



# Using Objective Measures of Customer Waiting Time to Correct Self-Reported Patience

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Foreword

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### Abstract

Waiting time for service affects customer satisfaction and loyalty. Models have been developed to manage customer waiting time using impatience (waiting time until abandoning) as guideline, yet, using patience (acceptable waiting time) as guideline could give more control of customer satisfaction. The object of this thesis was to provide groundwork for such a model. The aims of the study were: to verify that an exponential function is the best fit for the difference between objective and perceived waiting time, to compare perception of waiting time between different environments, and to add to the field of studies by formulating an estimation of objective waiting time by correcting perception of waiting time; to subsequently use to correct self-reported patience. Data was retrieved from a larger study, an extensive customer survey, and data from four companies was utilised: two call centres and two grocery stores. The study sample consisted of 1653 customers and the response rate was 65.5%. The measures were: perceived and objective waiting time; and self-reported patience and impatience. The study yielded an example of a formula which can be used to correct perception of waiting time in similar customer environments; however, its validity needs to be studied further.

*Keywords:* customer service, waiting time management, patience, time perception

### Útdráttur

Biðtími eftir þjónustu hefur áhrif á ánægju og tryggð viðskiptavina. Gerð hafa verið líkön sem nota má til þess að stjórna biðtíma viðskiptavina. Þau hafa áður notað óþolinmæði (biðtími að þeim tímapunkti sem fólk gefst upp) sem viðmið þó að það gefi betri stjórn á ánægju viðskiptavina að nota þolinmæði (viðunandi biðtími) sem viðmið. Tilgangur þessarar ritgerðar var undirbúningsvinna að slíku líkani. Markmið ritgerðarinnar voru: að kanna það hvort stigvaxandi eða línulegt samband sé betri lýsing á tengslunum milli raunverulegs og skynjaðs biðtíma, að skoða áhrif umhverfis á skynjun biðtíma og að bæta við fræðilegan gagnagrunn upplýsingum með því að útbúa leiðréttingu á skynjuðum biðtíma, sem nálgun á raunverulegan biðtíma; sem síðan má nýta til að leiðrétta sjálfsmat á þolinmæði. Í ritgerðinni voru notuð gögn frá stærri rannsókn, sem var ýtarleg þjónustukönnun, og notaðist við gögn frá fjórum fyrirtækjum: tveimur símaverum og tveimur matvörubúðum. Úrtakið samanstóð af 1653 viðskiptavinum og svartíðni var 65.5%. Mælingarnar voru: skynjaður og raunverulegur biðtími; og sjálfsmat á þolinmæði og óþolinmæði. Niðurstöður gáfu dæmi um leiðréttingar jöfnur sem nota má til þess að leiðrétta skynjun biðtíma í svipuðum kringumstæðum en þó þarf að rannsaka nánar réttmæti leiðréttingarinnar.

*Lykilhugtök:* þjónusta viðskiptavina, stjórnun biðtíma, þolinmæði, tímaskynjun

### Using Objective Measures of Customer Waiting Time to Correct Self-Reported Patience

In today's fast paced societies nobody likes to be kept waiting. Hence, customer waiting time for service is one of the factors that influence customer satisfaction and loyalty (Bielen & Demoulin, 2007; Bitran, Ferrer, & Oliveira, 2008; Davis & Vollmann, 1990). Customer satisfaction, which refers to perception of service in comparison to what they expected, and loyalty, the probability of a customer trading with the company again, naturally influence service companies' profitability (Davis & Heineke, 1998). Therefore, service companies have increasingly based their marketing strategies on time advantage (Bielen & Demoulin, 2007).

The main incentive for exploring customer waiting time is to create an easily accessible model to manage the number of staff needed in service companies to achieve a certain level of customer satisfaction and, by default, optimise the balance between customer satisfaction and operational efficiency (Bitran et al., 2008; Garnett, Mandelbaum, & Reiman, 2002). In previous models customer patience has usually been measured by the time a customer waits in line before getting impatient and leaving without getting service, this act is called reneging (Choudhury & Medhi, 2010; Garnett et al., 2002; Mandelbaum & Zeltyn, 2013; Roubos & Jouini, 2012). However, exploring what customers deem acceptable could give more control of customer satisfaction. At the same time, even though perception of time has been extensively studied since the human experience became a popular research subject, acceptable waiting time is hard to measure in the same way as objective reneging time (Fraisie, 1984).

Stevens (1967) reported the relations between objective and perceived time as direct; as objective time grows longer, perceived time grows proportionately (as cited in Fraisie, 1984). However, durations under study rarely exceeded one minute, therefore, the linear relation might not be the best model for longer durations. In fact, when durations under study

have exceeded one minute, the relation between objective and perceived waiting time has been found to be best described by an exponential function (Antonides, Verhoef, & Van Aalst, 2002). To clarify, in service companies with waiting times up to five minutes, customers have been shown to overestimate the length of wait up to 40% (Jones & Peppiatt, 1996); if the relation between objective and perceived waiting time is exponential, this overestimation of waiting time would decrease marginally as objective time increases. For instance, the data in Antonides et al.'s study (2002), who experimentally manipulated telephone waiting times in intervals from 10 seconds up to 3 minutes, showed that as objective time increased by 100%, perceived waiting time increased by 84%. These results should be extended to studies of observed waiting times at different service companies.

When modelling customer waiting times it is important to be aware of the factors that might influence customer patience and overestimation of wait durations (Fraisie, 1984). For example, young people have been shown to be more patient than older people (Hwang & Lambert, 2005). Various tangible factors such as monetary costs of waiting, queuing information, lighting and colours have been observed to influence the perception of waiting time (Antonides et al., 2002; Baker & Cameron, 1996). As well as internal factors such as expectation of service levels and type of service provided also affect customer patience and perception of waiting time (Roubos & Jouini, 2012; Tom & Lucey, 1997). Thus, for a single model to correctly represent the relation between objective time and perception, the same or similar environment must be present for each customer. If the environments differ, the influence on perception should be evaluated.

As noted before, previous models have measured customer patience as the time when customers renege (Garnett et al., 2002; Mandelbaum & Zeltyn, 2013; Roubos & Jouini, 2012). In contrast, Hwang and Lambert (2005) recognised that waiting longer than acceptable affects customer satisfaction, whether or not customers eventually get service. The aim of

their study was to gain insight to patience at different service stages at a restaurant (Hwang & Lambert, 2005). The results showed for example that at the greeting stage, participants believed that a mean value of waiting time of 2.6 minutes was acceptable, a mean of 5.6 minutes was deemed unacceptable, without influencing behaviour, and a waiting time of 8.5 minutes very unacceptable and would cause renegeing behaviour (Hwang & Lambert, 2005). It is important to take note that their study was limited for it was based on a limited convenience sample and the participants were not surveyed in the service settings, nor were they necessarily customers of the specific restaurant. However, their study brought a fresh perspective to the field of queue studying which should be examined further - the idea of studying patience instead of impatience.

Building a model for patience could be even more useful in managing service levels, since waiting time that is longer than acceptable affects the customer experience (Davis & Heineke, 1998). The author felt the definition of three classes of waiting times, as was done in Hwang and Lamberts (2005) research, was overly complicated. Instead, two waiting time points were explored and defined: Self-reported patience, the amount of time customers deem acceptable to wait for service; and self-reported impatience, the amount of time customers would wait before renegeing.

The current thesis is an attempt to provide groundwork in way to create a practical model, which includes both patience and impatience. The first aim of this thesis was to extend previous research by verifying that an exponential function is a better fit than a linear model for the difference between objective and perceived waiting time; the second aim was to examine further how different service environments affect customer perception of waiting time; and the last aim was to add to the field of studies by formulating a correction for customer perception of waiting time, which could then be used to correct self-reported patience and impatience, to reflect objective patience and impatience.

## Method

### Participants

This thesis was a part of a larger study sample which consisted of 3609 customers, where 2117 agreed to participate. The population was “customers at retail stores” and “call centres”. Five companies were chosen by convenience and four companies were chosen for the current analysis.

The companies and sample are out listed in Table 1. The main differences between companies were that response rate was higher at the call centres and the mean age was higher at the power company call centre, compared to the other companies. Age ranged from 18 to 91 years.

Table 1

*Number of Participants, Mean Age, Gender and Response Rate in the Four Companies*

	Sample (N)	Age (M)	Female	Response rate
Power company call centre	470	57	48.1%	79.7%
Bank call centre	438	46	50.5%	76.0%
Low-end grocery store	505	46	59.2%	51.8%
High-end grocery store	250	50	56.6%	63.9%
Responses in whole	1653	50	52.6%	65.5%

At the stores, all customers were approached randomly and asked to participate in the study. The only customers excluded were non-Icelandic speakers. At the call centres the customers who called in on the days of the study were called back and offered to participate. Non-Icelandic speakers and those calling on behalf of companies were excluded from the study. At the bank call centre, those who chose a call-back option were also excluded from the study (meaning that they left a message and the bank called them back); on the basis that their decision to leave the queue at a certain time was likely due to the call-back option. The participants at the call centres were divided into two groups: those who reneged and those who received service; which left the customer groups at six in total.

The incentive for taking part in the study was being placed in a lottery where participants had the chance to win a gift certificate at the value of 15.000-30.000 ISK.

### **Measures**

A questionnaire was designed for assessing customer perception of waiting time, satisfaction and patience. The questionnaire was then adjusted to fit each company participating. This process left the call centres with two questionnaires each for the telephone interviews, one for renegeing customers and one for those who received service (for a sample questionnaire, see Appendix A); and the retail stores with a version each for use in the face-to-face interviews (for a sample questionnaire, see Appendix B). During the study, the questionnaires were presented on the web program *Questionpro.com*.

The current thesis utilised five questions from the questionnaires along with measures of objective waiting time in queues. Two referred to the participants' gender and age (see Appendixes A, questions 22 and 23; and B, questions 30 and 31). The other questions all referred to waiting time length: perceived waiting time, self-reported patience and self-reported impatience (see Appendixes A, questions 13, 16 and 17; and B, questions 22, 24 and 25). Self-reported patience was measured by asking how long a customer deemed it acceptable to wait for service and self-reported impatience by asking how long a customer would wait before renegeing.

Measures of objective waiting time were based on review of security cameras at the retail stores where a staff member at the retail store recorded participants waiting times. At the call centres, all waiting times are automatically recorded and kept in a database. Certified staff members at the call centres used the existing database to calculate the waiting times of participants, both for those who received service and for those who renegeed. These measures ensured that the customers were left anonymous to the researchers. The data protection authorities were notified that the study would be using security camera recordings



(notification number: 6709) and the waiting times from call centre databases (notification numbers: S6707 and S6710). Participants were also asked for their permission at the retail stores (see Appendix B, question 32).

### **Procedure**

The study was conducted in the time period from January to April of 2014, between 4 pm and 9 pm in the evening at the call centres and retail stores, and from 12 am to 8 pm at the weekends at the retail stores. All the interviewers went through basic interviewers training prior to the data collection. At the training, importance of random selection at the retail stores and exact reading of questions was emphasised, in addition to the importance of high response rate and how to obtain it. All participants were informed that they were by no means obligated to participate and that information could never be traced back to individuals (see Appendixes A and B, introduction).

At the retail stores, one to three interviewers stood by the store exit and asked customers to participate in the study as they were leaving. Random selection was achieved by always approaching the next available customer after questioning the prior one. Those willing to participate were asked to answer the questionnaire. For those customers who agreed on the usage of security cameras in the study, objective waiting times in queues were recorded.

At the call centres, the customers who called in on the day of study were called back and asked to participate in the study. A randomised list of customers was prepared each day. Interviewers wrote down the exact time that participants called in at the call centre and a staff member at each call centre then matched each questionnaire with the objective waiting time in the data base, using the person's phone number and time of incoming call as reference.

### **Statistical Analysis**

First, ten outliers were removed as their responses were out of context that the author assumed this must have been measurement error, for example, when a participant objective

wait was 5 seconds but perceived wait 10 minutes. Then the variables were explored with descriptive analysis and the relation between objective and perceived waiting time was explored with a paired t-test and with curve fit regression analysis, where a linear and an exponential model fit were compared.

The difference between perceived and objective waiting time, impatience and patience were compared between customer groups separately with one-way ANOVA. A Games-Howell post-hoc test was then used to find between what groups there was difference. The Games-Howell test was chosen since it does not assume equal variances or equal sizes of groups compared (Games, Keselman, & Clinch, 1979). Cohen's  $d$  was calculated to interpret effect sizes when means were compared, since it is favoured when there is a discrepancy in group sizes.

Regression analysis was used to create a formula for the relation between perceived and objective waiting time. The formula was used first on the perception of waiting time, in attempt to predict objective waiting time. To verify that the formula worked as a correction in all customer groups, the correction variables were compared with objective waiting time, using paired t-tests.

Self-reported impatience was corrected in the renegeing customer groups with the same regression formula. The results from this correction were then compared to the objective waiting time, with a paired t-test. This was done to verify that the formula worked as a correction for self-reported impatience.

Lastly, the formula was used to correct self-reported patience, assuming that customers overestimate their patience in the same way that they overestimate waiting time. The resulting correction is an estimation of objective patience.

## **Results**

The distribution of the perceived waiting time and objective waiting time measures were both positively skewed as shown in Figure 1. There were 1203 valid responses to perceived waiting time and 60% of those reported under 120 s wait. Similarly, 1196 valid objective waiting times were recorded and 60% of those were under 106 s. The longest perceived waiting time was 1200 s and the longest objective waiting time was 681 s. The mean perceived waiting time was 44 s higher than objective waiting time. A paired t-test showed that the difference between the means was significant,  $t(1065) = 11.696, p < .001$ , and represented a medium-sized effect,  $d = 0.65$ .

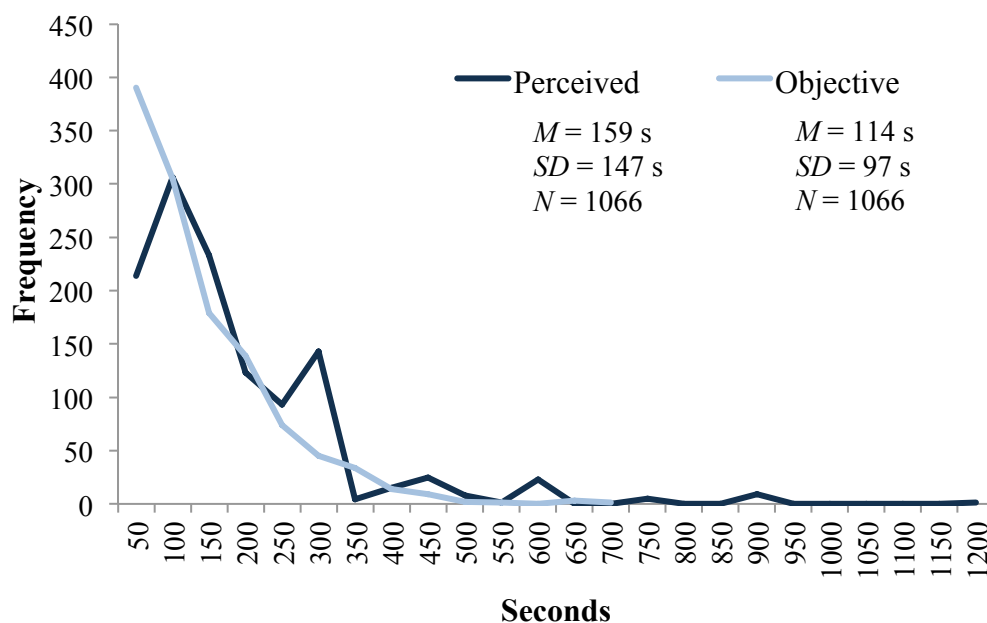


Figure 1. Response distribution of perceived and objective waiting time for service in all four service companies.

Both exponential and linear fit was applied with regression analysis with a curve fit; using objective waiting time as the independent variable and the perceived waiting time as the dependent variable. Both provided a significant fit to the data, however, the linear model had a stronger explanatory power,  $r^2_{\text{Adjusted}} = .30, F(1, 1064) = 457.87, p < .001$ , than the exponential model,  $r^2_{\text{Adjusted}} = .24, F(1, 1064) = 341.12, p < .001$ . The linear model could explain 30% of the variance, whereas, the exponential model could account for 24% of the

variance in the perceived waiting time. The regression coefficient of the linear model was .83, indicating that after the constant of 64 s, as objective waiting time increased by 100%, perceived waiting time increased by 83%,  $b = .83, p < .001$ .

The distribution of the difference between perceived and objective waiting time is shown in Figure 2. In the figure zero represents an accurate estimation of waiting time; below zero represents underestimation and above zero represents overestimation of waiting time. Most participants (62%) overestimated the waiting time, 1% correctly identified the waiting time and 37% of the participants underestimated the waiting time.

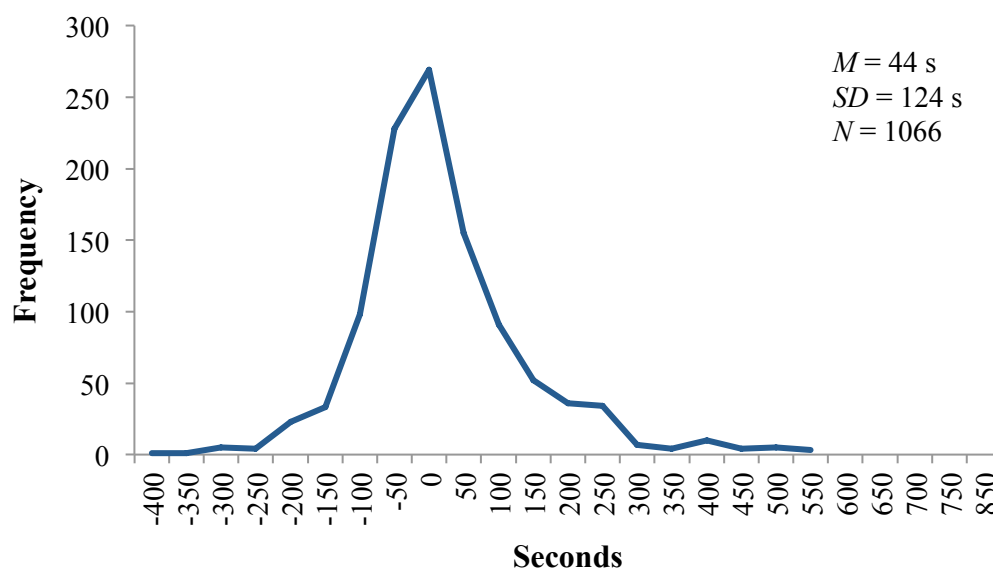


Figure 2. Distribution of the difference between perceived and objective waiting time.

### Comparison of Perception between Customer Groups

The participants were split into six different customer groups: 1) those who got service at the bank call centre and 2) at the power company call centre, 3) those who reneged in the power company call centre and 4) at the bank call centre, 5) customers at the low-end grocery store and 6) customers at the high-end grocery store. The difference in perceived and objective waiting time between the customer groups is displayed in Figure 3. In the boxplot figures, half the values fit within the boxes, the lines splitting the boxes represent the median in the data and the ends of whiskers represent the highest and lowest values. The means and

medians were all above zero, which signifies overestimation of waiting time. Figure 3 also reveals how perception was similar in those groups who got service, where the means ranged 14.7-37.5 s; in contrast with perception in the renegeing groups, where the means were 126 and 145 s. An ANOVA test revealed that there was a significant difference between customer groups,  $F(5, 1060) = 14.48, p < .001$ .

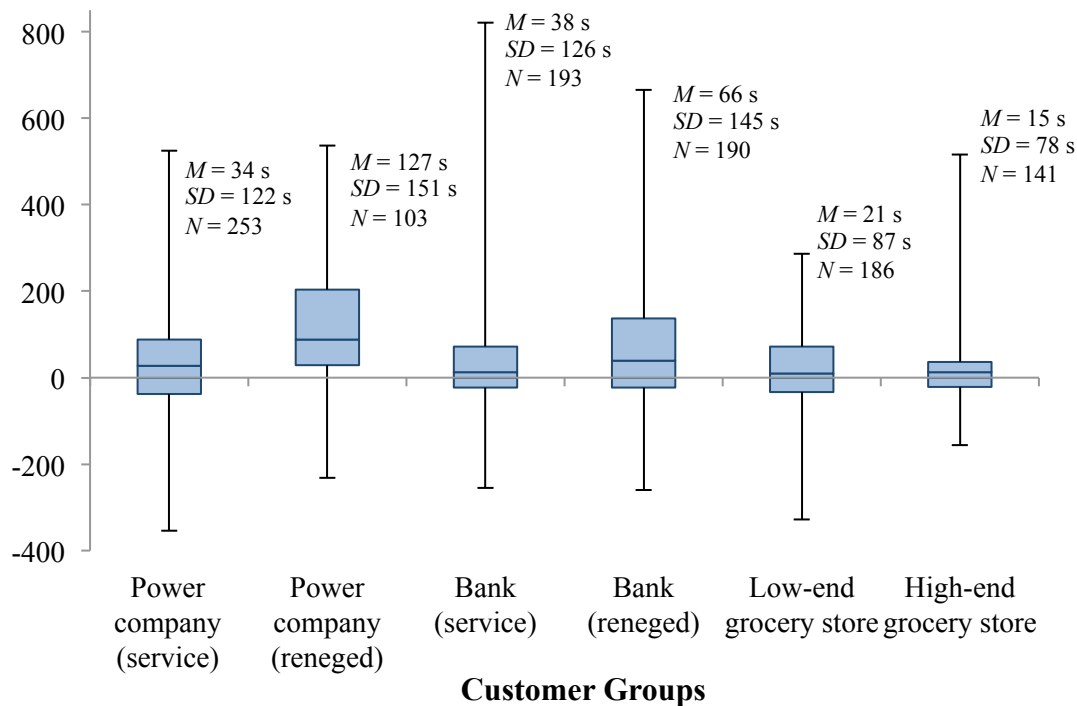


Figure 3. The distribution of the difference between objective and perceived waiting time, compared between customer groups.

Table 2 lays out the results from a Games-Howell post-hoc test which showed that the perception of the participants who renegeed in the two call centres differed significantly from each other ( $p = .013$ ), representing a small-sized effect,  $d = -0.41$ . The perception of those who renegeed at the power company was statistically different from all groups who received service ( $p < .001$ ), representing a medium-sized effect,  $d_{\text{average}} = -0.66$ . Similarly, the perception of those who renegeed at the bank differed significantly from the perceptions of customers of the grocery stores ( $p = .001 - .004$ ), representing a small-sized effect,  $d_{\text{average}} = -0.33$ , in contrast, it differed neither from the perception of participants who got service at the

bank ( $p = .317$ ) nor the power company ( $p = .145$ ). In addition, the difference in perception of participants between the groups who received service was insignificant ( $p = .329 - .990$ ).

Table 2

*Mean Difference in Seconds Between Objective and Perceived Waiting Time, Compared Between Customer Groups*

	Power company (service)	Power company (reneged)	Bank (service)	Bank (reneged)	Low-end store	High- end store
Power company (service)	0	92.4***	3.4	31.8	-13.6	-19.2
Power company (reneged)	92.4***	0	-89.0***	-60.6*	-106.0***	111.6***
Bank (service)	-3.4	89.0***	0	28.4	-17.0	-22.6
Bank (reneged)	-31.8	60.6*	-28.4	0	-45.4**	-51.0**
Low-end store	13.6	106.0***	17.0	45.4**	0	-5.6
High-end store	19.2	111.6***	22.6	51.0**	5.6	0

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### Correction of Perceived Waiting Time

Regression analysis was used to create a linear formula for the relation between perceived and objective waiting time. In contrast to the previous regression analysis, the independent variable was perceived waiting time, since the goal was to predict objective waiting time to know whether the correction formula worked for all customer groups. The resulting model predicted objective waiting time significantly,  $b = .55$ ,  $t(1064) = 21.40$ ,  $p < .001$ , and the following prediction formula was drawn from the analysis: Objective time =  $56.683 + .362 * \text{perceived waiting time}$ .

The data will be split from here on in three groups, based on the Games-Howell results described above: 1) all participants who got service, 2) participants who renege at the power company and, lastly, 3) participants who renege at the bank.

New corrective variables were created for all participants. To verify that the formula could significantly correct the perception of waiting time for all groups, the correction was compared with the objective and perceived waiting time for each group. The comparison for customers who got service is shown in Figure 4. The results from a paired samples t-test revealed that there was a difference between objective and perceived waiting time,  $t(772) = 7.23, p < .001$ , representing a small-sized effect,  $d = -0.25$ . The difference between perceived waiting time and the correction was also significant and represented a small effect size,  $t(898) = -11.06, p < .001, d = -0.35$ . Finally, the correction and objective waiting time did not differ significantly from each other ( $p = .272$ ).

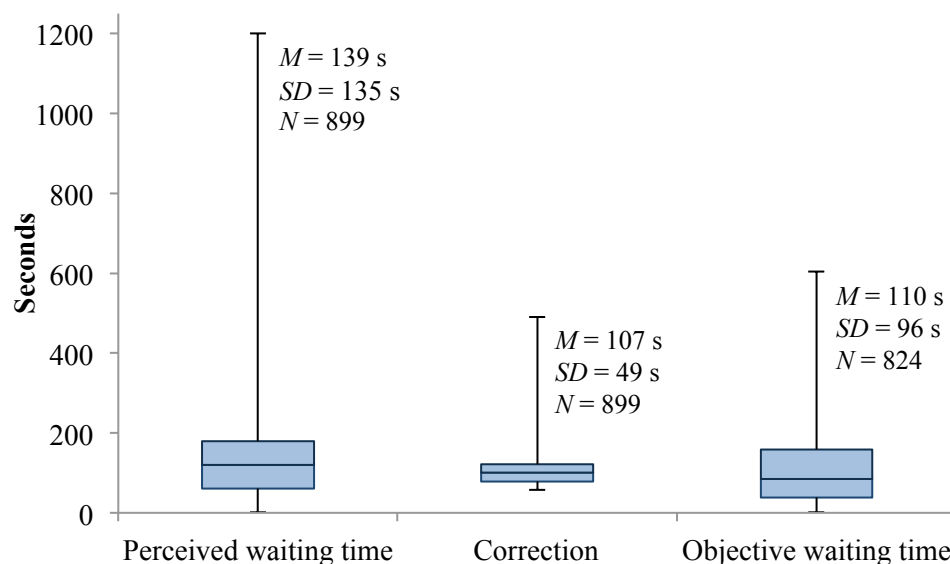


Figure 4. Comparison of the distribution of corrected values, objective and perceived wait of customers who got service.

The same calculations were then made with the group of customers who reneged at the power company, see Figure 5. A paired samples t-test revealed that there was a significant difference between the means of objective and perceived waiting time,  $t(102) = 8.48, p < .001$ , and the effect size was large,  $d = -0.89$ . The difference between perceived waiting time and the correction was also significant,  $t(107) = -8.69, p < .001$ , representing a large effect size,  $d = 0.78$ . The correction and objective waiting time also differed from each other,  $t(102) = 3.12, p = .002$ , representing a small effect size,  $d = 0.32$ .

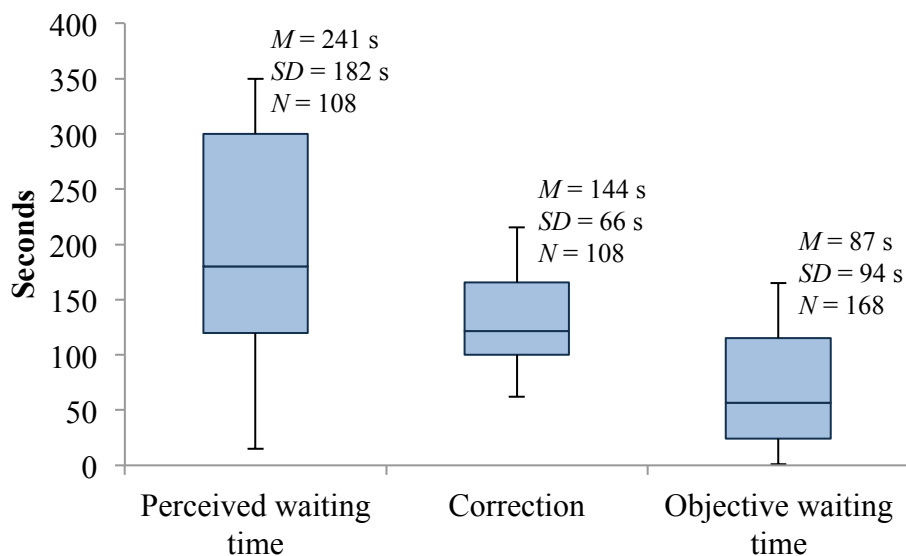


Figure 5. Comparison of the distribution of corrected values, objective and perceived wait of customers who reneged at the power company call centre.

The same calculations were made for the last customer group, the customers who reneged at the bank call centre. The comparison is shown in Figure 6. A paired samples t-test revealed that the difference between objective and perceived waiting time was significant,  $t(189) = 6.27, p < .001$ , representing medium-sized effect,  $d = -0.51$ . The mean between perceived waiting time and the correction was also significant,  $t(195) = -9.58, p < .001$ ,

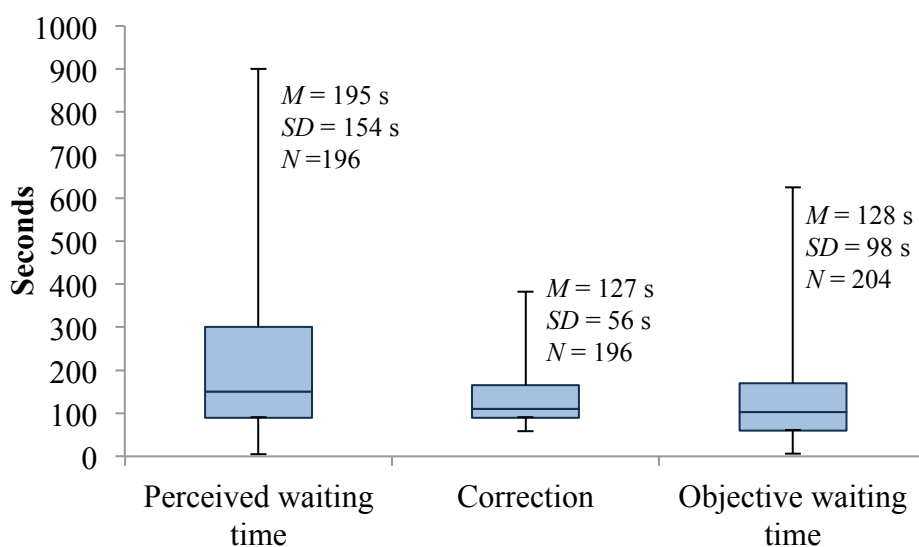


Figure 6. Comparison of the distribution of corrected values, objective and perceived wait of customers who reneged at the bank call centre.



representing a medium-sized effect,  $d = -0.64$ . However, the correction and objective waiting time did not differ significantly from each other ( $p = .684$ ).

### Self-Reported Patience and Impatience

Again, self-reported patience refers to how long customers deem acceptable to wait for service and self-reported impatience to how long customers would wait before renegeing. The distribution for self-reported patience and impatience in the whole sample is shown in Figure 7. Both variables were positively skewed, as were objective and perceived waiting time (see Figure 1). Self-reported patience ranged from 10 to 5400 s, with 90% of the values under 540 s. Self-reported impatience ranged from 3.5 to 7200 s; however, 90% of the values were under 1500 s.

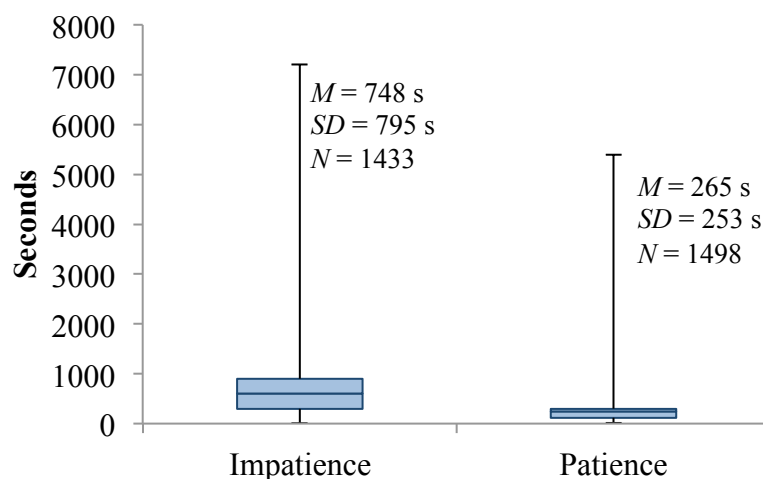


Figure 7. Distribution of self-reported impatience and patience in waiting for service.

Self-reported impatience was compared between customer groups, see Figure 8, revealing a different pattern than was seen in the difference in perception in Figure 3. In this case, the mean impatience at the call centres were similar, ranging from 398.5 s to 495.8 s, however, the means were much higher at the grocery stores, ranging from 998.9 s to 1130.7 s. One-way ANOVA revealed that there was a significant difference between the means of customer groups,  $F(5, 1427) = 55.51, p < .001$ .

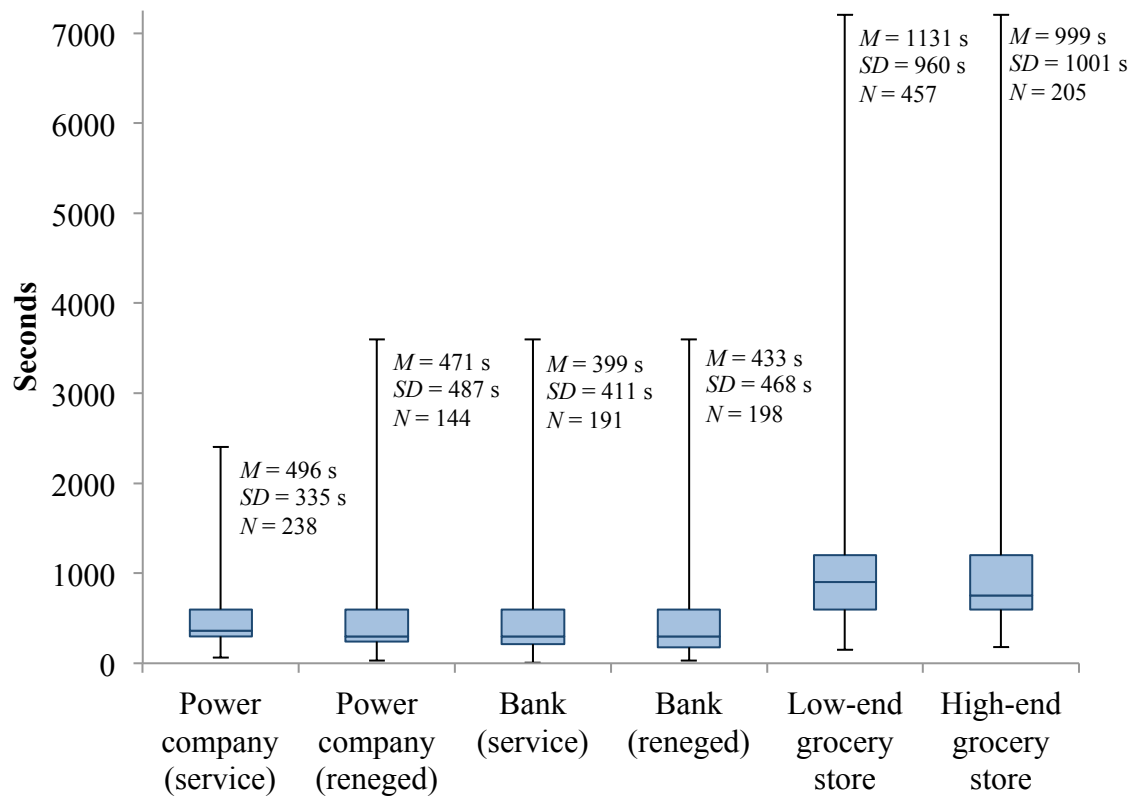


Figure 8. Distribution of self-reported impatience compared between customer groups.

According to a Games-Howell post-hoc test, the only difference in impatience was between the grocery stores and the call centres ( $p < .001$ ), representing a large-sized effect  $d = -0.87$ .

In Figure 9, self-reported patience was compared between customer groups. One-way ANOVA revealed that there was a difference in patience between customer groups,  $F(5, 1492) = 33.91, p < .001$ .

A Games-Howell post-hoc test revealed that mean patience in the grocery stores was significantly different from the call centres ( $p < .001$ ) and represented a medium sized effect,  $d = 0.69$ . But the difference in patience between the two grocery stores was insignificant ( $p = .993$ ). There was a significant difference between those who got service at the bank and those who got service at the power company ( $p = .007$ ) and the effect size was small,  $d = 0.33$ . Lastly, the difference between renegeing groups, as well as between renegeing and service groups at the call centres was insignificant ( $p = .099 - .974$ ).

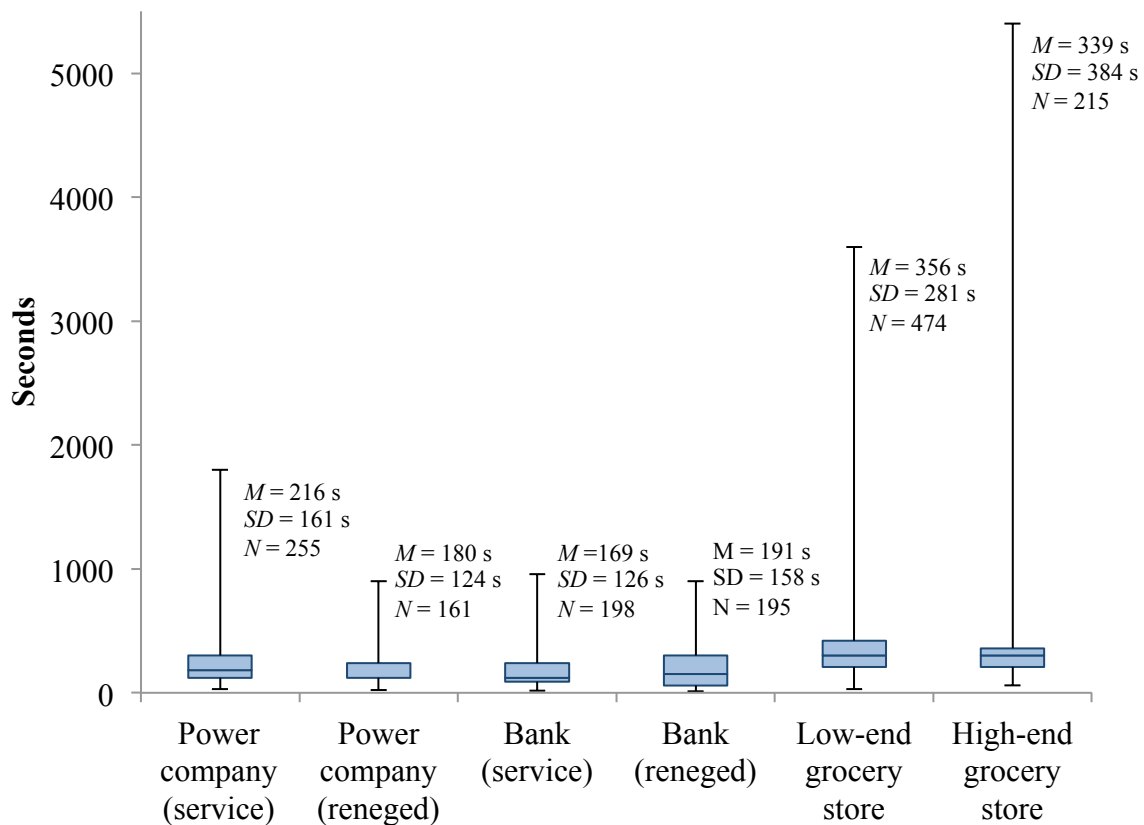


Figure 9. Distribution of self-reported patience compared between customer groups.

### Correcting Self-Reported Impatience

The correction formula was used to correct self-reported impatience, in attempt to find objective impatience values. In the groups who renege at the call centres, the correction of impatience was compared to the objective waiting time and the self-reported impatience values, as shown in Figure 10. Mean self-reported impatience was more than four times higher than the objective waiting time. The mean of the correction variable was closer to the objective waiting time, but still 110 seconds apart. Paired samples t-test showed a significant difference between objective and self-reported impatience and represented a large-sized effect,  $t(334) = 13.38, p < .001, d = -1.20$ . The difference between the corrected variable and self-reported impatience was also significant and represented a large-sized effect,  $t(341) = 13.98, p < .001, d = -0.71$ . Lastly, there was a significant difference between the corrected variable and objective waiting time and the effect size was large,  $t(334) = 10.44, p < .001, d = 0.79$ .

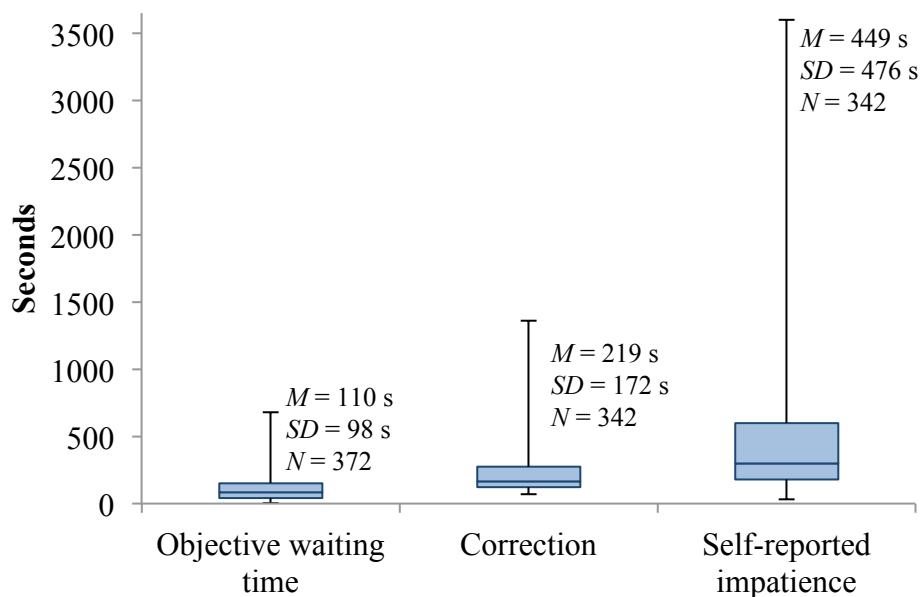


Figure 10. Comparison of the distribution of objective waiting time, corrected values, and self-reported impatience of customers who renege at the call centres.

### Correcting Self-Reported Patience

The same formula was used to correct reported patience and predict objective patience, based on participant's estimation of patience (see figure 11). The data was split into

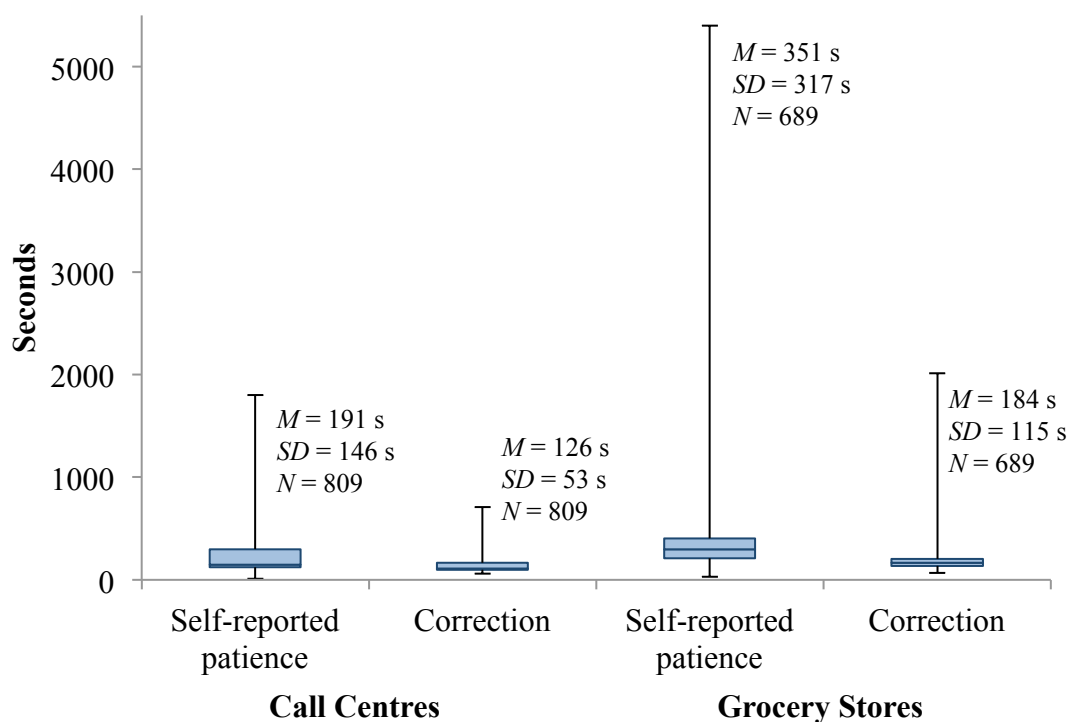


Figure 11. Comparison of the distribution of self-reported patience and corrected values, separately for all customers at the call centres and grocery stores.

two groups according to the comparison of customer groups described in Figures 8 and 9. According to the correction, the mean patience at the call centres was 65 s lower than self-reported patience; and 167 s lower at the grocery stores (see figure 11).

### Discussion

The first aim of the thesis was to verify that an exponential function is a better fit than a linear model for the relation between objective and perceived waiting time (Antonides et al., 2002). The results do not support this hypothesis, even though an exponential function fits the data significantly, a linear function provides stronger explanatory power. Yet, in line with Antonides et al.'s (2002) study, the current data shows that as objective time increased by 100%, perceived time increased by 83%; similarly the ratio was 100% versus 84% in their study (Antonides et al., 2002). In the current study, customers waited up to 11 minutes and most customers overestimated the waiting time. When the overestimation of waiting time ( $M = 44$  s) is divided by the mean objective waiting time ( $M = 111$  s) the outcome is 40%. Similarly, in a previous study where customers waited up to 5 minutes, the overestimation was up to 40% (Jones & Peppiatt, 1996). To summarise, the current results agree with previous studies in some ways, but they do not agree with Antonides et al.'s (2002) results that an exponential function is the best fit for the relation between objective and perceived waiting time.

The second aim of the study was to assess the difference in customer wait perception between different service environments. The results show the difference in wait perception between those customer groups who received service to be insignificant, regardless of the great difference in the nature of the service companies involved. However, the overestimation of waiting time was significantly greater for those customers who reneged, perhaps reflecting lower customer satisfaction. Assuming that customers who reneged and those who got service at the same company did not experience deviating external factors that explain the

difference in perception, the influencing factors must be internal. For instance, the customer group who overestimated waiting time the longest, also belonged to the company which had the highest customer mean age; previous studies have found that older people show more impatience than young people (Hwang & Lambert, 2005). Another example of an internal factor is customer expectation; although customer expectation has been shown to influence the perception of waiting time (Tom & Lucey, 1997), there is not a significant difference between the perception of customers at the low-end and high-end grocery stores. In fact, although the two stores provide quite different service levels, customer patience and impatience for waiting time did not differ significantly.

The third and last aim of the current thesis was to formulate a correction for the perception of waiting time. Since customer groups differed in perception, the correction was tried out for each non-differing group to verify that the same correction formula would work to correct the perception of all customers. It turned out that the correction did not fit one of the customer groups (those who reneged at the power company); the difference in perceived and objective waiting time was too great. Perhaps perception of reneging customers should be corrected with a different formula, on the basis of a perception bias resulting from not receiving service. The correction did not work to significantly predict objective waiting time of the reneging group, based on self-reported impatience. This could be both due to a perception bias, such as explained above, as well as other factors, such as the phrasing of the question (see Appendix B, question 24). This can also be due to the fact that the two measures should not fit together; self-reported impatience refers to impatience in general when calling the call centre, and the other variable is objective waiting time earlier that day.

Lastly, patience was corrected for all participants in attempt to uncover objective patience of waiting customers. Hwang and Lamberts study (2005) measured customer patience at a restaurant and found that at the greeting stage of a restaurant, two and a half min

was deemed acceptable. The results in the current thesis are that mean objective patience at the call centres is around 2 min and three min at the grocery stores.

Since perception does not differ significantly between the companies, the same formula can be used to correct perceived waiting time for the different companies. Yet, renegeing customers seem to need a larger correction. For managers who want to assess their customers objective patience, they could collect data on their customer patience through a customer survey, and then use the formula presented in the current thesis to find an approximation of their customers' objective patience.

However, these results are meant as an extension to current data and need to be studied further. It is hard verify that the correction is a righteous estimation of objective time. To verify it's worth in controlling customer satisfaction the formula would need to be applied within a management model and the results of its use to be measured.

The strengths of the current study were a large sample from a variety of service companies. Also, the retrieval of a number of objective waiting times, which is a relatively rare possibility, especially at retail stores. The limitations were that at the stores, the introduction text had to be changed during the study period; after the change interviewers had to first ask if the customer had to wait inside the store before asking if they would participate. This was due to the fact that, prior to the change, there were too many participants who did not have to wait for service. What limited the current thesis was that self-reported impatience was corrected for all renegeing customers, not only those who hung up because of impatience, and, therefore, the correction should not necessarily be in line with renegeing time. Further research should, therefore, seek to filter their participants on the basis of impatience reasons for the abandonment from queue.

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## Appendix A

## Sample Questionnaire at Call Centres

Good day/good evening. My name is \_\_\_\_ and I am calling on the behalf of \_\_\_\_.

Is it correct that you called \_\_\_\_ today?<sup>1</sup>

I am calling those who called in today to find out how we might better our service. Those who take part have a chance of receiving a gift certificate of the value of 15.000 ISK. Would you mind answering a few questions?<sup>2</sup>

Before we start, note that you are not obligated to answer any question or the questionnaire in whole. Also, that full confidential is provided in treating the data and answers can never be traced back to individuals.<sup>2</sup>

1. Did you take advantage of the option of making the call centre call you back?<sup>3</sup>

- a. Yes
- b. No
- c. Don't know/Refuse to answer

2. May I ask why you hung up at the \_\_\_\_ call centre today?<sup>1</sup>

- a. Waiting time was too long
- b. Too many people in the queue
- c. Didn't have time

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<sup>1</sup> Location of text in interviewing those who reneged.

<sup>2</sup> Location of text in interviewing those who received service.

<sup>3</sup> Questions only asked at the bank call centre.

- d. Didn't have the patience to wait
- e. Figured it out myself
- f. Don't know/Refuse to answer

3. Did you feel that the waiting time was too long, or were too many people in the queue?<sup>1</sup>

- a. Waiting time
- b. Number of people in queue
- c. Both
- d. Don't know/Refuse to answer

I am calling those who called in today to find out how we might better our service. Those who take part have a chance of receiving a gift certificate of the value of 15.000 ISK. Would you mind answering a few questions? <sup>1</sup>

Before we start, note that you are not obligated to answer any question or the questionnaire in whole. Also, that full confidential is provided in treating the data and answers can never be traced back to individuals.<sup>1</sup>

4. Wants to participate?

- a. Yes
- b. No

5. How satisfied or dissatisfied are you with the service at \_\_\_\_\_?

- a. Very satisfied
- b. Rather satisfied

- c. Neither satisfied nor dissatisfied
- d. Rather dissatisfied
- e. Very dissatisfied
- f. Don't know/Refuse to answer

6. If dissatisfied, what is the reason for your dissatisfaction?

- a. Don't know/Refuse to answer
- b. Answer: \_\_\_\_\_

7. How often do you think that you call the call centre on average?

- a. More than weekly
- b. Once a week
- c. Once a month
- d. A few times a year
- e. Twice a year
- f. Once a year
- g. Less than once a year
- h. Don't know/Refuse to answer
- i. Other: \_\_\_\_\_

8. How likely or unlikely are you to recommend \_\_\_\_\_, on a scale from 0 to 10 where zero corresponds to very unlikely and ten corresponds to very likely?

- a. 0
- b. 1
- c. 2

- d. 3
- e. 4
- f. 5
- g. 6
- h. 7
- i. 8
- j. 9
- k. 10
- l. Don't know/Refuse to answer

9. When you called in today, which was your errand?

- a. Don't know/Refuse to answer
- b. Answer: \_\_\_\_\_

10. Of how much or little importance was it, that your errand would be resolved immediately?

- a. Very important
- b. Rather important
- c. Neither important nor unimportant
- d. Rather unimportant
- e. Very unimportant
- f. Don't know/Refuse to answer

11. Now I'm going to mention a few factors regarding service. I'm going to ask you to tell me of how much or little importance the following factors are to you when you call \_\_\_\_.

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Don't know/Refuse to answer
11.1. Good manners						
11.2. Employee knowledge						
11.3. Employee initiative to offer additional services						
11.4. Short waiting time						
11.5. Few waiting in queue <sup>4</sup>						
11.6. Reliability <sup>3</sup>						

12. How short or long do you think that you waited for getting service today?

- a. Very short
- b. Rather short
- c. Neither short nor long
- d. Rather long
- e. Very long
- f. Don't know/Refuse to answer

13. How long do you estimate your wait for service was, in terms of minutes or seconds?

- a. Don't know/Refuse to answer
- b. Seconds/minutes: \_\_\_\_\_

12. How happy or unhappy were you with the time you had to wait before getting service in \_\_\_\_\_, compared to your experience with waiting times at other call centres?

- a. Very happy

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<sup>4</sup> Questions only asked at the power company call centre.

- b. Rather happy
- c. Neither happy nor unhappy
- d. Rather unhappy
- e. Very unhappy
- f. Don't know/Refuse to answer

14. How much did the wait test your patience?

- a. Very much
- b. Rather much
- c. Neither much nor little
- d. Rather little
- e. Very little
- f. Don't know/Refuse to answer

15. Did you feel that the service provider gave you too short, suitable or too long time for the service?<sup>3</sup>

- a. Too short
- b. Suitable
- c. Too long
- d. Don't know/Refuse to answer

16. When you call the \_\_\_\_\_, how long would you wait for service before becoming so impatient that you give up and hang up?

- a. Don't know/Refuse to answer
- b. Minutes: \_\_\_\_\_

17. What do you consider as acceptable waiting time in minutes, when you wait for service at \_\_\_\_\_, that is, how long would you wait patiently?

a. Don't know/Refuse to answer

b. Minutes: \_\_\_\_\_

18. When you call \_\_\_\_\_, how many people would have to be in queue before you so that you would decide not to wait?

a. Don't know/Refuse to answer

b. Number: \_\_\_\_\_

19. What would you deem as an appropriate number of people before you in queue when you wait for service at \_\_\_\_\_?

a. Don't know/Refuse to answer

b. Number: \_\_\_\_\_

20. Do you think that you will call more often, equally often or less often to \_\_\_\_\_ in the future?

a. More often

b. Equally as often

c. Less often

d. Don't know /Refuse to answer

e. Other: \_\_\_\_\_

21. On the scale from 0-10, where zero corresponds to very patient and ten corresponds to very impatient, how patient or impatient do you consider yourself compared to others?



- a. 0
- b. 1
- c. 2
- d. 3
- e. 4
- f. 5
- g. 6
- h. 7
- i. 8
- j. 9
- k. 10
- l. Don't know/Refuse to answer

22. Which year were you born?

- a. Don't know/Refuse to answer
- c. Birth year (YYYY): \_\_\_\_\_

The questionnaire is now over and your name has been placed in the lottery. The lottery results will be out the 15<sup>th</sup> of March and the winners will be contacted. Thank you very much for participating and have a pleasant evening.

23. Participants gender?

- a. Male
- b. Female

## Appendix B

## Sample Questionnaire at Grocery Stores

Good day/good evening. My name is \_\_\_\_ and I am taking part in a service survey at \_\_\_\_\_. I want to ask you, did you have to wait by the register or in the service departments today?

(If no) Thank you and have a nice day.

(If yes) The point of this survey is to find out how we might better our service. Those who take part have a chance of receiving a gift certificate of the value of 30.000 ISK. Would you mind answering a few questions?

Before we start, note that you are not obligated to answer any question or the questionnaire in whole. Also, that full confidential is provided in treating the data and answers can never be traced back to individuals.

1. Wants to participate?

a. Yes

b. No

2. Exact time (f.x. 12:45): \_\_\_\_\_

3. How much did you spend today?

a. Don't know/Refuse to answer

b. Answer: \_\_\_\_\_

4. How satisfied or dissatisfied are you in general with \_\_\_\_\_?

a. Very satisfied

- b. Rather satisfied
- c. Neither satisfied nor dissatisfied
- d. Rather dissatisfied
- e. Very dissatisfied
- f. Don't know/Refuse to answer

5. If dissatisfied, what is the reason for your dissatisfaction?

- a. Don't know/Refuse to answer
- b. Answer: \_\_\_\_\_

6. How often do you think that you shop at \_\_\_\_\_ on average?

- a. More than weekly
- b. Once a week
- c. Once a month
- d. Every other month
- e. A few times a year
- f. Twice a year
- g. Once a year
- h. Less than once a year
- i. Don't know/Refuse to answer
- j. Other: \_\_\_\_\_

7. How likely or unlikely are you to recommend \_\_\_\_\_, on a scale from 0 to 10 where zero corresponds to very unlikely and ten corresponds to very likely?

- a. 0

- b. 1
- c. 2
- d. 3
- e. 4
- f. 5
- g. 6
- h. 7
- i. 8
- j. 9
- k. 10
- l. Don't know/Refuse to answer

8. Did you need service at the service department?<sup>5</sup>

- a. Yes
- b. No
- c. Don't know/Refuse to answer

9. Did you need to wait for service at the service department?<sup>5</sup>

- a. Yes, waited and got service
- b. Yes, waited and did not get service
- c. No, didn't wait but got service
- d. No, didn't wait and didn't get service
- e. Don't know/Refuse to answer

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<sup>5</sup> Question only asked at the high-end grocery store which had a service department.

10. How many customers stood before you in line when you started to wait, excluding those who were already being serviced?<sup>5</sup>

- a. Don't know/Refuse to answer
- b. Number of customers: \_\_\_\_\_

11. How long do you estimate your wait for service was, in terms of minutes or seconds?<sup>5</sup>

- a. Don't know/Refuse to answer
- b. Did not go in line/Did not wait
- c. Seconds/Minutes: \_\_\_\_\_

12. How much did the wait test your patience?<sup>5</sup>

- a. Very much
- b. Rather much
- c. Neither much nor little
- d. Rather little
- e. Very little
- f. Don't know/ Refuse to answer

13. Did you feel that the service provider gave you too short, suitable or too long time for the service?<sup>5</sup>

- a. Too short
- b. Suitable
- c. Too long
- d. Don't know/Refuse to answer

14. When you wait for service at the service department of \_\_\_\_\_, how long would you wait for service before becoming so impatient that you give up and leave the queue?<sup>5</sup>

a. Don't know/Refuse to answer

b. Minutes: \_\_\_\_\_

15. What do you consider as acceptable waiting time in minutes, when you wait for service at the service department, that is, how long would you wait patiently?<sup>5</sup>

a. Don't know/Refuse to answer

b. Minutes: \_\_\_\_\_

16. When you wait for service at the service department, how many people would have to be in queue before you so that you would decide not to wait?<sup>5</sup>

a. Don't know/Refuse to answer

b. Number: \_\_\_\_\_

17. What would you deem as an appropriate number of people before you in queue when you wait for service at the service department?<sup>5</sup>

a. Don't know/Refuse to answer

b. Number: \_\_\_\_\_

18. Now I'm going to mention a few factors regarding service. I'm going to ask you to tell me of how much or little importance the following factors are to you when you call \_\_\_\_\_.

	Very important	Rather important	Neither important nor unimportant	Rather unimportant	Very unimportant	Don't know/Refuse to answer
18.1. Good manners						
18.2. Sufficient number of registers open						

18.3. Short waiting time						
18.4. Few waiting in queue						

19. Did the customer shop anything? (Tick if obvious)

- a. Yes
- b. No
- c. Don't know/Refuse to answer

20. Did you need to wait for service at the register?

- a. Yes
- b. No
- c. Don't know/Refuse to answer

21. How many customers stood before you in line when you started to wait at the register, excluding those who were already being serviced?

- a. Don't know/Refuse to answer
- b. Number of customers: \_\_\_\_\_

22. How long do you estimate your wait for service at the register was, in terms of minutes or seconds?

- a. Don't know/Refuse to answer
- b. Did not go in line/Did not wait
- c. Seconds/Minutes: \_\_\_\_\_

23. How much did the wait test your patience?

- a. Very much
- b. Rather much
- c. Neither much nor little
- d. Rather little
- e. Very little
- f. Don't know/ Refuse to answer

24. When you wait in line at the register in \_\_\_\_\_, in how many minutes would you become so impatient that you give up waiting and walk away?

- a. Don't know/Refuse to answer
- b. Minutes: \_\_\_\_\_

25. What do you consider as acceptable waiting time in minutes, when you wait for service at the register, that is, how long would you wait patiently?

- a. Don't know/Refuse to answer
- b. Minutes: \_\_\_\_\_

26. When you wait for service at the register, how many people would have to be in queue before you so that you would decide not to wait?

- a. Don't know/Refuse to answer
- b. Number: \_\_\_\_\_

27. What would you deem as an appropriate number of people before you in queue when you wait for service at the register?



a. Don't know/Refuse to answer

b. Number: \_\_\_\_\_

28. Do you think that you will shop more often, equally often or less often at \_\_\_\_\_ in the future?

a. More often

b. Equally as often

c. Less often

d. Don't know/Refuse to answer

e. Other: \_\_\_\_\_

29. On the scale from 0-10, where zero corresponds to very patient and ten corresponds to very impatient, how patient or impatient do you consider yourself compared to others?

a. 0

b. 1

c. 2

d. 3

e. 4

f. 5

g. 6

h. 7

i. 8

j. 9

k. 10

l. Don't know/Refuse to answer

30. Participants gender?

- a. Male
- b. Female

31. Which year were you born?

- a. Don't know/Refuse to answer
- b. Birth year (YYYY): \_\_\_\_\_

32. Finally, I want to point out that a part of the survey is estimating how long customers wait in queues in the store. The store's staff member could review the security camera recordings in the sole purpose of observing actual waiting time and number of customers. Do we have your permission to do so?

- a. Yes
- b. No

Thank you very much and have a good day.