (2010), so this may explain why the errors did not have significant effects on the participants' behavioural intention or attitudes.

So to answer sub-questions 2, 5, and 8:

The results of this study do not show an effect of errors or the nationality of the author on the behavioural intention, attitude towards the text, or author evaluation, nor do they show an interaction.

5.1.4 Relation between attention and behavioural intention, attitude towards the e-mail and author evaluation

Based on the theory it would be expected that the interaction between perceived errors and nationality of the author that was found for attention would be related to the outcomes of the questionnaire on behavioural intention, attitude towards the text and author evaluation (Burgoon and Miller, 1985; Vignovic and Thompson ,2010; Meurs, Planken and Maria, submitted). However, since there were no significant results for the questionnaire, this relationship was not found.

So to answer sub-questions 3, 6, and 9:

No relation has been found between the effects found for attention and the outcome on behavioural intention, attitude towards the text or author evaluation.

5.2 Explanations for results

The main result in this study is that the participants who perceived errors in the text looked at the first error in the British version more often and at the sender in the Spanish version more often. This could be explained because the participants were non-native speakers of English and possibly when they saw that the sender was British they double-checked to see if it was actually an error, whereas when they saw that the sender was Spanish, the participants may have had to remind themselves throughout the text that this writer was indeed a non-native speaker of English. This was also found in a one-way ANOVA comparing both nationalities perceived English proficiency of the authors and the participants showed a significant effect (F (2) = 5.25, p = .007). Both the English proficiency of the British author (M = 5.34, SD = 0.85) and the own English proficiency (M = 5.25, SD = 0.89) were rated

significantly higher than the English proficiency of the Spanish author (*M* = 4.57, *SD* = 1.27). So the participants had a lower perception of the Spanish author's English abilities than of the English author's or their own English abilities. This may have to do with their own non-nativeness, which might mean that they doubted their own abilities when it comes to a native sender.

Furthermore, the fact that no significant results were found for the questionnaire may have been due to the small sample. This could explain the lack of results and maybe this could be tested with further research. Second of all, the main difference of this study with the study by Rietbergen (2014) is that this time the participants were asked to consider whether they wanted to comply with the request in the e-mail before reading the e-mail. The study by Rietbergen (2014) only asked the participants to read the e-mail carefully and then answer the questions in the questionnaire. Moreover, the participants in the current study had had 6 tasks before the e-mail task in which they were asked to locate specific information on a website.

5.3 Implications and further research

5.3.1 Implications

This study has contributed to existing theory by giving insights in what elements of an e-mail attract attention. It was found that, apart from the paragraphs, the Sender and Recipient are the two elements that attract most attention and that Date attracts the least attention. These insights can then be used in business situations, e.g. when sending an important e-mail, it can be chosen to have it signed by a particular person.

Furthermore it was shown that when errors are perceived in the text the participants fixate more often on the non-native author's name than the native author's name. This can also help when choosing a sender for an e-mail.

It does however, contradict findings by van Meurs, Planken and Maria (submitted) and Rietbergen (2014). This could mean that the sample that was used was too small and the variation too large. Therefore, to find out which results reveal the truth, further research may be required.

In terms of ethical implications, this study does not really have any. In theory, a reaction of companies could be not to let non-native speakers of English sign their name at the bottom of an e-mail, but in practice this will prove to be impossible, so that is not a real, relevant ethical implication.

5.3.2 Further research

First of all, a good proposal for further research would be repeating this study with a larger sample. Since many of the analyses on behavioural intention, attitude towards the text and author evaluation

were close to significant, these results may have been due to the small sample and may become significant when a larger sample is used. This will also solidify the conclusions of this study.

These factors may have contributed to the participants not reading the e-mail as carefully as in the study by Rietbergen (2014). To check for these differences it might be interesting to repeat the study by Rietbergen (2014) only with the same task description as in this study. It can also be chosen to repeat the current study only without the question to consider whether they would comply with the request in the e-mail. This could give further insights in whether the motivation for reading an e-mail has an effect on the viewing behaviour, behavioural intention, attitude towards the e-mail and/or author evaluation.

Lastly, this study was only conducted among Dutch participants, but it could be interesting to see if other non-native speakers of English show the same behaviour. Therefore, a recommendation for further research would be to repeat this study with different participants, e.g. German or French participants. It could then also be nice to see if cultural dimensions have an effect on the fixating behaviour and the behavioural intention, attitude towards the text, or author evaluation.

5.4 Limitations and restrictions

This study had a limited sample of 55 participants, with a maximum of 15 participants per condition. Even though in eye tracking studies this is a sufficient sample, a larger sample may give a more accurate representation or even more significant results.

Another limitation is that this study was only conducted with a British name and a Spanish name. This was chosen to represent the native and non-native speaker of English, but just one nationality would not be enough to represent the whole group. Therefore, it would be interesting to check for more nationalities and see if the outcomes are the same.

Furthermore, the participants in this study were all students or graduate from higher educational levels. Therefore, this is not a complete representation of the Dutch society. This target group was chosen however, because in multinational companies, the people dealing with e-mails in other languages are usually higher educated people.

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Appendix A

British

Name	Times English speaking country	Times British	Mean Sureness	Number of Associations
1. Grace Sutherland	5	3	4.2	3
2. Jessica Thompson	5	1	4.4	1
3. Hannah Griffiths	5	3	3.6	0
4. Megan Stephenson	3	0	3.4	0
5. Abigail Matthews	5	2	3.8	1

Spanish

	Times Spanish speaking country	Times Spanish	Mean Sureness	Number of Associations
1. Margarita Moreno	3	1	4.4	2
2. Carmen Hernández	5	3	4.6	2
3. Alejandra García	5	4	3.8	1
4. Josefa Rodríguez	5	2	3.8	1
5. Francisca Martín	2	2	2.6	0

Appendix B

Dutch text the authors used for translation to Spanish:

Hoi [naam],

Wij zijn 6 studenten van de Radboud Universiteit en wij zijn bezig met een onderzoek waarvoor we teksten nodig hebben. Wij willen jou graag vragen om een tekst in het Engels te schrijven volgens de volgende regels:

1. Schrijf een aanhef
2. Stel je voor als student aan de universiteit
3. Vertel dat je een onderzoek aan het doen bent naar eetpatronen
4. Vertel dat er pas een onderzoek is geweest waaruit blijkt dat men steeds ongezonder gaat eten en dat het aantal gevallen van obesitas toeneemt. Zeg dat je dit nader wilt onderzoeken
5. Stel de vraag of ze mee willen werken
6. Geef aan dat er een beloning te winnen valt
7. Zeg dat het onderzoek 5-10 minuten duurt

Heel erg bedankt voor je hulp bij ons onderzoek.

Groetjes,

[onze namen]

Spanish version of the text sent to the authors:

Hola [nombre],

Somos 6 estudiantes de la Universidad Radboud y estamos realizando una investigación y necesitamos unos textos. Queremos preguntarte si puedes escribir un texto en Inglés que contiene las siguientes reglas.

1. Escribe un saludo.
2. Presentate como estudiante de la Universidad.
3. Explica que estas realizando una investigación sobre los patrones de alimentación.
4. Explica que había una investigación que muestra que la alimentación de la gente se esta convirtiendo insalubre y el número de los casos de obesidad se esta aumentando. Explica que queres investigar este tema.
5. Preguntar al receptor si le gustaría ayudar.
6. Indica que puede ganar una recompensa.
7. Explica que la investigación dura 5-10 minutos.

Muchas gracias por ayudarnos en nuestra investigación.

Saludos,
[nuestros nombres]

Appendix C

Texts that were gathered from native Spanish speakers to use for the authentic errors

Text Edith (24) from Mexico

Hello,

My Name is Edith Guevara im studen from Radboud University and im condcuting a research about feeding paterns.

In these days obesity and diabetes are now common all over the world and not only for older people young and even kids are now victims of these kind of diseases and also heart disease have even read in different studies that obesity is related to the appearance of cancer by as will affect the tissues and cells to the point of making them vulnerable to disease.

Thats why Im trying to do this research, as a young adult im concerned for the future of Mexico that is younger people, kids and future mothers. these paterns in a way are changing because others reasons like unemployment and lack of income even bad habits and the influences of another countrys In my opinion Mexico is a changing country we are trying to conserve our culture and with that our costums and habits in eating and cooking but with all this changes and the fact that aour society is also changing our effort is kind of useless. In a society where our priorities are consumed for pleasure rather than necessity, satisfeed aour ego before that aour bodies

Currently, there is a study that delves into these issues and which I would like to analyze to make it part of my own research and invite you if you are interested to collaborate in this study as an important part of society, we have to be interested in these topics and assisted with the correct information develop the necessary measures to make this a more healthy society.

This type of study or research in addition to having recognition has a reward. Considering that this study only take from 5 to 10 minutes to be concluded I will like to thank you for the attention paid to the present and without further concluded with the idea that now is the best time for us to worry about grow as a society to leave firm foundations for the future

I hope to hear from you.
Edith

Text Lola (20) from Argentina

Hi everyone!

My name is Lola and I am a student from the Radboud Univeristy.

I'm in my last year of career and as part of my final thesis, I'm starting a research about current eating patterns.

There are lot of analysis, and it is known that our food habits had severely changed. Apart from being more conscious of the importance of eating healthy, as a society we still have massive issues regarding overweight and obesity.

We are living in an era where everyone expres their thoughts and ideals deliberately. Through Facebook, Twitter, Tumblr or YouTube, we are constantly showing the world who we are and who we would like to be.

Do you think that you have something to say about our eating patters? What it's your opinion about it? I'm interested on hearing other perspectives!

If you are whiling to help just sent an email to eatmyp@nts.com with the subject 'helpwithesis'.

By contributing with this, you could win an interesting reward! It will only take you about 5 to 10 minutes so… if I were you I wouldn't even think about it!

Hoping to hear from you soon!

Lola.

Text Daniel (23) from Mexico

Hi

i´m Daniel Barcenas from Mexico. I´m an student from the University Radboud. I realize an investigation about patrons of supply, this patrons are a guide in which are indicated all the shares of every group of food you can consume in one day.

There are an investigation that show us, that the supply of all the people are unhealthy and the number of the cases of obesity is increasing. I am interested in this topic, then I want to investigate deeper on this topic. So, do you want to help me, in my investigation about patrons of supply? If you take part in this work, you can win a surprise. Do you want?

Its to easy, you just need spend 5 to 10 min.

Text Miguel (23) from Spain

Hello,

My name is Miguel Ángel González and I am studying at Radboud University. I am doing a research project about eating and diet patterns and standards in people. Recently, a new research has stated that nutrition among the people is becoming worse than ever and because of that the number of obesity cases is increasing quickly. My aim is to investigate and do research about this specific subject.

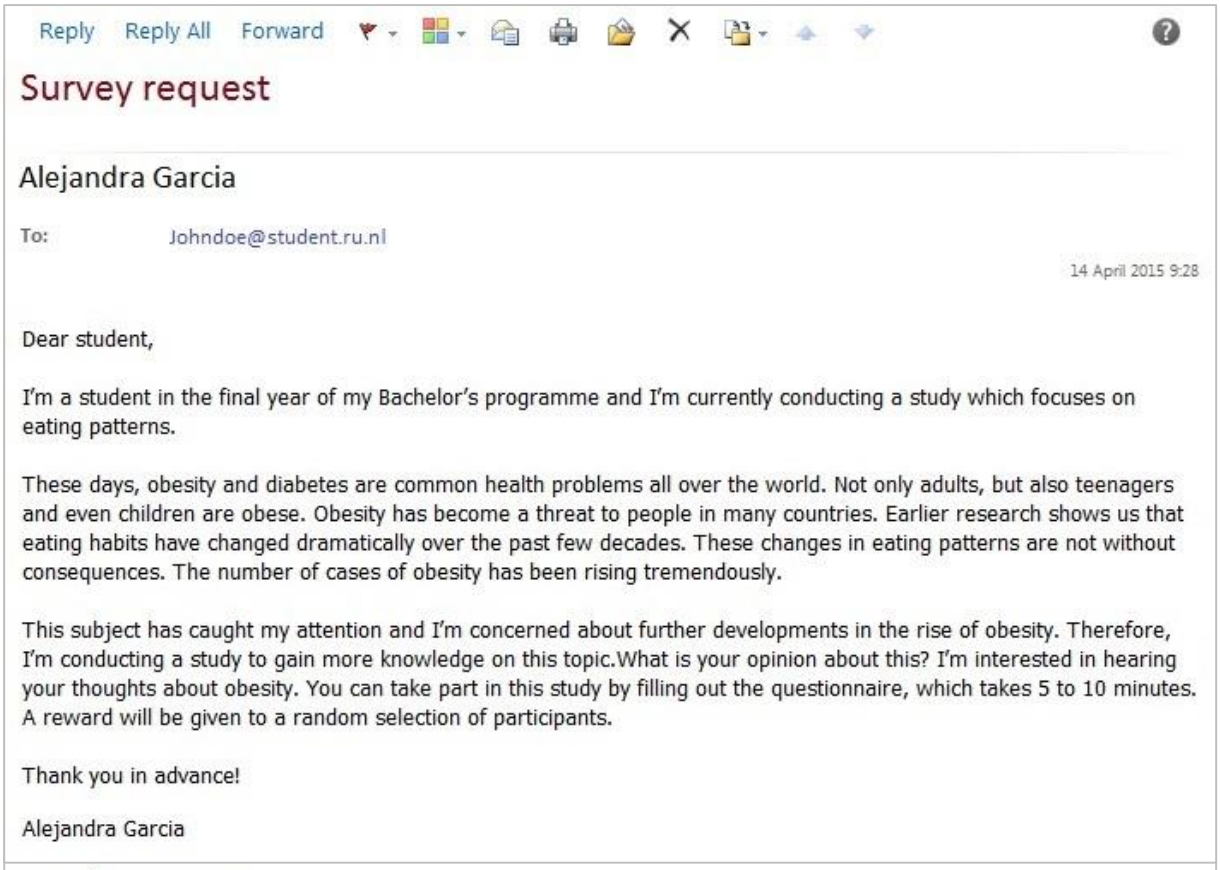
If you are reading this and you are interested, would you like to help me with my research project? If you participate in this investigation you will receive a reward, it only lasts between 5 and 10 minutes.

Thanks for your interest,

Miguel

Appendix D

No errors, Spanish author



Reply Reply All Forward

Survey request

Alejandra Garcia

To: Johndoe@student.ru.nl

14 April 2015 9:28

Dear student,

I'm a student in the final year of my Bachelor's programme and I'm currently conducting a study which focuses on eating patterns.

These days, obesity and diabetes are common health problems all over the world. Not only adults, but also teenagers and even children are obese. Obesity has become a threat to people in many countries. Earlier research shows us that eating habits have changed dramatically over the past few decades. These changes in eating patterns are not without consequences. The number of cases of obesity has been rising tremendously.

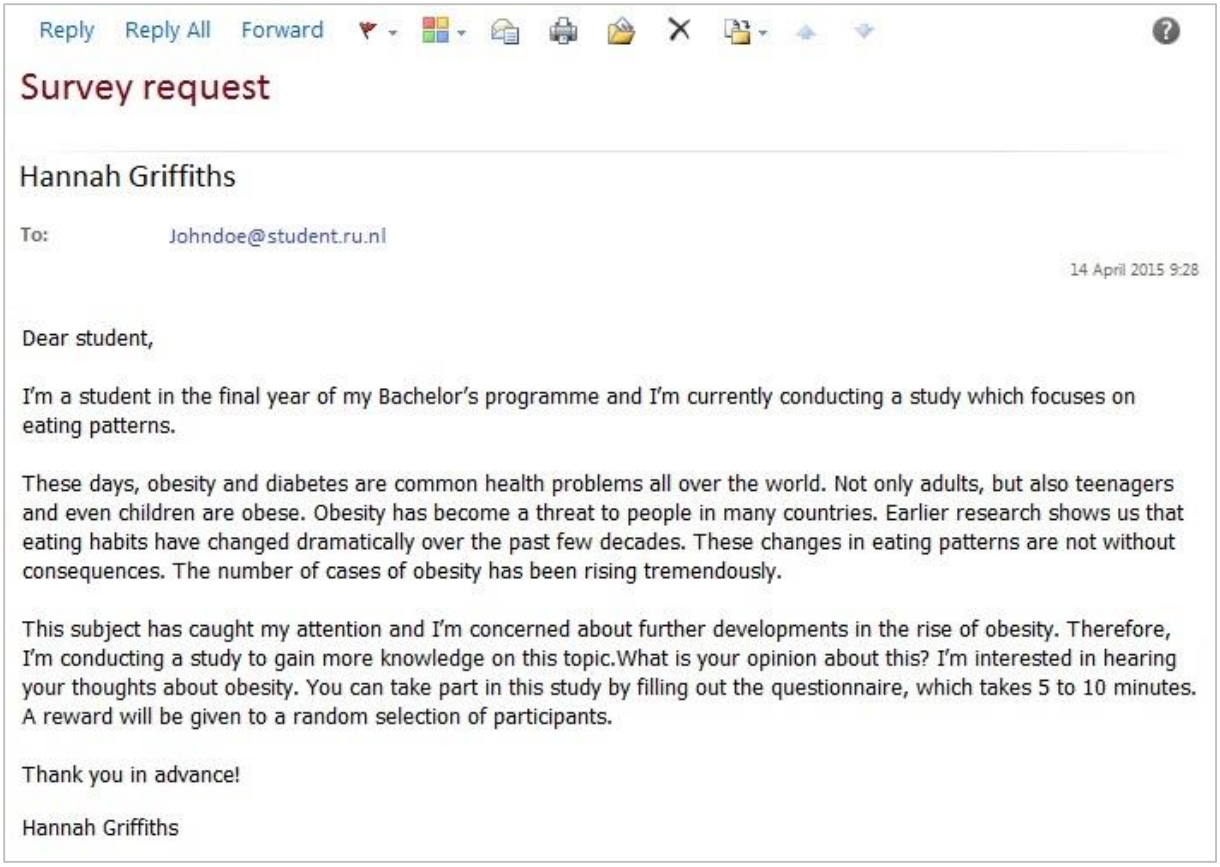
This subject has caught my attention and I'm concerned about further developments in the rise of obesity. Therefore, I'm conducting a study to gain more knowledge on this topic.What is your opinion about this? I'm interested in hearing your thoughts about obesity. You can take part in this study by filling out the questionnaire, which takes 5 to 10 minutes. A reward will be given to a random selection of participants.

Thank you in advance!

Alejandra Garcia

Grammatical errors, Spanish author

No errors, British author



Reply Reply All Forward

Survey request

Hannah Griffiths

To: Johndoe@student.ru.nl

14 April 2015 9:28

Dear student,

I'm a student in the final year of my Bachelor's programme and I'm currently conducting a study which focuses on eating patterns.

These days, obesity and diabetes are common health problems all over the world. Not only adults, but also teenagers and even children are obese. Obesity has become a threat to people in many countries. Earlier research shows us that eating habits have changed dramatically over the past few decades. These changes in eating patterns are not without consequences. The number of cases of obesity has been rising tremendously.

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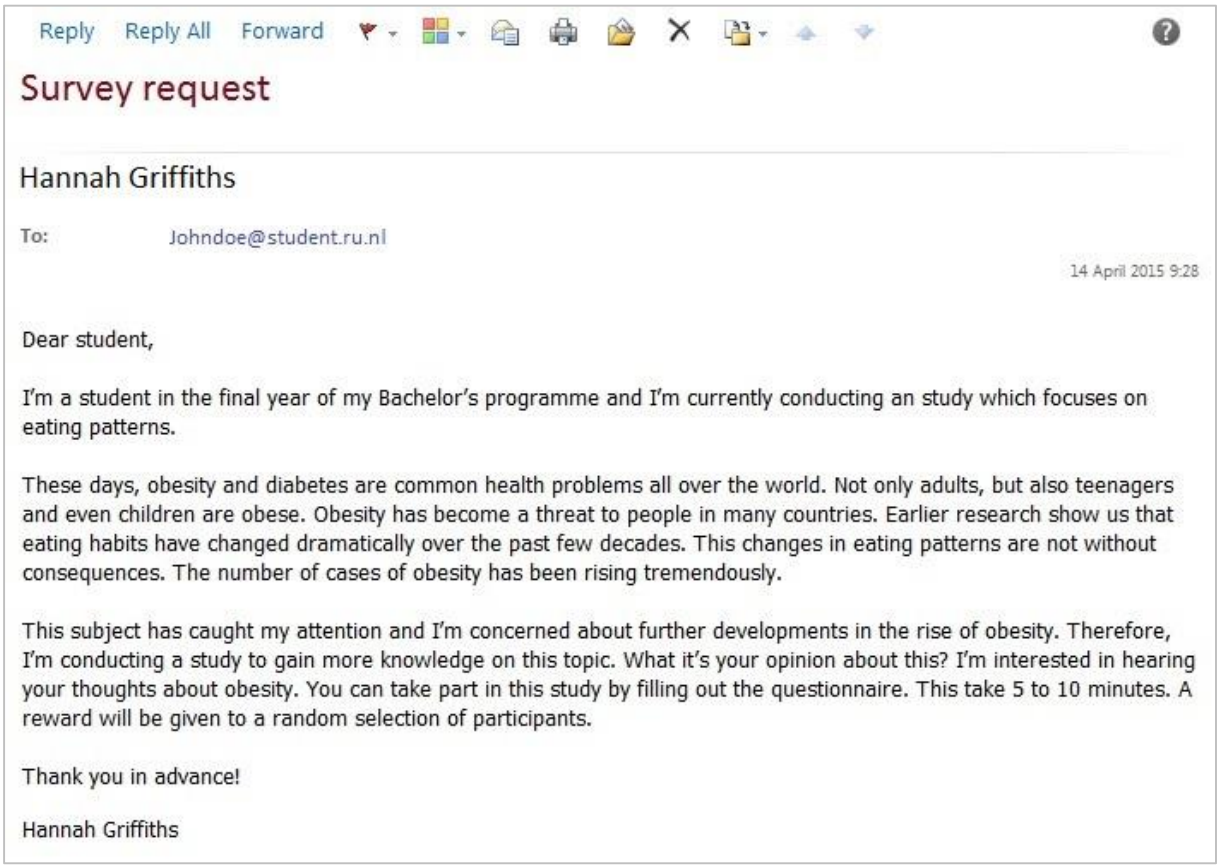
Thank you in advance!

Hannah Griffiths

Grammatical errors, British author



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To: Johndoe@student.ru.nl

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This subject has caught my attention and I'm concerned about further developments in the rise of obesity. Therefore, I'm conducting a study to gain more knowledge on this topic. What it's your opinion about this? I'm interested in hearing your thoughts about obesity. You can take part in this study by filling out the questionnaire. This take 5 to 10 minutes. A reward will be given to a random selection of participants.

Thank you in advance!

Hannah Griffiths

Appendix E

Table E1. Means and Standard Deviations for Number of fixations as a function of the Interest area, Nationality and Errors.

			Number of fixations		
Interest area	**Nationality**	**Errors**	***M***	***SD***	***N***
Above e-mail	British	No errors	2.71	3.60	14
		Errors	2.13	3.01	16
	Spanish	No errors	2.50	3.50	12
		Errors	3.00	4.30	13
	Total	Total	2.56	3.52	55
To	British	No errors	6.36	5.62	14
		Errors	6.56	6.69	16
	Spanish	No errors	7.08	7.17	12
		Errors	5.85	4.39	13
	Total	Total	6.45	5.92	55
Sender	British	No errors	10.14	7.27	14
		Errors	10.19	10.79	16
	Spanish	No errors	12.25	10.38	12
		Errors	9.23	7.45	13
	Total	Total	10.40	8.97	55
Date	British	No errors	0.64	1.65	14
		Errors	0.25	0.58	16
	Spanish	No errors	1.08	1.93	12
		Errors	0.69	1.11	13
	Total	Total	0.64	1.37	55
Error1	British	No errors	1.50	1.51	14
		Errors	1.94	2.74	16
	Spanish	No errors	2.00	2.13	12
		Errors	2.54	2.44	13
	Total	Total	1.98	2.24	55
Error2	British	No errors	2.36	2.13	14
		Errors	3.00	2.94	16
	Spanish	No errors	2.75	3.41	12
		Errors	1.92	1.55	13
	Total	Total	2.53	2.57	55
Error 3	British	No errors	2.21	1.89	14
		Errors	4.63	3.69	16
	Spanish	No errors	2.83	2.86	12
		Errors	2.46	2.11	13
	Total	Total	3.11	2.88	55
Error 4	British	No errors	1.50	1.83	14
		Errors	2.25	2.44	16
	Spanish	No errors	2.08	2.50	12
		Errors	2.00	1.15	13
	Total	Total	1.96	2.03	55
Error 5	British	No errors	1.79	2.97	14
		Errors	2.06	2.86	16
	Spanish	No errors	1.75	2.38	12
		Errors	2.00	1.53	13
	Total	Total	1.91	2.47	55

Table E2. Means and Standard Deviations for Number of fixations as a function of the Interest area, Nationality and Perceived errors.

			Number of fixations		
Interest area	**Nationality**	**Perceived Errors**	***M***	***SD***	***N***
Above e-mail	British	Yes	5.40	3.58	5
		No	1.80	2.90	25
	Spanish	Yes	3.33	5.77	3
		No	2.68	3.72	22
	Total	Total	2.56	3.52	55
To	British	Yes	12.20	9.15	5
		No	5.32	4.79	25
	Spanish	Yes	3.00	3.61	3
		No	6.91	5.94	22
	Total	Total	6.45	5.92	55
Sender	British	Yes	7.00	6.75	5
		No	10.80	9.56	25
	Spanish	Yes	21.33	10.79	3
		No	9.23	7.83	22
	Total	Total	10.40	8.97	55
Date	British	Yes	0.00	0.00	5
		No	0.52	1.30	25
	Spanish	Yes	0.00	0.00	3
		No	1.00	1.60	22
	Total	Total	0.64	1.37	55
Error1	British	Yes	4.20	3.27	5
		No	1.24	1.64	25
	Spanish	Yes	0.33	0.58	3
		No	2.55	2.28	22
	Total	Total	1.98	2.24	55
Error2	British	Yes	3.60	4.83	5
		No	2.52	1.98	25
	Spanish	Yes	1.00	1.73	3
		No	2.50	2.67	22
	Total	Total	2.53	2.57	55
Error 3	British	Yes	5.20	4.09	5
		No	3.16	2.95	25
	Spanish	Yes	2.00	1.73	3
		No	2.73	2.55	22
	Total	Total	3.11	2.88	55
Error 4	British	Yes	2.20	2.05	5
		No	1.84	2.23	25
	Spanish	Yes	2.00	1.00	3
		No	2.05	1.99	22
	Total	Total	1.96	2.03	55
Error 5	British	Yes	1.60	2.07	5
		No	2.00	3.03	25
	Spanish	Yes	1.33	0.58	3
		No	1.95	2.06	22
	Total	Total	1.91	2.47	55

Table E3. Means and Standard Deviations for Proportion fixation duration as a function of the interest area, nationality and errors.

			Proportion fixation duration		
Interest area	**Nationality**	**Errors**	***M***	***SD***	***N***
Above e-mail	British	No errors	.016	.020	14
		Errors	.009	.011	16
	Spanish	No errors	.012	.019	12
		Errors	.014	.019	13
	Total	Total	.013	.017	55
To	British	No errors	.036	.030	14
		Errors	.030	.025	16
	Spanish	No errors	.035	.038	12
		Errors	.030	.022	13
	Total	Total	.032	.028	55
Sender	British	No errors	.062	.044	14
		Errors	.050	.040	16
	Spanish	No errors	.058	.051	12
		Errors	.044	.027	13
	Total	Total	.053	.041	55
Date	British	No errors	.004	.009	14
		Errors	.002	.004	16
	Spanish	No errors	.005	.009	12
		Errors	.004	.006	13
	Total	Total	.003	.007	55
Error1	British	No errors	.008	.008	14
		Errors	.009	.013	16
	Spanish	No errors	.010	.011	12
		Errors	.014	.014	13
	Total	Total	.010	.012	55
Error2	British	No errors	.013	.012	14
		Errors	.016	.014	16
	Spanish	No errors	.012	.014	12
		Errors	.010	.009	13
	Total	Total	.013	.012	55
Error 3	British	No errors	.014	.012	14
		Errors	.024	.018	16
	Spanish	No errors	.012	.011	12
		Errors	.012	.010	13
	Total	Total	.016	.014	55
Error 4	British	No errors	.009	.011	14
		Errors	.012	.012	16
	Spanish	No errors	.009	.011	12
		Errors	.010	.007	13
	Total	Total	.010	.010	55
Error 5	British	No errors	.011	.017	14
		Errors	.014	.020	16
	Spanish	No errors	.007	.009	12
		Errors	.011	.009	13
	Total	Total	.011	.015	55

Table E4. Means and Standard Deviations for the Number of times one returned to a certain interest area as a function of the interest area, nationality and errors.

			Number of returned views		
Interest area	**Nationality**	**Errors**	***M***	***SD***	***N***
Above e-mail	British	No errors	1.29	1.64	14
		Errors	1.50	1.90	16
	Spanish	No errors	1.33	1.50	12
		Errors	1.15	1.41	13
	Total	Total	1.33	1.60	55
To	British	No errors	2.43	1.95	14
		Errors	3.44	3.52	16
	Spanish	No errors	3.50	3.29	12
		Errors	2.92	2.57	13
	Total	Total	3.07	2.87	55
Sender	British	No errors	4.64	3.13	14
		Errors	4.88	4.66	16
	Spanish	No errors	5.67	4.03	12
		Errors	4.38	3.55	13
	Total	Total	4.87	3.83	55
Date	British	No errors	0.43	1.09	14
		Errors	0.19	0.40	16
	Spanish	No errors	0.75	1.22	12
		Errors	0.38	0.65	13
	Total	Total	0.42	0.88	55
Error1	British	No errors	1.14	1.10	14
		Errors	1.75	2.29	16
	Spanish	No errors	1.50	1.45	12
		Errors	2.15	2.08	13
	Total	Total	1.64	1.81	55
Error2	British	No errors	2.07	1.82	14
		Errors	2.44	2.25	16
	Spanish	No errors	2.00	2.41	12
		Errors	1.92	1.55	13
	Total	Total	2.13	1.99	55
Error 3	British	No errors	2.14	1.88	14
		Errors	3.94	2.93	16
	Spanish	No errors	2.75	2.77	12
		Errors	2.00	1.68	13
	Total	Total	2.76	2.46	55
Error 4	British	No errors	1.29	1.44	14
		Errors	2.06	2.29	16
	Spanish	No errors	1.83	2.04	12
		Errors	1.92	1.19	13
	Total	Total	1.78	1.79	55
Error 5	British	No errors	1.64	2.65	14
		Errors	1.94	2.77	16
	Spanish	No errors	1.42	1.83	12
		Errors	2.00	1.53	13
	Total	Total	1.76	2.25	55

Table E5. Means and Standard Deviations for the Number of times one returned to a certain interest area as a function of the interest area, nationality and perceived errors.

			Number of returned views		
Interest area	**Nationality**	**Perceived Errors**	***M***	***SD***	***N***
Above e-mail	British	Yes	3.60	2.07	5
		No	0.96	1.34	25
	Spanish	Yes	0.67	1.16	3
		No	1.32	1.46	22
	Total	Total	1.33	1.60	55
To	British	Yes	6.40	4.93	5
		No	2.28	1.77	25
	Spanish	Yes	2.33	2.52	3
		No	3.32	2.97	22
	Total	Total	3.07	2.89	55
Sender	British	Yes	3.00	2.35	5
		No	5.12	4.15	25
	Spanish	Yes	10.33	4.73	3
		No	4.27	3.07	22
	Total	Total	4.87	3.83	55
Date	British	Yes	0.00	0.00	5
		No	0.36	0.86	25
	Spanish	Yes	0.00	0.00	3
		No	0.64	1.00	22
	Total	Total	0.42	0.88	55
Error1	British	Yes	3.60	2.30	5
		No	1.04	1.43	25
	Spanish	Yes	0.33	0.58	3
		No	2.05	1.81	22
	Total	Total	1.64	1.81	55
Error2	British	Yes	3.00	3.54	5
		No	2.12	1.67	25
	Spanish	Yes	1.00	1.73	3
		No	2.09	2.00	22
	Total	Total	2.13	1.99	55
Error 3	British	Yes	4.40	3.29	5
		No	2.84	2.46	25
	Spanish	Yes	2.00	1.73	3
		No	2.41	2.34	22
	Total	Total	2.76	2.46	55
Error 4	British	Yes	2.00	1.87	5
		No	1.64	2.00	25
	Spanish	Yes	1.67	1.15	3
		No	1.91	1.69	22
	Total	Total	1.78	1.79	55
Error 5	British	Yes	1.40	1.67	5
		No	1.88	2.85	25
	Spanish	Yes	1.33	0.58	3
		No	1.77	1.77	22
	Total	Total	1.76	2.25	55