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Numbers or Apologies? Customer Reactions to Telephone Waiting Time Fillers

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The authors examined the effect of time perception and sense of progress in telephone queues on caller reactions to 3 telephone waiting time fillers: music, apologies, and information about location in the queue. In Study 1, conducted on 123 real calls, call abandonment was lowest, and call evaluations were most positive with information about location in the queue as the time filler. In Study 2, conducted with 83 participants who experienced a simulated telephone wait experience, sense of progress in the queue rather than perceived waiting time mediated the relationship between telephone waiting time filler and caller reactions. The findings provide insight for the management and design of telephone queues, as well as theoretical insight into critical cognitive processes that underlie telephone waiting, opening up an important new research agenda.

Keywords: telephone waiting, queues, atmospherics, perceived time, perceived progress

Queues are an essential buffer between customer arrival rates and service resources, but they also mean waiting, which is undesirable for customers. Because reducing waiting times is not always an option, vehicles to mitigate negative reactions to waiting are important (Clemmer & Schneider, 1989; Hall, 1991; Katz, Larson, & Larson, 1991; Larson, 1987; Maister, 1985; Osuna, 1985; Schwartz, 1975). We explore one such vehicle: the use of various waiting-time fillers.

Time fillers can be viewed as atmospherics (Bitner, 1990; Shostack, 1977) and are known to influence people's reactions to the physical context (Baker & Cameron, 1996; Smith & Curnow, 1966). Time fillers seem especially important in telephone waiting, in which they constitute the only source of atmospherics and are therefore likely to have a strong influence over people's reactions. Yet very few researchers have examined this issue. North, Hargreaves, and McKendrick (1999) did suggest that people stay on hold longer if they like the waiting-time filler and if it fits their expectations. Tom, Burns, and Zeng (1997) and Antonides, Verhoef, and van Aalst (2002) found that the type of filler affected perceived waiting time and satisfaction with the wait and the organization. But this limited research does not provide a good foundation for understanding the psychological effects of telephone waiting. Development of our hypotheses therefore relies on available findings about physical waiting as well.

This generalization requires caution because of four key differences between physical and telephone queues. First, telephone queues, unlike their physical counterparts, are invisible and do not allow the people who are waiting to see the progress of those ahead of them in line. Second, the frustration of physical queues can be alleviated through the physical setting, for instance by making available chairs and magazines. Third, telephone waiting times (generally measured in seconds) are typically much shorter than those of physical waits (generally measured in minutes). Fourth, joining or deserting a telephone queue is generally easier than joining or leaving a physical queue, as it involves only a telephone call and not travel from place to place.

In addition, studies of telephone queues can easily rely on nonobtrusive behavioral measures such as customer abandonment rate—that is, the proportion of callers who hang up prior to reaching a service point (Gans, Koole, & Mandelbaum, 2003; Webb, Campbell, Schwartz, Sechrest, & Grove, 1981). Studies of physical queues, however, rely primarily on self-report evaluations (e.g., Rafaeli, Barron, & Haber, 2002; Taylor, 1994). In this article we develop a psychological analysis of telephone waiting by exploring how different time fillers influence both behavior and self-reported evaluations (which we refer to hereafter as "reactions").

Building on available research on time fillers, we begin with the assumption that time fillers in telephone waiting affect satisfaction and abandonment rate. We explore three of many possible types of filler: music, apologies, and information about location in the queue. Our hypotheses use these fillers to compare predictions of two distinct lines of research: perceived waiting time and progress toward desired goals.

Perceived Waiting Time and Reactions to Waiting

Although long waits are generally more annoying than short ones (e.g., Carmon & Kahaneman, 1996; Katz et al., 1991; Osuna, 1985; Taylor, 1994), actual waiting time may not be the most important factor at play. Zakay and Hornik (1991) proposed a model of subjective time estimation according to which the critical variable is perceived rather than objective time. In their model,

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perceived time is monitored by *cognitive timers*—mental vehicles for processing temporal information. Subjective time is suggested to be the temporal information obtained through these cognitive timers and is argued to be a direct positive correlate of the amount of attention focused on the passage of time. When attention is focused primarily on time rather than anything else (e.g., in the absence of other distractions in a waiting situation), time is perceived as passing more slowly (e.g., Block, 1990). Factors that draw attention away from the passage of time are argued to halt the operation of cognitive timers. Such factors are therefore likely to reduce the perceived duration of a wait and, as a result, to increase satisfaction. Empirical studies of physical waiting support this theoretical framework, demonstrating a negative relationship between perceived waiting time and customer satisfaction (e.g., Katz et al., 1991; Taylor, 1995; Tom & Lucey, 1997).

Using this logic, we suggest a hypothesis about the telephone queues we examine: Time fillers that create a sense of shorter waiting time will produce more positive caller reactions than fillers that create a sense of longer waiting time (*Hypothesis 1a*). This hypothesis suggests perceived waiting time as a mediator between the filler and caller reactions.

Yet the predicted negative relationship between perceived waiting time and caller reactions has not been supported unilaterally. In fact, some research has found that providing participants with information about the duration of their wait leads to more positive evaluations without producing a reduction in perceived waiting time (Hui & Tse, 1996). In one study in which such information was provided, even time fillers that led participants to estimate longer waiting times produced greater satisfaction (Hui & Zhou, 1996). Thus, reactions to waiting may be motivated by something other than sense of time. Below we consider sense of progress as a likely mechanism. This mechanism introduces the distance between a desired goal and one's actual position as key, rather than judgments about time, as in the perceived-waiting-time model.

Sense of Progress in the Queue and Customer Reactions

People crave a sense of progress toward desired goals (cf. Deci & Ryan, 1985; Lewin, 1951), and control theories of self-regulation argue that behavior is regulated by the perceived distance between a desired goal and current position vis-à-vis that goal (Carver & Scheier, 1990, 1998; Phillips, Hollenbeck, & Ilgan, 1996; Powers, 1973). Considering the target of a queue as a goal (e.g., receiving service) suggests that positive reactions should accompany progress toward that target (see also Hsee, Salovey, & Abelson, 1994). Various studies have, in fact, shown that the rate of progress toward a goal can affect people's behavior, whether the goal is personal (Holman, Totterdell, & Rogelberg, 2004) or set by others (see, e.g., Hsee & Abelson, 1991).

Given the importance of progress toward a goal in general human behavior, the paucity of discussion on this issue in research on queues seems surprising. What literature there is on the subject, however, easily supports the idea that progress is a necessary precondition for satisfaction. In one study that graphically simulated queueing, a sense of movement in the queue was the only factor that temporarily reversed a constant decline in the negative reactions of participants (Carmon & Kahaneman, 1996). In a similar vein, Soman and Shi (2003) saw perception of progress in a physical queue as a critical factor for customers, suggesting that "a queue discipline in which consumers can actively see the rate of progress (e.g., a queue which physically moves as consumers are serviced) will result in better service evaluations" (p. 1247).

On the basis of the evidence thus accumulated, we predict in our next hypothesis that time fillers that create a stronger sense of progress will produce more positive caller reactions than fillers that create a weaker sense of progress (*Hypothesis 1b*). This hypothesis suggests sense of progress as a mediator between the filler and caller reactions.

Two types of time fillers—apologies and information about location in the queue—are particularly interesting in light of these two perspectives, because contradictory predictions can be made about them, as elaborated below. We suggest these two types of fillers as a useful point of departure for research on telephone waiting. In contrast to these two fillers, music (rather than lack of music or silence) is best treated as a control condition. Music provides a clear indication that a person is on hold, whereas silence may be interpreted as indicating that the line has been disconnected.

The Effects of Specific Telephone Waiting Time Fillers

Apology Messages While Waiting

Telephone waiting customers are frequently consoled by service providers by being told "we apologize for the delay" or "we will be with you shortly." Such messages are rarely heard in physical waiting situations and have therefore received scant research attention. However, in one empirical study apologies were found to negatively affect customer reactions to telephone waiting, although they did not affect caller estimations of the time spent on hold (North et al., 1999).

Theoretically, both the framework of perceived waiting time and that of a sense of progress toward desired goals would predict that apologies negatively affect caller reactions. From the perspective of perceived waiting time, apology messages are atmospherics that do not serve as distractions but rather focus caller attention on the passage of time and thus should increase the perceived waiting time. We therefore predict that apology messages will create a sense of longer waiting time and thus less positive caller reactions than music (*Hypothesis 2a*). Likewise, apology messages offer no information about movement toward the service goal. Moreover, apology messages can be viewed as reminding customers that they are still waiting without giving any clue about progress. Therefore, they may be interpreted as suggesting that the queue is not moving. Thus we predict that apology messages will create a weaker sense of progress and therefore less positive caller reactions than music (*Hypothesis 2b*).

Information About Location in the Queue While Waiting

An alternative to apologies is information about one's location in the queue (e.g., "You are fourth in line"). The perceived-waiting-time framework would regard such information updates as environmental cues similar to apology messages, in that they do not distract from but rather focus attention on the passage of time. This framework would therefore predict that location-information updates will increase the perceived waiting time (Antonides et al., 2002; Hornik & Zakay, 1994, 1996; Zakay & Hornik, 1991).

Hence, we predict that location information will create a sense of longer waiting time and thus less positive caller reactions than music (*Hypothesis 3a*). This hypothesis suggests perceived waiting time as a mediator between the specific fillers and caller reactions.

In contrast to Hypothesis 3a, location information can be predicted to improve caller reactions when viewed through the framework of progress toward a goal, because such information precisely communicates that one is getting closer to the desired goal (the service one is waiting for). In terms of sense of progress, location information is expected to make a wait less annoying, especially toward the head of the queue, as people get closer to their goal (Carmon & Kahaneman, 1996). Polilli (1992) noted sense of progress as the logic of the "queue jockeys" provided by Lotus Software on telephone help lines to give customers an estimated wait time. In this vein, Osuna (1985) argued that information about a wait reduces the psychological costs of waiting and so improves customer reactions. Hui and Tse (1996) documented that service evaluations improved when location information was provided, even though it led people to perceive their wait as longer than it actually was.

The sense-of-progress framework thus positions information about location in the queue as a positive intervention, suggesting that location information will create a stronger sense of progress and therefore more positive caller reactions than music (*Hypothesis 3b*). This hypothesis suggests sense of progress as a mediator between the specific fillers and caller reactions. Also, building on Hypothesis 2b, we predict that location information will create a stronger sense of progress and thus more positive caller reactions than apology messages (*Hypothesis 4*). It is important to note that no competing hypothesis can be presented because the perceived-waiting-time framework does not predict differences between apologies and location information.

In sum, our hypotheses, as summarized in Table 1, compare the predictions of the perceived-waiting-time framework and sense-of-progress framework. To test these hypotheses we conducted two studies. The first, a field study, documented differences in behavioral reactions and subjective evaluations to different time fillers. The second, a laboratory study, then tested the predictions drawn from our two theoretical frameworks.

Study 1

Method

Overview, participants, and procedure. Data were collected when individuals called a university lab to sign up for experiments. Callers heard two phone rings and then a short introduction asking whether they had used the system before. Only data from first-time callers were used. A computer program (Interactive VoiceGuide, Version 4.9.0; Katalina Technologies, n.d.) then randomly assigned callers to one of three conditions (apologies, location information, and music). After they waited, the program asked for callers' evaluations (see below). Of 123 callers, 48 waited through the entire process and provided their evaluations. Upon completing the evaluation, callers were thanked and connected to someone who signed them up for an experiment.

Independent variable. There were three conditions of waiting-time filler, all of which lasted precisely 108 s, a duration selected to be slightly longer than typical telephone waits in order to encourage abandonment (Gans et al., 2003). The music in the music condition was a tune frequently used in telephone waiting ("Ballade Pour Adeline," performed by Richard Clayderman) played for the full 108 s. In the apologies condition this music stopped three times (at equal intervals) and callers heard "We are sorry to keep you waiting. Please hold and you will be answered according to your position in line." In the location-information condition the music likewise stopped three times (at equal intervals), and participants received updates about their position (e.g., "You are third in line"). We kept the numbers intentionally low (following the procedure of Carmon & Kahaneman, 1996) to indicate proximity to the end.

Dependent variables. Caller abandonment was tracked by the program and coded 0 (callers who abandoned before the end of the process) or 1 (otherwise). Caller satisfaction was measured by a three-item index adapted from the service evaluation measures used by Hui and Tse (1996) and Zeithaml, Parasuraman, and Berry (1990): (a) To what extent did you find the wait pleasant? (b) To what extent did you find this system convenient? (c) Would you like to encounter this system in other waiting situations? For each

Table 1
Summary of the Research Hypotheses

Hypothesis	Independent variable	Mediator	Predicted variable
	Predictions following the perceived-waiting-time framework		
1a	Time filler	Perceived waiting time	Caller reaction
2a	Music versus apologies	Perceived waiting time	Caller reaction
3a	Music versus location information	Perceived waiting time	Caller reaction
	Predictions following the sense-of-progress framework		
1b	Time filler	Sense of progress	Caller reaction
2b	Music versus apologies	Sense of progress	Caller reaction
3b	Music versus location information	Sense of progress	Caller reaction
4[a]	Apologies versus location information	Sense of progress	Caller reaction

[a] Only one Hypothesis 4 is tested because the sense-of-progress framework does not predict differences between the apologies and location-information conditions.

item, participants were instructed to respond on a scale of 1 to 5 by pressing the appropriate key on the telephone dial, with 1 indicating *absolutely not* and 5 indicating *very much* (Cronbach's α = .83).

Results

Descriptive statistics for the variables in the first study appear in Table 2.[1] A chi-square test confirmed that abandonment rate varied significantly between the experimental conditions, $\chi^2(2, N = 123) = 11.21$, $p < .005$, $\phi = .30$. Post hoc tests[2] indicated no significant difference between music and apologies, $\chi^2(1, N = 84) = 0.07$, $p > .10$, $\phi = .03$. The difference between music and location information was significant, $\chi^2(1, N = 75) = 8.44$, $p < .005$, $\phi = .34$, with more callers abandoning with music (69.4%) than with location information (35.9%). There was also a significant difference between apologies and location information, $\chi^2(1, N = 87) = 8.18$, $p < .005$, $\phi = .31$, with more callers abandoning in the former (66.7%) than in the latter (35.9%) condition.

Time fillers also differed in self-reported caller satisfaction, as summarized in Table 3, $F(2, 45) = 10.71$, $p < .0001$, $\eta^2 = .32$. Planned comparisons confirmed the mean reported satisfaction following location information ($M = 3.82$) as significantly higher than that following music ($M = 2.87$), $F(1, 30) = 6.34$, $MSE = 0.84$, $p < .05$, $\eta^2 = .18$, and that following apologies ($M = 2.58$), $F(1, 38) = 22.91$, $MSE = 0.64$, $p < .0001$, $\eta^2 = .38$.

Summary

Study 1 demonstrated that different time fillers produced different caller abandonment rates and satisfaction in a real-life setting, with location information producing fewer abandonments and greater satisfaction. The findings of Study 1 legitimate a second step in the research: testing the predictive power of the two theoretical frameworks—perceived time and sense of progress. The goal of this step is to identify what it is about the location-information filler that makes people more likely to stay on the line and to be satisfied with their telephone waiting experience. (Note that Study 1 was not designed to measure perceived waiting time or sense of progress, quantities that we specifically examine in Study 2.)

Study 2

Method

Overview, participants, and procedure. Data were collected from 83 students (55% female, 45% male) who received partial course credit in return for "calling" a fictitious call center from a lab computer and reporting their responses. The instructions were as follows:

> For this experiment you will be asked to dial a call center via the computer, and you may have to wait "on hold." If you wish to end the call at any time please press the "hang-up" key. In that case, your wish will be documented, but your wait will continue until the end of the experiment.

Participants dialed the number with the mouse and after two rings heard a message asking them to wait. They were randomly assigned to one of the three experimental conditions, each of which created a wait that lasted exactly 108 s. Participants who pressed the hang-up key saw the message "Your wish to hang up was noted" but continued to wait the entire 108 s. After the full wait all participants were asked for their responses to the dependent and mediating variables (see below) and then thanked, debriefed, and released. Psychometric qualities of the time measure were collected from independent participants.

Independent variable. The independent variable was identical to the independent variable in Study 1, with the same three values: music, apologies, and location information. A separate group of 24 participants confirmed that the manipulation had worked as expected.

Dependent variables. Caller abandonment was a discrete variable coded 0 if the hang-up key was pressed and 1 if it was not pressed. Caller satisfaction was an index of two items: "Did you find the wait pleasant?" and "Would you like to encounter this system in other waiting situations?" Responses were rated on a scale of 1 to 5 (1 = *absolutely not* and 5 = *very much*; correlation between the items was .70, Cronbach's α = .82). A pilot study found that the third item used in Study 1 ("Did you find this system convenient?") was not appropriate in Study 2 because participants could not evaluate convenience, given that all they did was listen and wait.

Table 2
Means, Standard Deviations, and Minimum and Maximum Values of Study 1 Variables

Variable	*n*	*M*	*SD*	Minimum	Maximum
Caller abandonment	123	0.42[a]	0.50	0	1
Caller satisfaction	48	3.25	1.03	1	5

Note. Because caller satisfaction is available only for those callers who did not abandon the queue, no correlation with the variables can be computed.
[a] Caller abandonment is coded 0 or 1, so mean indicates the proportion of callers who did not abandon the call.

Table 3
Means, Standard Deviations, and Confidence Intervals of Caller Satisfaction in the Three Conditions in Study 1

Condition	*n*	*M*	*SD*	95% Confidence interval for *M*	
				Lower bound	Upper bound
Music	8	2.87	1.15	1.91	3.84
Apologies	16	2.58	0.75	2.19	2.98
Location information	24	3.82	0.83	3.47	4.17
Total	48	3.25	1.03		

Note. Caller evaluation is available only for callers who did not abandon during the wait.

[1] Data obtained from the central university operator about the points at which people hung up confirmed the similarity between our data and other systems (Gans et al., 2003), suggesting that caller behavior was similar to that seen in larger and more natural contexts.

[2] Bonferroni's correction indicated a required significance level of .047.

Mediating variables. Perceived waiting time was measured by asking "How long did you wait? ___ minutes _____ seconds." Test–retest reliability of this measure was proven satisfactory (r = .73) by a separate group of 32 participants who performed the procedure twice. Sense of progress in the queue was measured with an index of four items adapted from the "goal distance and goal velocity" items used by Holman et al. (2004; Cronbach's α = .94): (a) Did you feel you were making progress toward the end of the wait? (b) Did you feel you were approaching the end of the wait? (c) Did you feel the queue was not moving? (Inverted scale), and (d) Did you feel the wait was going to end soon? Responses were rated on a scale of 1 to 5 (1 = *absolutely not* and 5 = *very much*).

Results

Time fillers and caller abandonment. The data collected in Study 2 (see Table 4) provided additional support for the claim that the time filler affects caller abandonment rate, $\chi^2(2, N = 83) = 12.83$, $p < .005$, $R^2 = .24$. Planned comparisons found the abandonment rate following location information (15.4%) to be significantly lower than that following music (53.3%), $F(1, 54) = 9.98$, $MSE = 0.20$, $p < .01$, $\eta^2 = .16$, and apologies (66.7%), $F(1, 51) = 18.93$, $MSE = 0.18$, $p < .0001$, $\eta^2 = .27$. There was no difference between music and apologies in abandonment rate, $F(1, 55) = 1.03$, $MSE = 0.24$, $p > .10$, $\eta^2 = .02$.

To test the hypotheses, we followed Baron and Kenny (1986; see Table 5). The significant effect of time filler on caller abandonment noted above was the first step. The second step examined sense of progress and perceived waiting time with different time fillers. The effect on perceived waiting time was not supported, whereas the effect on sense of progress was supported: The three types of fillers varied significantly in terms of the sense of progress, $F(2, 80) = 25.16$, $p < .0001$, $\eta^2 = .39$, but not in terms of perceived waiting time, $F(2, 80) = 1.28$, $p > .10$, $\eta^2 = .03$. All differences in perceived waiting time were not significant. In contrast, planned comparisons confirmed the sense of progress produced by location information ($M = 3.81$) as significantly stronger than that following music ($M = 2.35$), $F(1, 54) = 36.96$, $MSE = 0.80$, $p < .0001$, $\eta^2 = .41$, and apologies ($M = 2.17$), $F(1, 51) = 44.06$, $MSE = 0.81$, $p < .0001$, $\eta^2 = .46$. There was no difference between music and apologies in produced sense of progress, $F(1, 55) = 0.50$, $MSE = 0.95$, $p > .10$, $\eta^2 = .01$.

The third step tested perceived waiting time and sense of progress as predictors of abandonment. The complete model yielded $R^2 = .25$, and only predictions regarding sense of progress were supported, $\chi^2(1, N = 83) = 13.70$, estimate = -0.87, $p < .0001$, whereas those regarding perceived waiting time were not supported, $\chi^2(1, N = 83) = 0.45$, estimate = 0.003, $p > .10$.

A final analysis included time filler, perceived waiting time, and sense of progress as predictors of caller abandonment, a model that yielded an overall $R^2 = .30$ and also supported the mediation of sense of progress. Here the effect of perceived waiting time was not significant, $\chi^2(1, N = 83) = 0.42$, estimate = 0.003, $p > .10$, whereas the effect of sense of progress was significant, $\chi^2(1, N = 83) = 4.47$, estimate = -0.58, $p < .05$. The effect of the variable of time filler was insignificant with the mediating variables in the equation, $\chi^2(2, N = 83) = 4.12$, $p > .10$. The mediator variable of sense of progress significantly reduced the effect of location information, although it was still significant, $\chi^2(1, N = 53) = 4.11$, estimate = -1.57, $p < .05$ (see Table 5). The overall effect of the variable of time filler turned out to be, however, not significant. In other words, sense of progress explained the difference between the effects of different time fillers on caller abandonment. Follow-up analyses did not support a reverse mediation model.

In short, our findings did not confirm the mediation of perceived waiting time (Hypothesis 1a) while confirming the mediation of sense of progress (Hypothesis 1b). There was no difference between music and apologies (Hypotheses 2a and 2b were not supported), but location information produced a lower abandonment rate as predicted by the sense-of-progress framework (Hypotheses 3b and 4 in contrast with 3a).

Time fillers and caller satisfaction. A similar four-step analysis was conducted with caller satisfaction. First, time fillers were found to be significantly different in caller satisfaction. Planned comparisons found the satisfaction following location information ($M = 3.31$) as significantly greater than that following apologies ($M = 2.56$), $F(1, 51) = 8.36$, $MSE = 0.90$, $p < .01$, $\eta^2 = .14$. There was no difference between music ($M = 2.90$) and apologies, $F(1, 55) = 1.63$, $MSE = 1.03$, $p > .10$, $\eta^2 = .03$, and music and location information, $F(1, 54) = 1.95$, $MSE = 1.19$, $p > .10$, $\eta^2 = .03$, in reported satisfaction (Table 6).

Second, perceived waiting time and sense of progress were entered as predictors of caller satisfaction. The complete model yielded $R^2 = .28$. Perceived waiting time had no impact on caller satisfaction, $B = -0.002$, $t(80) = -1.06$, $p > .10$. In contrast, a stronger sense of progress was associated with greater satisfaction, $B = 0.47$, $t(80) = 5.51$, $p < .0001$. These findings again hint that sense of progress in the queue is the mechanism driving the relationship between time filler and customer satisfaction.

Table 4
Means, Standard Deviations, Minimum and Maximum Values, and Bivariate Correlations of Study 2 Variables

Variable	*n*	*M*	*SD*	Minimum	Maximum	1	2	3	4
1. Caller abandonment	83	0.46[a]	0.50	0	1	—	−.41***	.03	−.43***
2. Caller satisfaction	83	2.92	1.05	1	5		—	.06	.52***
3. Perceived waiting time	83	153.43	64.73	40	340			—	.08
4. Sense of progress	83	2.75	1.17	1	5				—

[a] Caller abandonment is coded 0 or 1, so mean indicates the proportion of callers who did not choose to abandon the call.
*** $p < .0001$.

Table 5
Summary of Logistic Regression Analysis for Variables Predicting Caller Abandonment (N = 83)

Variable	Model 1: Control model			Model 2: Time filler			Model 3: Perceived waiting time + sense of progress			Model 4: Time filler + perceived waiting time + sense of progress		
	B	*SE*	Odds ratio	*B*	*SE*	Odds ratio	*B*	*SE*	Odds ratio	*B*	*SE*	Odds ratio
Time filler[a]												
Music				−0.56	0.55	0.57				−0.44	0.57	0.65
Location information				−2.40***	0.68	0.09				−1.57*	0.78	0.21
Perceived waiting time							0.003	0.004	1.00	0.003	0.004	1.00
Sense of progress							−0.87***	0.24	0.42	−0.58*	0.27	0.56
Constant	−0.17	0.22	0.84	0.69	0.41	2.00	1.78*	0.83	5.94	1.59	0.94	4.88
R^2					.24			.25			.30	
Δ −2 log likelihood					16.32[b]***			16.43[c]***			4.50[d]*	

Notes. [a] The apologies condition served as a reference category. [b] Change of Model 2 and Model 1. [c] Change of Model 3 and Model 1. [d] Change of Model 4 and Model 2.
* $p < .05$. *** $p < .0001$.

Third, time fillers, perceived waiting time, and sense of progress were all entered as predictors of caller satisfaction. The complete model yielded $R^2 = .29$. In this model, perceived waiting time was not significant, $B = -0.002$, $t(78) = 0.87$, $p > .10$, whereas sense of progress was significant, $B = 0.52$, $t(78) = 4.75$, $p < .0001$, and the difference between location information and apologies was completely eliminated, $B = -0.11$, $t(78) = 0.35$, $p > .10$ (see Table 7). Follow up analyses did not support a reverse mediation model.

In short, our findings here as well did not confirm the mediation of perceived waiting time (Hypothesis 1a) while confirming the mediation of sense of progress (Hypothesis 1b). There was no difference between the music and apologies conditions (Hypotheses 2a and 2b were not supported) or the music and location information conditions (Hypotheses 3a and 3b were not supported). But, location information produced greater satisfaction than apologies as predicted by the sense-of-progress framework (Hypothesis 4). Thus, here as well, sense of progress was a more viable predictor of caller reactions than was perceived waiting time.

Summary

In addition to Study 1, Study 2 demonstrated an effect of time filler on caller reactions and sheds light on the source of the differences: Sense of progress, rather than perceived waiting time, explained the lower abandonment rate and greater satisfaction of people who received location information. The most consistent aspect of our findings is the advantage of location information over apologies. Location information was also superior to music in the abandonment rate it yielded, but this positive effect was not apparent with satisfaction. Music and apologies appear to be indistinct by our data, because they did not differ in sense of progress, perceived waiting time, or in people's reactions.

Table 6
Means, Standard Deviations, and Confidence Intervals of Caller Satisfaction in the Three Conditions in Study 2

Condition	*n*	*M*	*SD*	95% Confidence interval for *M*	
				Lower bound	Upper bound
Music	30	2.90	1.14	2.47	3.33
Apologies	27	2.56	0.86	2.22	2.89
Location information	26	3.31	1.03	2.89	3.72
Total	83	2.86	1.10		

General Discussion

In two studies we offer initial insights on the seemingly intuitive, yet previously unexamined, idea that fillers in telephone waiting situations can influence queue abandonment and satisfaction. Apologies heard while waiting were found to yield the most negative caller reactions, whereas information about location in the queue produced the most positive reactions. More broadly, results show that the sense of progress that fillers produce can predict reactions of people in the telephone queue.

Although our findings support what may appear to be common sense—the need to differentiate between effects of different telephone waiting fillers—previous research did not make this distinction. Some distinctions have been suggested, such as between interesting and uninteresting activities (Winter, 2000) or between fillers that are related or unrelated to the service (Haynes, 1990; Maister, 1985). However, ours is the first effort to empirically examine commonly used fillers, especially in relation to telephone waiting. The limited literature available considered time perception as a key factor (e.g., Zakay & Hornik, 1991), an assumption that our findings question.

Like Hui and Zhou (1996), we did not find perceived waiting time to adequately explain reactions to different telephone waiting fillers. We cannot claim that perceived waiting time does not influence reactions. Our findings show only that the particular fillers we examined did not create differences in perceived waiting time. Research may identify other fillers or specific contexts in which perception of time is a critical variable. It is also essential to

Table 7
Summary of Multiple Regression Analysis for Variables Predicting Caller Satisfaction (N = 83)

	Model 1: Time filler			Model 2: Perceived waiting time + Sense of progress			Model 3: Time filler + Perceived waiting time + Sense of progress		
Variable	*B*	*SE*	β	*B*	*SE*	β	*B*	*SE*	β
Time filler[a]									
Music	0.34	0.27	0.16				0.22	0.25	0.10
Location information	0.75**	0.28	0.33				−0.11	0.31	−0.05
Perceived waiting time				−0.002	0.002	−0.10	−0.002	0.002	−0.08
Sense of progress				0.47***	0.86	0.53	0.52***	0.11	0.58
Constant	2.56***	0.20		1.87***	0.34		2.56***	0.20	
R^2		.08			.28			.29	

[a] The apologies condition served as a reference category.
** $p < .01$. *** $p < .0001$.

consider additional limitations to this analysis and some implications for future research, as we do below.

Limitations and Future Research

A key question is whether our results can be generalized to other telephone waiting situations. The similarity between the results of our first and second studies despite the very different designs of the two studies is compelling in this regard. Moreover, our data revealed similar patterns to other telephone waiting settings (see Footnote 1 and Gans et al., 2003). These similarities suggest that our research design managed to create caller behavior that resembles behavior in larger and more natural contexts. Nonetheless, additional research is essential to examine the issue of time fillers in other settings.

Future research should also examine various variables that may affect the direction and/or strength of the relationship between telephone waiting design and caller reactions. We examined specific fillers with fixed waiting duration and queue length. It is an empirical question what will happen with different durations of the wait or different queue lengths. For example, does sense of progress also improve if the location information moves from 20th to 10th in line? And what improvement, if any, occurs when people wait for 10 min rather than 2 min? As Carmon and Kahaneman (1996) found the positive relationship between progress in a queue and satisfaction to be stronger with short rather than long queues, different results may occur when the information indicates greater distance from the service point.

Sense of progress may be influenced by other constructs as well. The significant effect of sense of progress may be a proxy for perceived control, which Hui and Zhou (1996) found to positively influence reactions to a wait. Comparing duration information (i.e., how long a wait is expected to be; cf. Hui & Tse, 1996; Hui & Zhou, 1996) to location information (i.e., where one stands in the queue) can help separate the two dynamics. Both fillers indicate progress, but duration information provides information that should provide a better sense of control than location information because it increases predictability (Averill, 1973).

Another limitation of our design was the repeated use of one particular stimulus in the different conditions. The same message, for example, was heard repeatedly in the apology condition. A different message (e.g., "We apologize for the wait") may have produced a different pattern.

Our findings support the hypotheses we developed on the basis of findings from physical waiting. The positive effect of location information in our studies is consistent with the findings of Carmon (1990, 1991) and Hui and Tse (1996) about physical waiting. This suggests that sense of progress may be a useful parameter for studying physical queues as well. However, as our introduction noted, the two types of waiting have distinct qualities, so that findings from one cannot be blindly generalized to the other.

Applied Implications

Organizations cannot avoid making customers wait on hold, because the required costs would be prohibitive. The key question therefore becomes whether and how waiting can be designed to mitigate negative reactions. We define this as a question of filling the waiting time and show that the type of time filler chosen can have important implications for customer satisfaction and call abandonment. Our findings reveal particular time fillers to produce better evaluations and lower abandonment rates by creating a sense of progress among people waiting on hold. Such fillers offer organizations one more step toward maximizing service quality.

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