



Time Perception, Acceptable Wait, Patience, and Reneging Behavior in Tele-Queues

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Foreword

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Abstract

In contemporary society, customers often have to wait for service. If the wait becomes too long, customers lose patience and eventually decide to abandon the queue. This behavior has been called *reneging*. Models and theories have been proposed in an attempt to understand and avoid reneging. An important variable in these models is *patience*, the amount of time customers are willing to wait before reneging. Until now, this variable has been only estimated, as it is difficult to observe. The current study attempted to measure patience of 908 customers in two different call centers, using questionnaires, along with assessing actual, perceived, and acceptable waiting time to compare between customers who received service and those who reneged. Results showed that participants overestimated their waiting time. Furthermore, reported patience was higher than actual waiting time in both call centers, indicating that self-report of patience might reflect on how long customers are willing to wait before reneging in optimal situations. Acceptable waiting time varied depending on whether participants reneged or received service and which call center they dialed into. Results suggested that queuing models should consider acceptable waiting time and patience.

Keywords: reneging, waiting time, time perception, patience, acceptable wait

Abstract - Icelandic

Í nútímasamfélagi þurfa viðskiptavinir oft að bíða í röð eftir þjónustu. Þeir geta orðið óþreyjufullir ef biðin er löng og ákveðið að fara úr röðinni. Þessi hegðun kallast *reneging*. Ýmis líkön og kenningar hafa verið settar fram til að skilja reneging hegðun og koma í veg fyrir hana. Mikilvæg breyta í þessum líkönum kallast *þolinmæði*, það er, hversu lengi viðskiptavinir eru tilbúnir til að bíða áður en þeir fara úr röð. Þar sem erfitt er að meta þolinmæði með athugun hefur hún ekki áður verið mæld. Þessi rannsókn gerði tilraun til þess að mæla þolinmæði með því að leggja spurningalista fyrir 908 viðskiptavinum tveggja þjónustuvera, ásamt því að mæla raunverulegan, skynjaðan og viðunandi biðtíma þeirra og bera saman viðskiptavinum sem fengu þjónustu og þá sem lögðu á. Niðurstöður sýndu að þátttakendur ofmátu biðtíma sinn. Jafnframt var sjálfmetin þolinmæði hærri en raunverulegur biðtími fram að *reneging*, sem gefur til kynna að sjálfmetin þolinmæði vísi til þess hversu lengi þátttakendur eru tilbúnir til að bíða undir ákjósanlegum kringumstæðum. Viðunandi biðtími var mislangur eftir því í hvoru þjónustuverinu þátttakendur biðu og hvort þeir fengu þjónustu eða lögðu á. Niðurstöður bentu til þess að biðraðalíkön ættu að taka viðunandi biðtíma og þolinmæði til greina.

Lykilhugtök: reneging hegðun, biðtími, tímaskynjun, þolinmæði, viðunandi biðtími

Time Perception, Acceptable Wait, Patience, and Reneging Behavior in Tele-Queues

Waiting for service is a part of everyday life in modern society. Whether customers are checking out at the grocery store, buying tickets at the cinema or calling their phone company for technical help, they usually have to wait for service. The longer customers wait in line, the more impatient they become and at some point decide to abandon the queue. This behavior is called *reneging*. Reneging can negatively impact customer satisfaction, which can be a problem for companies that provide service, as customer satisfaction and profits are closely linked (Bitran, Ferrer, & Rocha e Oliveira, 2008). Because of this, different types of models have been proposed to further understand reneging and avoid it. These models focus either on visible queues or invisible queues. Visible queues are queues where the other people waiting and number of service providers are visible. Invisible queues are queues where customers have no idea of how many people are ahead of them or behind them or how many service providers are working. This type of queue can be found in call centers, for example.

Time is an important factor in reneging from queues. It is an abstract concept, that organisms do not experience directly, but rather infer about based on their perception of the external world. Research on the passage of time in queues has focused on comparing subjective time (perceived) and objective time (actual) (Pande & Pati, 2010). Actual time refers to mathematical time that can be measured by clocks, watches, and a chronometer. Perceived time differs from one individual to another and can be perceived as longer, shorter or equal in comparison to what it actually is. A field study conducted by Tom and Lucey (1997) indicated a positive relation between actual waiting time and perceived waiting time, although it was not specified how strong this relation was. Furthermore, findings suggested that perceived waiting time is comparable to or greater than actual waiting time. A study by Antonides, Verhoef, and Van Aalst (2002) reported similar results with experimental conditions. Their study indicated that the over-estimation is around 100% for waiting times under 30 seconds but proportionately smaller for longer waits.

Models and theories on queues take passage of time into account when controlling for reneging behavior. However, they do not agree on whether the timeframe customers have regarding how long they are willing to wait before reneging, is chosen upon arrival (Mandelbaum & Momčilović, 2012; Mandelbaum & Shimkin, 2000; Mandelbaum & Zeltyn, 2013) or customers are continuously reevaluating whether they want to renege or wait further for service (Aksin, Ata, Emadi, & Su, 2013; Janakiraman, Meyer, & Hoch, 2011). These models and theories are not all built on empirical studies on reneging behavior and those that do, collect data from observations and document analysis. Without asking customers directly about their perceptions of the wait, theorists infer about their perceptions of waiting time and their decisions about when to renege.

Research by Mandelbaum and Zeltyn (2013), where customers were not able to receive service due to technical impairment, showed that on average, customers reneged after waiting five minutes. According to their results, time before abandoning varied and some customers waited up to 30 minutes before reneging. Even though it is not measured directly, the results of Mandelbaum and Zeltyn's study (2013) can give some idea of how long customers are willing to wait before reneging, which is a variable that has been referred to as *patience* (Brown et al., 2005; Mandelbaum & Momčilović, 2012; Mandelbaum & Shimkin, 2000). Patience is an important variable in queuing theories and is often only an estimated distribution (not measured), since it is difficult to observe. In the current study, the possibility of measuring patience with a self-report questionnaire was addressed. Self-report questionnaires have often been used in studies on behavior, because research show that attitudes and intentions towards a behavior reflect on actual behavior, especially if they correspond to the target behavior (Ajzen & Fishbein, 1977; Sweeny, Shepperd, & Howell, 2012). Using questionnaires does though have its flaws and bias (Donaldson & Grant-Vallone, 2002). A study by Epley and Dunning (2006) found that self-predictions of behavior

were overestimated. Furthermore, a meta-synthesis by Zell & Krizan (2014) of 22 meta-analyses from various domains on self-reports of ability revealed that the overall correlation between self-reported ability and objective performance was moderate. The correlations did vary, ranging from .09 to .63, depending on what ability was measured. It appears that if questionnaires are to be used for measuring how long customers are willing to wait before reneging, some deviation from reality might be expected.

Studies have used self-report questionnaires to measure acceptable waiting time (Antonides et al., 2002; Houston, Bettencourt, & Wenger, 1998; Hwang & Lambert, 2006). Acceptable waiting time refers to how long customers are satisfied with waiting and are content with the waiting time (Hwang & Lambert, 2006). In a study by Houston et al. (1998) customers of a bank were asked about their perception of waiting time and how acceptable their waiting time was. Results indicated a negative relation between acceptability of the wait and the duration of the wait. In other words, a short waiting time was more acceptable than a long waiting time. Hwang and Lambert (2006) referred to longer waiting time, when customers would be annoyed enough to leave the service facility, as an unsatisfactory wait, which corresponds to patience in queuing models. This notion supports the argument that patience in queues could be measured with a self-report questionnaire.

Previous studies on time in relation to queues have looked at perceived time, actual time and acceptable waiting time. Patience, how long customers are willing to wait before abandoning a queue, has not been measured, even though queuing models acknowledge its existence (Brown et al., 2005; Mandelbaum & Shimkin, 2000). Behaviors (Epley & Dunning, 2006), abilities (Zell & Krizan, 2014), perceived waiting time (Antonides et al., 2002; Tom & Lucey, 1997) and acceptable waiting time (Antonides et al., 2002; Houston et al., 1998; Hwang & Lambert, 2006) have been assessed with a self-report questionnaire, which suggests that patience can be measured using that method. The aim of the current study was

to assess reneging behavior in tele-queues by comparing actual waiting time, perceived waiting time, acceptable waiting time and reported patience between those who reneged and those who received service in two call centers. An attempt to measure patience with a self-report questionnaire was made by asking how long customers believe they are willing to wait before reneging. As studies show that people overestimate their abilities (Zell & Krizan, 2014) and behavior (Epley & Dunning, 2006), actual waiting time before reneging was hypothesized to be shorter than reported patience. Furthermore, it was hypothesized that customers perceive their waiting time to be longer than it actually was. Acceptable waiting time, which has not been given much attention in queuing models, was assessed and compared with reported patience.

Method

Participants

The current study was a part of a larger research with total of 2117 participants. Participants in the larger research were recruited in several retail stores and call centers. The sample used in the current study consisted of 906 participants who were recruited from two call centers, a bank and a power company. The response rate was 77.9%; 76.0% at the bank (438 participants, 217 received service and 221 reneged) and 79.7% at the power company (470 participants, 291 received service and 179 reneged). At the bank, participants were 50.6% female, aged 18-88 years, with the mean age of 46 years ($SD = 16.8$). At the power company, participants were 47.9% female, aged 21-91 years, with the mean age of 57 years ($SD = 16.7$). Customers who phoned the call centers were called back later the same day and offered to participate in the study. In order to participate in the study, customers had to speak Icelandic fluently. Participants from the bank who used a call-back option (where they leave a message with their name and phone number and a staff member of the call center contacts them later) were excluded from the study because for those customers, that option (not the

waiting time) was likely to influence the decision to renege. Customers who were calling on behalf of a company were also excluded from the study.

Measures

Data were collected using questionnaires. The online survey software QuestionPro was used to collect and preserve all answers. Two separate questionnaires were designed for each call center, one for participants who received service (21 questions) and one for those who reneged (20 questions). Both questionnaires included questions regarding satisfaction with the call center, waiting times and impatience (see Appendix). The questionnaire for those who received service had additional questions about quality of the service and the one for those who reneged had additional questions about why they abandoned the queue. The current study focused on questions concerning four types of waiting time; perceived waiting time, actual waiting time, acceptable waiting time and reported patience. Perceived waiting time was assessed with a question regarding how long participants assumed they waited before receiving service or reneging. Information about actual waiting time was collected from data about customers of each call center and was matched to each participant in the study. Actual waiting time began after customers had contacted an answering machine and entered the call center queue. Acceptable waiting time was assessed with a question regarding how long participants believe they are satisfied with waiting. Reported patience was assessed with a question about how long participants believe they are willing to wait before becoming frustrated enough to leave a queue.

In order to receive accurate answers and promote consistency between interviewers, all interviewers had to attend an interviewer-training program. A professional talked about how to communicate with potential participants in order to get customers to participate, how to keep a high response rate and the importance of reading each question as it is written in the

questionnaire. After reviewing the basics of how to be an interviewer, interviewers were introduced to the two questionnaires.

Procedure

Before starting data collection, the study was reported to the Icelandic Data Protection Authority (no: S6710 and no: S6707) and interviewers participated in the interviewer-training program. Data collection was done between 17:00 and 21:00 on weekdays, from January to March 2014. Customers who contacted the call center earlier each day were called back and asked to participate in the study. Participants at the power company were told that by participating, they had a chance to win a 15,000 ISK (about 100 EUR) gift certificate at a local restaurant and participants at the bank had a chance to win theater tickets for two. Furthermore, they were all informed that they were not required to answer all of the questions, they could end their participation whenever they wanted, and were promised a full confidentiality. After completing the questionnaire, participants were thanked for their participation and reminded that they would be contacted if they won the gift certificate or theater tickets. Interviewers recorded participants' phone number and the exact time they phoned the call center earlier that day, which made it possible to locate them in data provided by the call centers, in order to obtain their actual waiting time.

Analysis

Statistical analyses were made using SPSS. Variation in the four waiting times in each call center, for those who reneged and those who received service, was assessed using independent-samples t-tests, factorial analysis of variance (FANOVA) and visual analysis of central tendency with upper and lower 95% confidence limits. Three differences were assessed with paired-samples t-tests, (1) the difference between the actual time before reneging and reported patience, (2) the difference between actual waiting time and perceived waiting time, and (3) the difference between acceptable waiting time and reported patience.

Cases where the difference between perceived waiting time and actual waiting time was over 1,000 s (over 16 min) were deleted, as they were considered to be due to error instead of inconsistency between perception and reality.

Results

Means and standard deviations of the four waiting time variables are shown in Table 1. Actual waiting time ranged from 1 s to 681s, perceived waiting time ranged from 1 s to 900 s, acceptable waiting time ranged from 10 s to 1,800 s, and reported patience ranged from 30 s to 3,600 s.

Figures 1 and 2 present means and upper and lower 95% confidence limits for each of the four waiting time variables, for those who received service (Figure 1) and those who reneged (Figure 2) at the bank and at the power company. As depicted in Figure 1, actual waiting time was the shortest, followed by perceived waiting time and acceptable waiting time, while reported patience was the longest, for those who received service in both call centers. As visually shown in Figure 1, the difference between the four waiting times was parallel in the two companies and variability around the means of the waiting times was larger for longer waiting times than for the shorter ones. All four waiting times were significantly longer for those who received service at the power company than those who received service at the bank (see Table 1 for means and significance tests). Effect sizes for all comparisons between those who received service in the two call centers were small.

As depicted in Figure 2, actual waiting time was the shortest and reported patience was the longest, for those who reneged at the two call centers. Perceived waiting time exceeded acceptable waiting time for those who reneged, opposite of those who received service (see Figure 1). Actual waiting time was significantly longer for those who reneged at the bank than for those who reneged at the power company, as shown in Figure 2. However, perceived waiting time was significantly shorter at the bank than at the power company.

There was a significant difference between the bank and the power company in actual waiting time and perceived waiting time, while acceptable waiting time and reported patience were similar in the two call centers (see Table 1 for means and significance tests). Effect sizes for all comparisons between those who reneged at the two call centers were low.

Table 1

Summary of Means and Standard Deviations of Actual Waiting Time, Perceived Waiting Time, Acceptable Waiting Time, and Reported Patience in Seconds in Both Call Centers

		<i>M</i>	<i>SD</i>	<i>N</i>
Actual time	Total	111.3	102.9	878
	Bank _{service}	92.1 ^{a, b}	86.4	214
	Bank _{reneged}	127.2 ^{c, d, e}	97.8	207
	Power company _{service}	128.9 ^{a, f}	117.1	286
	Power company _{reneged}	86.6 ^{c, g, h}	93.5	171
Perceived time	Total	178.7	167.1	763
	Bank _{service}	129.6 ^{i, b}	132.4	196
	Bank _{reneged}	202.1 ^{j, d, k}	166.1	199
	Power company _{service}	167.0 ^{i, f}	165.2	258
	Power company _{reneged}	251.4 ^{j, g, l}	196.2	110
Acceptable time	Total	192.3	146.8	818
	Bank _{service}	170.7 ^{m, n}	129.0	200
	Bank _{reneged}	191.0 ^{o, p}	156.8	197
	Power company _{service}	216.2 ^{m, q}	160.1	257
	Power company _{reneged}	182.5 ^{o, r}	127.5	164
Reported patience	Total	460.2	419.1	781
	Bank _{service}	427.9 ^{s, n}	404.7	193
	Bank _{reneged}	432.6 ^{t, k, e, p}	465.0	201
	Power company _{service}	499.1 ^{s, q}	336.4	240
	Power company _{reneged}	476.7 ^{t, l, h, r}	486.0	147

Note. Superscript letters a, c, i, j, m, o, s, and t are independent-samples t-tests. Superscript letters b, d, e, f, g, h, k, l, n, p, q, and r are paired-samples t-tests.

M and *SD* for paired-samples t-tests are similar, but not equal to those in the table, due to missing data.

^a $p < .001$, $\eta^2 = .03$. ^b $p < .001$, $\eta^2 = .09$. ^c $p < .001$, $\eta^2 = .04$. ^d $p < .001$, $\eta^2 = .18$. ^e $p < .001$, $\eta^2 = .29$. ^f $p = .001$, $\eta^2 = .08$. ^g $p < .001$, $\eta^2 = .39$. ^h $p < .001$, $\eta^2 = .45$. ⁱ $p = .008$, $\eta^2 = .02$. ^j $p = .027$, $\eta^2 = .02$. ^k $p < .001$, $\eta^2 = .19$. ^l $p < .001$, $\eta^2 = .18$. ^m $p = .001$, $\eta^2 = .02$. ⁿ $p < .001$, $\eta^2 = .36$. ^o $p = .573$, $\eta^2 = .001$. ^p $p < .001$, $\eta^2 = .26$. ^q $p < .001$, $\eta^2 = .54$. ^r $p < .001$, $\eta^2 = .29$. ^s $p = .046$, $\eta^2 = .01$. ^t $p = .392$, $\eta^2 < .01$.

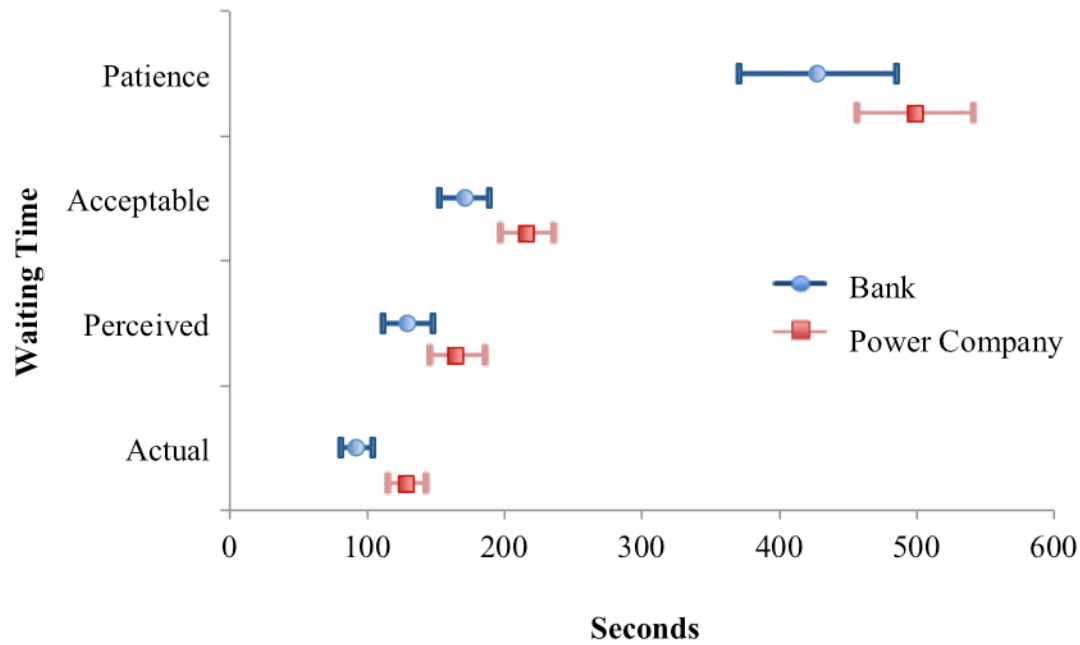


Figure 1. Means of actual waiting time, perceived waiting time, acceptable waiting time, and reported patience with upper and lower 95% confidence limits for those who received service at the bank and at the power company.

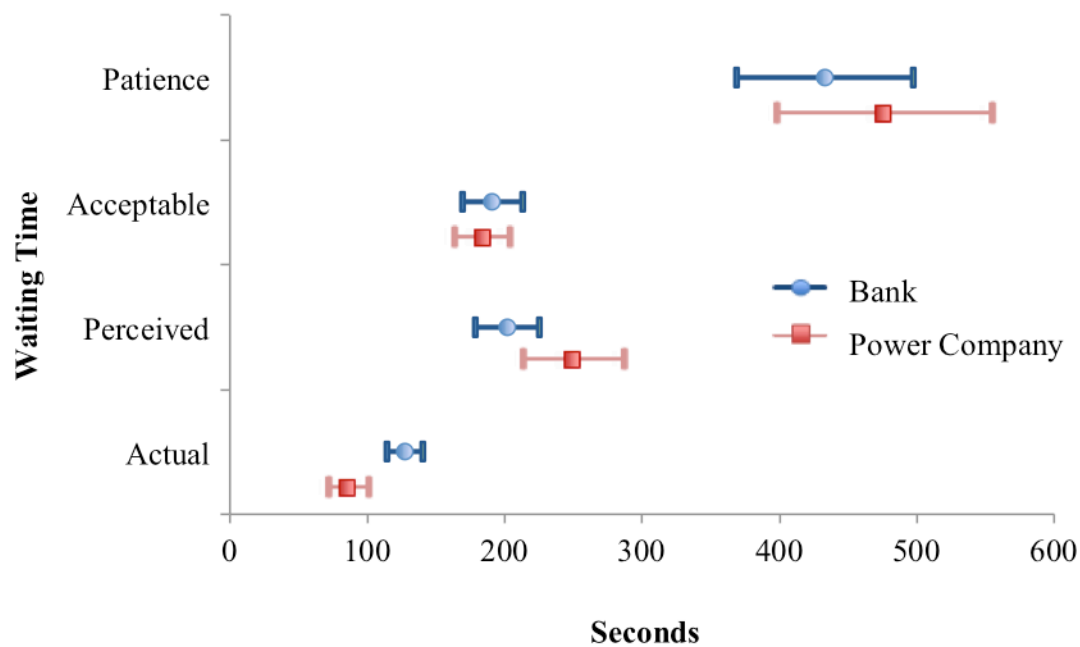


Figure 2. Means of actual waiting time, perceived waiting time, acceptable waiting time, and reported patience with upper and lower 95% confidence limits for those who reneged at the bank and at the power company.

FANOVA was used to assess the interaction effect of call center (bank or power company) and receiving service/renegeing on the waiting time variables. As shown in Figure 3, actual waiting time for those who reneged and those who received service varied depending on the call center. Those who received service at the bank had a shorter actual waiting time than those who reneged at the bank, while those who received service at the power company had a longer actual waiting time than those who reneged at the power company. This interaction was significant, $F(1, 874) = 30.95, p < .001$.

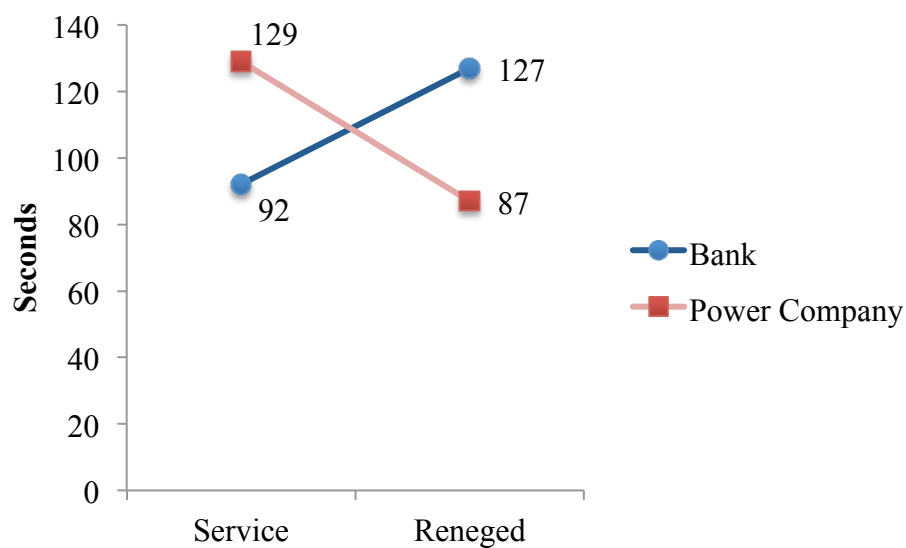


Figure 3. Mean of actual waiting time in seconds for those who reneged and those who received service at the bank and the power company.

Acceptable waiting time of those who received service and those who reneged varied significantly, depending on the call center. As shown in Figure 4, acceptable waiting time was shorter for those who received service at the bank than those who reneged, while it was longer for those who received service at the power company than at the bank. Those who reneged had similar accepted waiting time, however, those who received service had different acceptable waiting time depending on which call center they waited in. This interaction was significant, $F(1, 814) = 6.82, p = .009$.

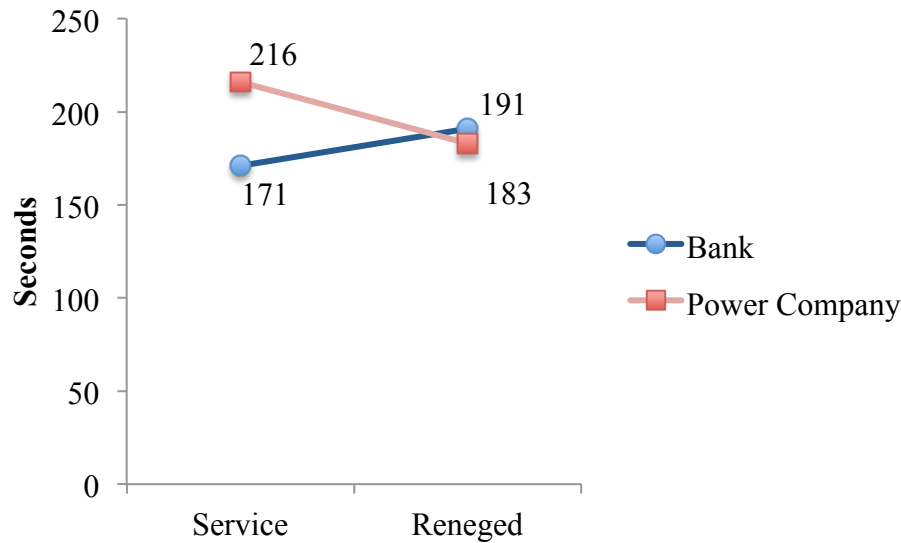


Figure 4. Mean of acceptable waiting time in seconds for those who reneged and those who received service at the bank and the power company.

The difference between actual waiting time before reneging and reported patience was assessed with paired-samples t-tests. As shown in Table 1, reported patience was significantly longer than actual waiting time before reneging in both call centers, with very large effect sizes. However, there was not a significant correlation between actual waiting time before reneging and reported patience in either call center (bank: $r = .065$, $p = .367$, power company: $r = .160$, $p = .065$), indicating that reported patience cannot be used as a substitute for actual waiting time. Mean difference in actual waiting time before reneging and reported patience at the power company was 372 s ($SD = 410$) and 304 s ($SD = 473$) at the bank, however, these mean differences were not significantly different between the two call centers, $t(339) = 1.38$, $p = .169$.

Perceived waiting time before reneging was significantly shorter than reported patience in both companies with a high effect size (see Table 1 for significance tests and effect sizes). There was a significant, positive correlation between perceived waiting time before reneging and reported patience at the bank ($r = .168$, $p = .021$), while the correlation was not significant at the power company ($r = .056$, $p = .592$).

A paired-samples t-test showed that perceived waiting time was longer than actual waiting time in every comparison: those who received service at the bank, those who received service at the power company, those who reneged at the bank, and those who reneged at the power company. All comparisons of perceived and actual waiting time were significant (see Table 1 for significance tests). Effect sizes were high for those who reneged at the two call centers and moderate for those who received service at the two call centers. There was a significant, positive correlation between actual waiting time and perceived waiting time in every comparison: for those who received service at the bank ($r = .414, p < .001$), those who reneged at the bank ($r = .358, p < .001$), those who received service at the power company ($r = .595, p < .001$), and those who reneged at the power company ($r = .442, p < .001$). That is, the longer actual waiting time was, the longer participants perceived their waiting time.

The inconsistency between perceived waiting time and actual waiting time was analyzed further by subtracting actual waiting time from perceived waiting time. FANOVA showed that the inconsistency between perceived and actual waiting time was larger for the participants at the power company ($M = 68$ s, $SD = 153$) than participants at the bank ($M = 57$ s, $SD = 145$), $F(1, 743) = 8.15, p = .004$. Furthermore, those who reneged ($M = 98$ s, $SD = 169$) had greater inconsistency between perceived and actual waiting time than those who received service ($M = 39$ s, $SD = 129$), $F(1, 743) = 37.25, p < .001$. As depicted in Figure 5, those who received service at the two call centers had similar inconsistency, while those who reneged had greater inconsistency, which varied in magnitude depending on the call center. Those who reneged at the power company had almost double the inconsistency of those who reneged at the bank. This interaction effect of call center (bank or power company) and receiving service/reneging on the inconsistency between perceived and actual waiting time was significant, $F(1, 743) = 8.34, p = .004$.

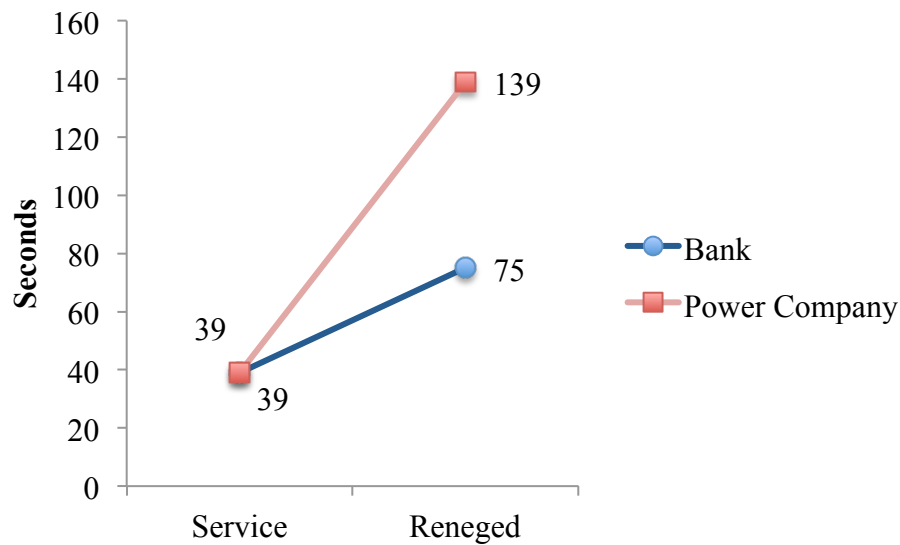


Figure 5. Mean differences between perceived and actual waiting time in seconds for those who reneged and those who received service at the bank and the power company.

Reported patience was significantly longer than acceptable waiting time, with a very large effect size in all comparisons (see Table 1 for significance tests and effect sizes). Additionally, there was a significant, positive correlation between reported patience and acceptable waiting time for those who received service at the bank ($r = .564, p < .001$), those who reneged at the bank ($r = .473, p < .001$), those who received service at the power company ($r = .630, p < .001$), and those who reneged at the power company ($r = .375, p < .001$). That is, the longer participants believed it was acceptable to wait, the longer was their reported patience.

Discussion

The main aim of the study was to assess reneging behavior in two call centers, with regard to time perception, acceptable wait, and patience by comparing those who renege and those who received service. Two hypotheses were examined. First, it was hypothesized that reported patience would be longer than actual waiting time before reneging. In order to examine this hypothesis, an attempt was made to measure patience with a self-report questionnaire, by asking customers how long they believe they are willing to wait before

reneging. The hypothesis was supported in both call centers. Participants reported being able to wait longer before reneging than they actually did. Similar overestimation has been found in other research where participants were asked to report on their own ability or behavior (Epley & Dunning, 2006; Zell & Krizan, 2014). Zell and Krizan (2014) reported moderate correlation between self-reports of various abilities and objective performance, however, the current study found no significant correlation between reported patience and actual waiting time before reneging, indicating that reported patience cannot be used as a substitute for actual time before reneging. The fact that a significant correlation was not found might imply that patience is a more subjective variable and more difficult to self-report than ability or behavior. Also, when waiting in line in real life, many environmental factors can affect customers' decision to abandon a queue. It could be, for example, that their lunch break was over, their cell phone ran out of battery, or they found a solution to their problem themselves. Customers' self-report of patience might, therefore, suggest how long they are willing to wait before reneging in optimal situations, where only the waiting time influences their decision to renege. The fact that perceived waiting time before reneging was significantly shorter than reported patience further suggests that reported patience might refer to patience in optimal situations. Customers believed they were able to wait longer before reneging than they perceived waiting before abandoning the queue that day.

The second hypothesis was that customers perceive their waiting time to be longer than it actually is. The hypothesis was supported since perceived waiting time was significantly longer than actual waiting time for those who received service and those who reneged in both call centers. Results were in line with studies by Tom and Lucey (1997) and Antonides et al. (2002), where perceived waiting time was either comparable to or longer than actual waiting time. Current results further indicated that the difference between perceived and actual waiting time varied between the two call centers and between those who

reneged and those who received service. Those who received service in both call centers had similar difference between perceived and actual waiting time, while those who reneged at the power company had greater difference than those who reneged at the bank. It appears that customers who receive service when contacting a call center perceive their waiting time more accurately than those who renege. In addition, those who reneged at the power company had a shorter actual waiting time than those who reneged at the bank, yet those who reneged at the power company perceived their waiting time as longer than those at the bank. This notion suggests that discrepancy in waiting time perception might vary, depending on which call center customers are trying to reach. The question arose of whether the discrepancy was because customers of the two call centers had different characteristics, such as age and how patient they rated themselves compared to others. These variables did not correlate significantly with the difference between perceived and actual waiting time in either call center, suggesting that the reason why perception of waiting time compared to actual waiting time is different between the two call centers might lie more within the characteristics of the call centers than the characteristics of their customers.

The two call centers were quite different, which might explain why actual versus perceived waiting time was different at the two companies. The service they provided was not the same, as the most common errands at the bank included general banking and consultation, while the most common errands at the power company regarded energy bills, reading of energy meters and changes of residence. Further, the two call centers had different waiting time fillers and research shows that different fillers can reduce the overestimation of waiting time (Antonides et al., 2002). At the power company, waiting customers were informed of how many customers were waiting ahead of them, while customers at the bank knew nothing about their position in the queue. However, customers at the bank were offered a call-back service, where they could leave their names and phone numbers in order to be

phoned back by a staff member of the call center. Both call centers played music as a waiting time filler.

Acceptable waiting time was assessed and compared to reported patience. Reported patience exceeded acceptable waiting time in both call centers. The difference between acceptable waiting time and reported patience was similar in both call centers and between those who reneged and those who received service. This indicates that customers have a clear idea of how long they feel it is acceptable to wait and how long after that they will abandon a queue, if they have not received service by that time, supporting Hwang and Lamberts (2006) idea that acceptable wait and unsatisfactory wait are two separate waiting times. Furthermore, the results indicate that the interval between acceptable time and when they will abandon the queue does not depend on which call center customers are waiting at. Future research should examine this notion, as it raises the question of whether this similarity can be found only in these particular call centers, or also in other call centers or companies that provide service, such as retail stores. Companies that provide service benefit from understanding this further, because they want to keep their customers satisfied, while having an optimal number of employees to maximize profit and avoid under- or over-staffing. Knowing acceptable waiting time can help companies keep waiting time within the right range to prevent reneging behavior, while making them wait as long as possible without negatively affecting loyalty and profit.

Results showed that mean acceptable waiting time in both call centers was longer than mean perceived waiting time for those who received service, while it was shorter than mean perceived waiting time for those who reneged. This implies that reneging customers felt that the wait had exceeded what they considered an acceptable waiting time. Although self-report of acceptable waiting time might not be equal to actual acceptable waiting time (since customers' perception of waiting time is not accurate), it can give companies some idea of

how long customers are satisfied with waiting. Future research could take these results even further and find a way to correct self-reported acceptable waiting time, to bring it in line with actual time.

Due to limitations, results of the current study should be interpreted with caution. First, customers were asked to report their perceived waiting time a few hours after they waited for service. The time that passed after customers phoned the call center might affect their perception of the waiting time and somehow change it. Future research should keep this in mind and try to ask customers about their waiting time as soon after the call as possible. Also, some customers had phoned the call center multiple times during the day, making it difficult to identify the call they were referring to when they estimated their waiting time. In the current study, the latest call was used as a reference point for actual waiting time. In order to prevent this problem, future research could ask customers about their waiting time soon after they place their first call, before they get a chance to contact the call center again. Another limitation of the current study was that some customers called another department within the company before they got connected with the call center. The time it takes to connect to other departments and then be forwarded to the call center might increase perceived waiting time, which would not be accounted for in actual waiting time. This might be part of the reason why perceived waiting time was often much longer than actual waiting time. By excluding customers who do not contact the call center directly, future research can avoid this problem and possibly get a more accurate comparison of perceived and actual waiting time of customers.

Despite its limitations, the current study has advantages, such as the fact that it was executed in real-life situations, which contributes to higher external validity. It also has the advantage of comparing two different call centers, adding credibility to the results. When customers have the option to refuse participation, the question arises whether those who do

not participate are in some way different from those who do. In the current study, actual waiting time of those who reneged at the bank and refused participation was accessible ($n = 71$). Actual waiting time of those who refused to participate was not significantly different from the actual waiting time of those who participated, which gives the results strength. Since response rate was high and similar in both call centers (one of the study's key strengths), the likelihood of those who refused to participate being different from those who participated was low. To the authors' knowledge, the current study has the advantage of being the first in queuing research to make an attempt to measure patience with a questionnaire. Even though reported patience was much higher than actual waiting time before reneging, it can give an idea of how long customers believe they are willing to wait before reneging in optimal situations. In addition, acceptable waiting time, which previous studies on queues have not given much attention to, was assessed. Ideally, results of the current study will inspire other researchers to take the findings further and consider acceptable waiting time and reported patience when designing queuing models.

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Appendix

Nafn þess sem tekur viðtalið: _____

Góðan daginn/gott kvöld.

Ég heiti ____ og er að hringja á vegum *fyrirtæki*. Er ekki rétt hjá mér að þú hafir hringt í þjónustuver *fyrirtæki* í dag?

(ef nei: gæti verið að einhver annar á heimilinu hafi hringt í *fyrirtæki* í dag? ef já, má ég fá að tala við þann aðila)

1. Mætti ég spyrja hvers vegna þú lagðir á þegar þú hringdir inn í þjónustuver *fyrirtækis* í dag?^a

- ☐ Of langur biðtími
- ☐ Of margir á undan í röðinni
- ☐ Hafði ekki tíma
- ☐ Hafði ekki þolinmæði
- ☐ Nennti ekki að bíða
- ☐ Fann út úr þessu sjálfur
- ☐ Veit ekki
- ☐ Vill ekki svara

2. Fannst þér biðtíminn vera orðinn of langur eða voru of margir á undan þér í röðinni?^a

- ☐ Biðtími
- ☐ Fjöldi á undan Bæði
- ☐ Veit ekki
- ☐ Vill ekki svara

Við erum að hringja í þá sem hringdu í þjónustuver *fyrirtæki* í dag til þess að komast að því hvernig bæta megi þjónustuna. Þeir sem taka þátt eiga möguleika á að vinna gjafabréf að andvirði 15.000 krónum á veitingastað/gjafabréf fyrir tvo í leikhús. Værir þú til í að svara nokkrum spurningum fyrir okkur?

Ef vill taka þátt:

Áður en við byrjum vil ég benda þér á það að þér er ekki skylt að svara einstaka spurningum né könnuninni í heild. Jafnframt að fulls trúnaðar er gætt við meðferð gagna og ekki verður hægt að rekja svör til einstaklinga.

3. Til í að taka þátt?

- ☐ Já
- ☐ Nei

^a Only reneging customers were asked this question

4. Hversu ánægð(ur) eða óánægð(ur) ert þú almennt með þjónustuver *fyrirtæki*?

- ☐ Mjög ánægð(ur)
- ☐ Frekar ánægð(ur)
- ☐ Hvorki ánægð(ur) né óánægð(ur)
- ☐ Frekar óánægð(ur)
- ☐ Mjög óánægð(ur)
- ☐ Veit ekki
- ☐ Vil ekki svara

5. Ef óánægður, hver er ástæðan fyrir óánægjunni?

- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ svar: _____

6. Hvað telur þú að þú hringir um það bil oft að meðaltali í þjónustuver *fyrirtæki*?

- ☐ Oftar en vikulega
- ☐ Vikulega
- ☐ Nokkrum sinnum í mánuði
- ☐ Mánaðarlega
- ☐ Nokkrum sinnum á ári
- ☐ Tvisvar á ári
- ☐ Einu sinni á ári
- ☐ Sjaldnar en einu sinni á ári
- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Annað

7. Hversu líkleg(ur) eða ólíkleg(ur) ert þú til þess að mæla með þjónustuveri *fyrirtæki*, á kvarðanum 0 til 10 þar sem núll jafngildir afar ólíkleg(ur) eða tíu jafngildir afar líkleg(ur)

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ Veit ekki/Vil ekki svara

8. Þegar þú hringdir í þjónustuverið fyrr í dag, var erindið: reikningar^b, álestur^b, flutningur^b eða annað? // var erindið: almenn bankaviðskipti^c, ráðgjöf^c eða annað?

- ☐ Reikningar // almenn bankaviðskipti
- ☐ Álestur // ráðgjöf
- ☐ Flutningur // --
- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Annað

9. Hversu mikið eða lítið áriðandi var að erindi þitt yrði leyst strax?

- ☐ Mjög áriðandi
- ☐ Fremur áriðandi
- ☐ Hvorki mikið né lítið áriðandi
- ☐ Fremur lítið áriðandi
- ☐ Mjög lítið áriðandi
- ☐ Veit ekki
- ☐ Vil ekki svara

10. Nú ætla ég að nefna nokkra þætti varðandi þjónustu. Ég vil biðja þig að segja hversu miklu eða litlu máli eftirfarandi þættir skipta þig þegar þú hringir í þjónustuver fyrirtæki?

	Mjög miklu	Frekar miklu	Hvorki miklu né miklu	Frekar litlu	Mjög litlu	Veit ekki/Vil ekki svara
Þekking starfsmanns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fáir á undan þér í röðinni	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gott viðmót	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stuttur biðtími	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frumkvæði starfsmanns til að bjóða frekari þjónustu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Áreiðanleiki	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lausn mála	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Hversu stutt eða lengi fannst þér þú þurfa að bíða eftir að ná sambandi við þjónustufulltrúa/áður en þú lagðir á?

- ☐ Mjög stutt
- ☐ Frekar stutt
- ☐ Hvorki lengi né stutt
- ☐ Frekar lengi
- ☐ Mjög lengi
- ☐ Veit ekki
- ☐ Vil ekki svara

^b Power company

^c Bank

12. Hvað myndir þú áætla að þú hafir beðið í margar sekúndur eða mínútur eftir að ná tali af þjónustufulltrúa?

- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Sekúndur/Mínútur: _____

13. Hversu ánægð(ur) eða óánægð(ur) varst þú með þann tíma sem þú þurftir að bíða eftir að ná tali af þjónustufulltrúa *fyrirtæki*, samanborið við reynslu þína af biðtíma hjá öðrum þjónustuverum?^d

- ☐ Mjög ánægð(ur)
- ☐ Fremur ánægð(ur)
- ☐ Hvorki ánægð(ur) né óánægð(ur)
- ☐ Fremur óánægð(ur)
- ☐ Mjög óánægð(ur)
- ☐ Veit ekki
- ☐ Vil ekki svara

14. Hversu mikið eða lítið reyndi biðin á þolinmæði þína?

- ☐ Mjög mikið
- ☐ Frekar mikið
- ☐ Hvorki mikið né lítið
- ☐ Frekar lítið
- ☐ Mjög lítið
- ☐ Veit ekki
- ☐ Vil ekki svara

15. Fannst þér þjónustufulltrúinn gefa þér of stuttan, of langan eða hæfilegan tíma í þjónustuna?^d

- ☐ Of stuttan tíma
- ☐ Hæfilegan tíma
- ☐ Of langan tíma
- ☐ Veit ekki
- ☐ Vil ekki svara

Nú langar mig til að spyrja þig út í þolinmæði varðandi biðtíma. Annars vegar hvenær biðin reynir svo mikið á þolinmæði þína að þú gefst upp og leggur á og hins vegar um hversu lengi þú værir róleg(ur) að bíða.

16. Þegar þú hringir í þjónustuver *fyrirtæki*, eftir hve langan tíma í mínútum myndi biðin reyna svo mikið á þolinmæði þína að þú myndir gefast upp á biðinni og leggja á?

- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Mínútur: _____

^d Only customers who received service were asked this question

17. Hvað finnst þér vera viðunandi biðtími í mínútum eftir þjónustu þegar þú hringir í þjónustuver *fyrirtæki*, það er, hversu lengi ertu róleg(ur) að bíða?

- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Mínútur: _____

18. Þegar þú hringir í þjónustuver *fyrirtæki*, hversu margir þyrftu að vera á undan þér í röðinni til þess að þú hættir við að bíða eftir sambandi við þjónustuverið?

- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Fjöldi: _____

19. Hvað finnst þér vera viðunandi fjöldi á undan þér í röðinni þegar þú bíður eftir að ná sambandi við þjónustuver *fyrirtæki*?

- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Fjöldi: _____

20. Telur þú að þú munir hringja oftár, jafn oft eða sjaldnar en hingað til í þjónustuver *fyrirtæki* í framtíðinni?

- ☐ Oftár
- ☐ Jafn oft
- ☐ Sjaldnar
- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Annað: _____

21. Á kvarðanum 0-10, þar sem núll jafngildir mjög óþolinmóð(ur) og tíu jafngildir mjög þolinmóð(ur), hversu þolinmóða(n) eða óþolinmóða(n) telur þú þig vera samanborið við aðra?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ Veit ekki/Vil ekki svara

22. Hvaða ár ertu fædd(ur)?

- ☐ Veit ekki
- ☐ Vil ekki svara
- ☐ Fæðingarár (YYYY): _____

Þá er könnuninni lokið og símanúmer þitt verður sett í pott, dregið verður 15. mars og haft samband við vinningshafa.

Takk kærlega fyrir þátttökuna og eigðu gott kvöld! (næstu spurningum svarar spyrill að símtali loknu)

23. Kyn þátttakanda?

- ☐ Karl
- ☐ Kona

Símanúmer: _____

Nákvæmur tími þegar viðkomandi hringdi inn í þjónustuverið: _____

Biðtími fram að þeim tíma sem viðkomandi hætti við eða fékk þjónustu - í sekúndum:

Hversu löng var þjónustan (talk time) - í sekúndum: _____