MINJUNG KOO and AYELET FISHBACH*

This article examines a silver lining of standing in line: Consumers infer that products are more valuable when others are behind them. Specifically, the value of a product increases as more people line up behind a person (Study 1) and when others are present (versus absent) behind a person in line (Study 2). Value increases further when directing consumers' attention to the presence of others behind them—that is, when they look backward versus forward (Study 3) and when the queue structure emphasizes the last person to join rather than the person being served (Study 4). This effect of people in line behind them is associated with increased expenditures by queuing consumers (Study 5).

Keywords: queue, line, wait, value

A Silver Lining of Standing in Line: Queuing Increases Value of Products

Waiting in lines is a ubiquitous social phenomenon that people face every day, such as when checking in for flights, purchasing groceries, getting on rides in amusement parks, or waiting on the telephone for customer service. Waiting in lines has both economic costs (Becker 1965; Gross and Harris 1985; Newell 1982) and psychological costs, such as people's negative experiences (Bateson and Hui 1992; Carmon, Shanthikumar, and Carmon 1995; Larson 1987; Osuna 1985). Thus, much of the current research on queuing focuses on understanding and reducing its negative consequences on people's retrospective evaluations of the quality of service they received (Baker and Cameron 1996; Houston, Bettencourt, and Wenger 1999; Hui and Tse 1996; Katz, Larson, and Larson 1991; Taylor 1994; Tom and Lucey 1997).

Although queues signal the effort required to reach products, they can also provide information about the value of products. Accordingly, we examine how people infer the value of an object on the basis of their queuing experience, such as how queuing affects the expected enjoyment of an amusement park ride or the amount of money consumers spend at a store. We propose that looking behind and perceiving real or illusionary progress signals an increase in the product's value. As a result, the consumer will not only expect to like but also actually like the product more and increase his or her expenditure.

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THEORETICAL BACKGROUND

To address the effect of queuing on the value of the queue object, we employ a goal-based analysis in which standing in line is considered a means to a goal. We predict that for people standing in line, a distinct difference exists between the information they derive from the presence of people behind them versus those ahead of them. Specifically, the presence of people behind a person in line conveys information about the value of goal attainment. In contrast, the presence of people ahead of a person provides information about the required effort to attain the goal. These two inferences from a queuing experience correspond to two distinct questions people ask themselves when working toward a goal: (1) Is the goal valuable? and (2) Are they making sufficient progress toward reducing the discrepancy between their current state and goal attainment? (Koo and Fishbach 2008).

Our main focus is on inferring the value of products. To make inferences about goal value, people rely on their previous goal pursuit experiences and the strength of their engagement (Higgins 2006; Shah and Kruglanski 2002). In the course of pursuing a goal (e.g., saving for a house), accomplished actions signal to a person that a goal is desirable and commitment is high (Fishbach and Dhar 2005). Because people infer greater value from accomplished actions, they are more likely to adhere to a goal following an initial investment, that is, at the point at which they consider what they have achieved to date.

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Attitude research makes a similar point by suggesting that people learn about their preferences by observing their own prior behavior, which leads to a general tendency to select actions that resemble prior ones by serving the same underlying goals (Bem 1972; Cialdini, Trost, and Newsom 1995; Freedman and Fraser 1966). For example, research on effort justification and dissonance reduction posits a general tendency to justify prior investments by pursuing similar actions in the present (Aronson 1997; Aronson and Mills 1959; Cooper and Fazio 1984; Festinger 1957). Furthermore, research on the sunk-cost effect indicates that people justify their prior efforts by persisting with the same course of action to pursue the same goal, even in situations in which they were not successful in the past (Arkes and Ayton 1999; Arkes and Blumer 1985; Thaler 1991).

In a queuing context, the focus on accomplished actions corresponds to looking backward and attending to the presence of others in line. We predict that when people in a queue look behind (versus ahead of) them, they assume that they have invested in making the progress to date. Therefore, they infer that the product they are waiting for is more valuable to them than before investing in it. For example, amusement park visitors will infer that a ride is more enjoyable than they previously believed it was when they see more people behind them in line.

Regarding the size of the discrepancy from goal attainment (i.e., required effort), people make this inference on the basis of unaccomplished actions required to meet a goal (Carver and Scheier 1998; Higgins 1987; Locke and Latham 2002). Specifically, people in a queue are prone to seek information about the required effort to attain a goal, which they infer from the presence of the people ahead of them. When more people are ahead of them, they infer that more effort is required. For example, more people ahead of an amusement park visitor would signal to the visitor that continued effort is required to get to the ride.

We also predict an asymmetry in inferences, whereby the people behind a person signal value but are less likely to signal required effort, and the people ahead of the person signal required effort but are less likely to signal value. The focus on the people behind versus ahead of a person is independent of the person's actual position in the queue. That is, at any level of progress (e.g., the midpoint), a person can focus on the presence of people either behind or ahead of him or her, and only the focus on the people behind increases evaluation. It follows that even in situations in which a person can infer the presence of people behind him or her from the absence of people ahead (i.e., the total length of the queue is constant), looking ahead does not have the same impact on evaluation as looking back. What is salient for the person looking ahead is a lack of progress, which signals effort still needed to reach the end of the line, rather than progress accomplished, which signals value.

An alternative analysis suggests that people use total queue length as social proof that the product is worth waiting for (Cialdini 1985) because valuable products are popular and draw longer lines. If a queue only serves as a social validation cue, its total length should influence valuation, regardless of the presence of others behind versus ahead, because it indicates popularity. In contrast with this view, our analysis predicts a unique effect on value for the presence of people behind (versus ahead of) a person, independent of the effect of the total number of people waiting in line (both ahead and behind). We specifically predict that the sense of accomplishment people get from looking at those behind them has an effect on value.

Our hypothesis is congruent with previous research on the positive side effects of queuing (e.g., Carmon and Kahneman 1995) and in particular with research by Zhou and Soman (2003), who show that the presence of people behind a person in a queue decreases the likelihood that the person will leave the queue. However, this previous research does not assess product evaluations. The decision to renege can reflect lower valuation, as well as other variables, such as lower estimated time costs to reach the product or service if the person leaves the line now and decides to come back later. Presumably, if more people line up behind a person, the overall cost of getting the product would be higher were the person to join the queue later. Therefore, a reneging decision is associated only partially with product evaluation. To test for value, we explore how the presence of people behind a person in a queue influences his or her value estimates of the queuing goal, as well as the expenditure at the end of the queue.

Assuming that the presence of people behind a person increases the value of a queuing object, a related question arises: When is this inference accurate, revealing actual personal value, and when is it not? Naturally, the presence of people ahead is an objective proxy for required effort; however, the presence of people behind does not always reveal actual value, particularly when a consumer cannot infer the required time investment from such presence. Specifically, the presence of people behind a person indicates the value of the queuing goal when such presence reflects the actual time investment. Because people tend to invest more in goals that are dear to them, the number of people behind them could be a reliable heuristic for inferring value, if that number is correlated with actual investment. However, this generally useful heuristic will lead people in a queue to infer value from the people behind them even when those behind do not correspond to the actual time investment and therefore are not indicative of personal value. For example, people standing in line may infer greater value simply by attending to the presence of others behind them as a result of the structure of the queue. In a similar way, illusionary progress (Kivetz, Urminsky, and Zheng 2006; Nunes and Dreze 2006)—that is, when new people join the queue—should have a similar effect on increased perceived value. People may infer that they have made some progress from the presence of new people behind them, even when they have not actually progressed. In this case, the focus on the presence of people behind increases the perceived value of the queuing goal, even when it is not correlated with actual time investment.

We assume that people ask about value only to the extent that this information is somewhat unavailable, that is, whenever the value of the queuing goal is ambiguous or not fully known. If people have a clear idea of the value of a product before joining the queue, they should not derive additional value information from the presence of others behind them. For example, we predict that when people join a line to a novel amusement park ride or a new bakery, the presence of people behind them will inform them that the ride is enjoy-

able or the bakery products are tasty to a greater extent than if these products were familiar.

In terms of the downstream consequences of inferring value, we predict that value inferences increase goal adherence, for example, by inducing consumers to increase their expenditures on products or services at the end of the queue. The presence of others behind a person in a line to order food could influence the person's expected liking of the food, which in turn could affect the amount the person spends on the order or how much of it he or she consumes.

OVERVIEW OF RESEARCH

We propose that people infer value on the basis of accomplished actions, which correspond to the presence and number of people behind them in a queue. Therefore, emphasizing the presence of people behind someone in a queue should increase the value of the queuing goal. We predict that both the actual presence of people behind (but not people ahead of) someone in a queue and the attentional focus on the people behind (versus ahead of) someone in a queue will increase this person's evaluation of the queue object. As a result, those in line will infer higher value of products (1) as the number of people behind them increases and (2) when they focus on the people behind versus ahead of them. We further predict that the presence of others ahead of someone in a queue will lead this person to infer the required effort to reach the product but not the value of the product.

Five studies test our hypotheses. In Studies 1 and 2, we examine the effect of the actual number of people behind (versus ahead of) a person on the evaluation of products. Study 1 assesses the number of people behind and ahead of a person in a queue in a natural field setting (bagel sandwich store), and Study 2 manipulates the presence of people behind and ahead of a person in a fully controlled experimental setting. In Studies 3 and 4, we manipulate participants' attention to the presence of people behind versus ahead of them to examine whether a focus on the people behind them increases value more than a focus on the people ahead of them. Specifically, Study 3 directs participants' attention to the presence of people behind or ahead in a natural field setting (amusement park ride), and Study 4 manipulates the structure of a queue in an experimental setting in which participants are directed to note the last person that joined the queue (behind them) or the person currently being served (ahead of them). Finally, Study 5 is a field study that examines the implications of value estimates by testing the effect of the number of people behind (versus ahead of) a person in a queue on that person's expenditure.

STUDY 1: THE NUMBER OF PEOPLE BEHIND

This field study examines whether people in a queue infer the value of a product from the number of people behind them. We asked customers standing at different positions in a queue of a local bagel shop to estimate their expected enjoyment from their meal and the required effort to reach it. We independently recorded the number of people standing behind and ahead of them. We predicted that the number of people behind a person would increase his or her perceived value of the product, whereas the number of people ahead of a person would increase his or her perceived effort to reach the product.

Method

This study employed a within-subject design with one factor: the number of people behind versus ahead of a person in a queue. Thirty participants (16 women, 14 men) were recruited from a queue at a bagel shop on a large midwestern U.S. university campus, where students and faculty members purchase customized bagel sandwiches for immediate consumption.

To minimize the effect of time of day, we conducted the entire study during a busy lunchtime. During that time, the total queue size varied from 4 to 14 customers. An experimenter sampled individual participants standing in the queue by asking them to complete a short survey while waiting in line. Meanwhile, another experimenter unobtrusively recorded the number of people standing behind and ahead of each surveyed participant.

To increase the variance in the number of people behind and ahead of the participants, we recruited participants in different positions in the queue. An experimenter who was blind to our hypothesis approached people at the one-third and two-third positions of the queue. For example, when the total queue size was nine people, the experimenter sampled the people standing at the third and sixth position. After sampling two participants, the experimenter waited until new customers replaced the entire queue. No participants left the queue before completing a purchase.

To measure participants' evaluation of their meal, we asked them to rate the extent to which they expected to enjoy the sandwich they were about to purchase (seven-point scale: 1 = "not at all," and 7 = "very much"). As a measure of the required effort to get their meal, participants indicated how long they expected to wait to get their sandwich (seven-point scale: 1 = "only a little," and 7 = "very long"). We counterbalanced the order of these two items.

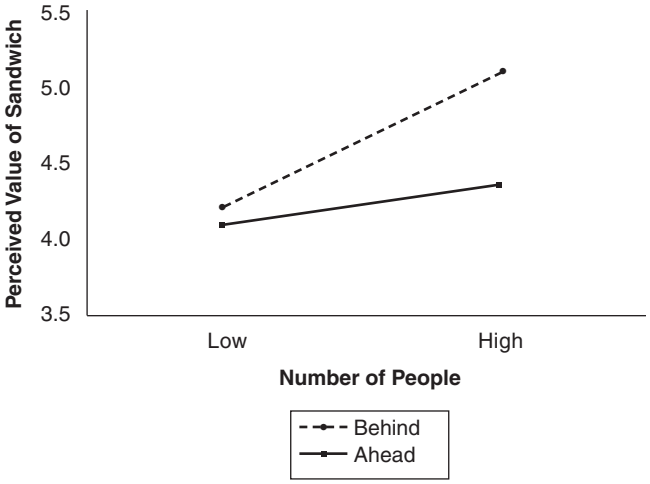
Results and Discussion

We tested the effect of the number of people behind (M = 3.38, SD = 2.22) and ahead of (M = 4.62, SD = 2.49) the participant on the value and effort ratings. Because the total queue size changed over time, the number of people behind and ahead of the participants was not significantly correlated ($r = -.30$, $p > .10$), which enabled us to evaluate the effect of these two factors independently. We further controlled for these effects statistically by entering two predictors—the number of people behind and ahead of participants—to the regression analyses.

In support of our prediction, a regression of the value measure on the two predictors yielded a positive effect for the number of people behind ($b = .40$, $t(27) = 2.16$, $p < .05$) but not for the number of people ahead ($b = .12$, $t < 1$; see Figure 1).[1] In addition, a similar regression of the effort measure yielded a positive effect for the number of people ahead ($b = .59$, $t(27) = 3.55$, $p < .01$) but not for the number of people behind ($b = .26$, $t(27) = 1.57$, $p > .13$). Thus, when we controlled for the number of people ahead of participants in the queue, more people behind them increased their perceived enjoyment of the product. When we controlled for the number of people behind the participants in the queue,

[1]We report standardized coefficients here and in subsequent analyses.

Figure 1
STUDY 1: PERCEIVED VALUE OF THE SANDWICH AS A FUNCTION OF THE NUMBER OF PEOPLE BEHIND AND AHEAD



Notes: Following Aiken and West (1991), we present the value predicted by the regression model to obtain a ±1 standard deviation from the means.

more people ahead of them increased their perceived effort to reach the product.

The zero-order correlations yielded a similar pattern. The number of people behind the participants predicted value ($r = .37$, $p < .05$) but not effort ($r = .08$, not significant [n.s.]). In contrast, the number of people ahead of the participants predicted effort ($r = .51$, $p < .01$) but not value ($r = .00$, n.s.). In addition, the total length of the queue (ahead and behind) did not predict value ($r = .29$, $p > .10$) but did predict effort ($r = .52$, $p < .01$), which suggests that participants inferred different information from the number of people behind (value) and ahead of (effort) them in the queue.[2]

These results provide initial field-based evidence that people infer value from the presence of others behind them in a queue, which signals personal investment. In addition, they do not infer value from the presence of others ahead of them, which instead leads them to infer effort, or from the total length of the queue. Because the participants did not infer value from the total length of the queue, we can rule out an alternative interpretation—the presence of others, regardless of their position, provides social proof that the queuing goal is valuable. Although the length of the line may have signaled the value of the product before the person joined the queue (i.e., people infer that popular sandwiches draw long lines), a unique effect of the presence of people behind those already in line existed that was independent of the presence of others in general.

Because Study 1 was a field study, it suffered from some limitations associated with the lack of experimental control. In addition, the study could not distinguish between the effect of illusionary progress (i.e., when new people join the queue) and actual progress (i.e., time investment). To address these limitations, Study 2 adopted a fully controlled experimental design that manipulated both the presence of people behind and the presence of people ahead of the participants while holding the actual time investment constant. Using an experimental design, we investigated whether people inferred greater value for products if others joined the queue after them, even if they did not make actual progress.

[2]A similar analysis conducted on participants' sampling position (one-third and two-thirds) revealed that the position did not predict value ($r = –.16$, $p > .30$) or effort ($r = .19$, $p > .30$), which implied that the inferences of both value and effort were based not on participants' relative position in the queue but rather on the absolute number of people behind and ahead of them.

STUDY 2: THE PRESENCE OF PEOPLE BEHIND

Study 2 examines whether the presence (versus absence) of people behind someone in a queue increases perceptions of the value of the queuing goal in a fully controlled experimental design. We recruited participants for a taste test study in which they sampled an unfamiliar smoothie. To manipulate the presence of people behind and ahead of participants in a queue, two confederates either joined the queue behind the participant or did not, and another two confederates either were standing in a queue ahead of the participant or were not. We predicted that when others joined the queue after the participant, the participant would expect to enjoy the smoothie more and prefer it over monetary compensation than when no one joined the queue. Furthermore, we anticipated no similar effect on expected enjoyment for the presence of people ahead of the participant in a queue.

Method

This study employed a 2 (people behind: two versus none) × 2 (people ahead: two versus none) between-subjects design. Sixty-three participants (37 women, 26 men) were recruited for a taste test study at a large midwestern U.S. university campus. A table set up in the hall of a student facility offered a "smoothie sample tasting study." Experimenters solicited participants (if they did not voluntarily approach) passing by and randomly assigned them to the four conditions. The participants completed the study one at a time.

We presented the study as a blind taste test. Participants' task was to sample an unfamiliar smoothie presented as a "new brand of smoothie with a flavor of mixed berries." The smoothie sample was served in a small cup.

To manipulate the presence of people behind, half the participants completed the study after two confederates lined up behind them, and the other half completed the study with no people behind them. To manipulate the presence of people ahead of the participant in the queue, half the participants completed the study in the absence of people ahead of them, and the other half completed the study in the presence of two confederates ahead of them. The confederates, all men, were undergraduate students at the same university as the participants.

Approximately 30 seconds after participants joined the queue and before they tasted the smoothie, an experimenter handed a survey to all the people in the queue (participant and confederates), which they completed at that time. The time between joining the queue and receiving the survey was equal across conditions. No one joined or left the queue during this time. The experimental survey measured the expected value of the smoothie sample. Participants reported the extent to which they expected to enjoy the sam-

ple smoothie before they tasted it (seven-point scale: 1 = "not at all," and 7 = "very much"). After tasting the sample, participants also reported their actual enjoyment of the sample on the same scale, and they indicated their preference for compensation between a cup of the smoothie and $.50 (seven-point scale: 1 = "definitely $.50," and 7 = "definitely smoothie"). After completion of the study, an experimenter debriefed and dismissed the participants, none of whom expressed awareness of the experimental manipulation.

Results and Discussion

We analyzed the expected enjoyment ratings of the smoothie. In support of our prediction, a people behind × people ahead analysis of variance (ANOVA) yielded the predicted main effect for people behind the participant in the queue ($F(1, 59) = 6.14$, $p < .05$; see Figure 2). Neither a main effect of people ahead nor an interaction effect was significant ($F < 1$). That is, regardless of the presence of people ahead, when the confederates lined up behind, the participants expected to enjoy the smoothie sample more ($M = 5.46$, $SD = 1.07$) than when no confederates lined up behind ($M = 4.39$, $SD = 1.66$).

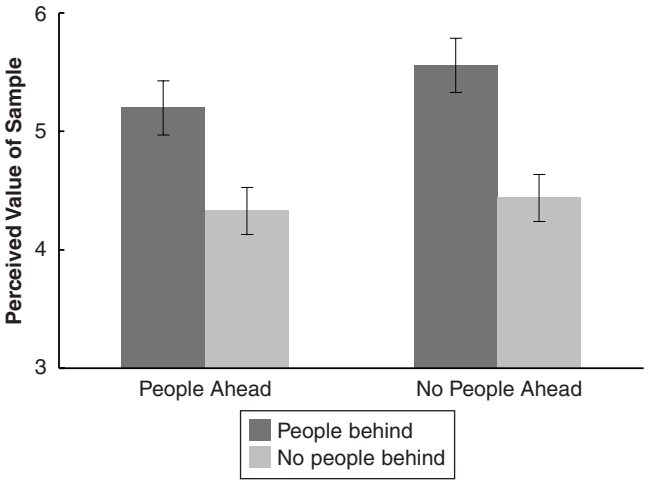
We also analyzed participants' actual enjoyment ratings after tasting the smoothie. An ANOVA of posttasting enjoyment yielded the predicted main effect for people behind the participant in the queue ($F(1, 59) = 3.93$, $p < .05$). Neither the main effect of people ahead nor an interaction effect was significant ($F < 1$). This main effect indicated that participants enjoyed the sample more when others lined up behind them ($M = 5.20$, $SD = 1.59$) than when no others lined up behind them ($M = 4.42$, $SD = 1.73$), and there was no effect of people ahead of them on their actual enjoyment. Apparently, adding people behind the participant increased their actual enjoyment from the sampled smoothie.

We conducted a similar analysis on the ratings of participants' preference for compensation. In support of our expectation, a people behind × people ahead ANOVA yielded the predicted main effect for people behind the participant in the queue ($F(1, 59) = 11.02$, $p < .01$). Neither a main effect for people ahead nor an interaction effect was significant ($F < 1$). Regardless of the presence of people ahead of the participants in the queue, participants preferred a cup of smoothie over monetary compensation in the presence of people behind them ($M = 3.88$, $SD = 2.39$) more than in the absence of people behind them ($M = 2.14$, $SD = 1.76$).

Study 2 also revealed that the presence (versus absence) of people who lined up behind a person increased the perceived value of a product, but there was no similar effect for the presence of people ahead of the person. Because we experimentally manipulated the presence of people behind and ahead, it did not correspond to the actual time spent in the queue and could not reveal actual preferences. Therefore, we conclude that people infer value from illusionary progress toward the queuing object, even when it does not correspond with actual progress (i.e., time investment).

In addition, because the presence of people ahead of a participant had no influence on the evaluation of the smoothie, we can again rule out an alternative possibility that the presence of people behind the participant in the queue increased value by providing social proof that the product was valuable. This alternative would predict that the presence of people in a queue signals value, regardless of their position (ahead or behind), but we find that for people standing in line, only the presence of people behind increased value.

Figure 2
STUDY 2: PERCEIVED VALUE OF THE BEVERAGE SAMPLE AS A FUNCTION OF THE PEOPLE BEHIND AND AHEAD



It could still be argued that both people behind and ahead of someone in a queue provide information about value, but the presence of people ahead of someone in a queue provides negative information about required effort, which cancels out the positive information on value. However, this alternative is less likely because the required effort would reduce the value of the wait experience, whereas we find effects on the value of the product itself (i.e., smoothie). By measuring the value of the products, rather than the queuing experience, we can tease apart inferences regarding value versus effort.

Thus far, our studies have investigated the effect of the number or presence of people behind a person in a queue on his or her evaluation of a product. Next, we investigate whether an attentional focus on people behind someone is sufficient to improve his or her evaluation. We predict that by directing people's attention to the presence of others behind (versus ahead of) them in a line, we can increase their evaluation because looking behind makes their accomplishments more salient. This effect should be independent of the actual presence of people lining up behind the person.

STUDY 3: LOOKING BACK AT OTHERS IN A LINE

Study 3 is a field study conducted in an amusement park. It tested whether park visitors standing in line inferred that a ride was more valuable when their attentional focus centered on those behind (versus ahead of) them. To manipulate attentional focus, we asked the amusement park visitors to look backward (versus forward) to estimate the number of people behind (versus ahead of) them in the queue to a ride. Then, they indicated their expected enjoyment of the ride.

In addition, Study 3 tested whether value ambiguity moderates the effect on value. Unlike the previous studies that used ambiguous experiences, we manipulated value ambi-

guity and predicted that people use information about the people behind them to infer value only in the absence of more direct information. In the amusement park context, the presence of people behind the participant in line should increase value only when that value is somewhat unknown. If the participant already knows that the value is high, he or she should not infer the value of the ride from the presence of others. Thus, we predicted that looking backward (versus forward) would increase perceived value but only if the value of the ride was somewhat ambiguous, that is, if the ride was not familiar or popular.

Method

This study used a 2 (ride type: familiar versus unfamiliar) × 2 (focus: backward versus forward) between-subjects design. Seventy-nine participants (53 women, 26 men) were recruited from queues in an amusement park in South Korea. Two participants did not complete the value measures and were dropped from the study. Participants were standing in queues for either a familiar, popular ride, for which value ambiguity was low ("Pharaoh's Fury"; $M_{estimated\ length}$ = 102.24 people, SD = 34.38, M_{time} = 45 minutes), or a less familiar, unpopular ride, for which value ambiguity was high ("Spinning Basket"; $M_{estimated\ length}$ = 59.08 people, SD = 19.30, M_{time} = 25 minutes). Pharaoh's Fury is a signature ride in the amusement park and has appeared in commercials; thus, its value was not ambiguous to park visitors before they completed the ride. However, Spinning Basket was a rather unfamiliar ride that most visitors encountered for the first time when they visited the park; thus, in general, its value was ambiguous.

To reduce the variance between the number of people behind and ahead of the participants in the lines, the experimenter approached only those who were standing in the middle of the lines. After sampling each participant, the experimenter waited until the line moved and the sampling position was filled with new visitors before approaching the next person. Half the participants were randomly selected to look backward and estimate how many people were standing behind them, and the other half were asked to look forward and estimate how many people were standing ahead of them. To assess the perceived value of the ride, the experimenter asked participants in both conditions to rate the extent to which they wanted to go on the ride and expected to enjoy the ride (seven-point scale: 1 = "not at all," and 7 = "very much"). Finally, participants indicated on seven-point scales how often they visited the amusement park and how popular each ride was.

Results and Discussion

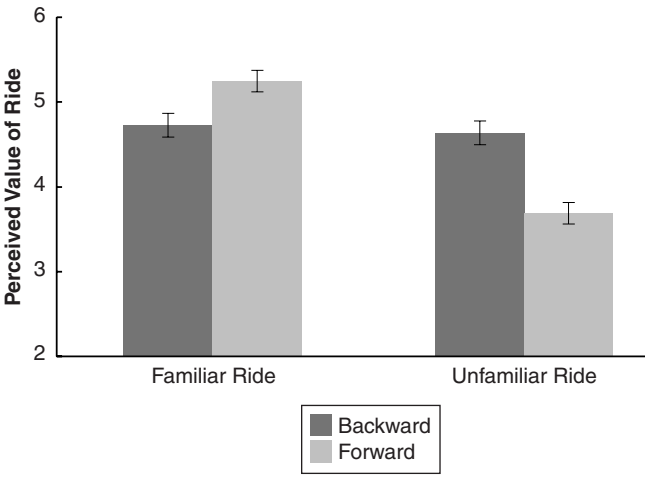
A ride type × focus ANOVA on the popularity ratings yielded a main effect only for the ride type ($F(1, 73) = 18.62$, $p < .01$; all other Fs < 1), indicating that the predicted familiar ride was more popular (M = 4.60, SD = 1.41) than the predicted unfamiliar ride (M = 3.33, SD = 1.29). Thus, we can reasonably assume that participants had better information about the value of the familiar ride. Another ride type × focus ANOVA on the frequency of visiting the amusement park did not yield any effect or interaction (F < 1). Although we did not have a random allocation for the ride-type variable, these results indicate that participants in the queue for the familiar versus unfamiliar ride had similar prior exposure to the amusement park. In addition, participants' estimates of the number of people behind and ahead of them were similar for each ride (familiar: $M_{backward}$ = 50.49, $M_{forward}$ = 51.75; t < 1; unfamiliar: $M_{backward}$ = 29.00, $M_{forward}$ = 30.17; t < 1). Because we sampled participants in the middle of the queues, the finding that those in both backward and forward conditions provided similar estimations suggested that the focus manipulation did not systematically affect the accuracy of their estimations.

To test our hypothesis, we collapsed the value measures (r = .70, $p < .001$). A ride type × focus ANOVA of the value index yielded a main effect for ride type ($F(1, 73) = 8.46$, $p < .01$), indicating more positive evaluations of the familiar ride (M = 5.00, SD = 1.35) than the unfamiliar ride (M = 4.20, SD = 1.22). There was no main effect for focus (F < 1). This analysis also yielded the predicted ride type × focus interaction ($F(1, 73) = 6.65$, $p < .05$; see Figure 3).

Contrast analyses showed that for the unfamiliar ride, participants who directed their attention backward evaluated the ride more positively (M = 4.64, SD = 1.31) than those who directed their attention forward (M = 3.69, SD = .90; $t(37) = 2.61$, $p < .05$). However, for the familiar ride, the evaluations of the ride were similar for those who directed their attention forward (M = 5.25, SD = 1.28) and backward (M = 4.73, SD = 1.41; $t(36) = -1.18$, $p > .20$). In addition, looking backward in the queue for the unfamiliar ride increased positive evaluations (M = 4.64), such that they were not significantly different from the evaluations of the familiar ride, regardless of the focus condition ($M_{backward}$ = 4.73; t < 1; $M_{forward}$ = 5.25; $t(36) = 1.57$, $p > .10$). It appears that we were able to increase the expected value of an unfamiliar ride up to the level of a familiar one simply by directing visitors to attend to the presence of people behind them.

These results extend our findings in two ways. First, we found that focusing people's attention on the side of the queue that represented accomplished actions increased their perceived value, independent of the actual number of people (behind and ahead) and time spent in line, which

Figure 3
STUDY 3: PERCEIVED VALUE OF FAMILIAR VERSUS UNFAMILIAR RIDES AS A FUNCTION OF LOOKING BACKWARD VERSUS FORWARD



remained similar across the attentional focus conditions. Second, the ambiguity of value moderated the effect of looking backward versus forward on evaluations. These findings have implications for marketers who want to increase the value of somewhat ambiguous products (e.g., a new ride). They can increase the value of a product by directing consumers' attention to the people behind rather than ahead of them, even when the actual number of people in line is constant. For example, marketers could design a line system that makes the presence of people behind them more salient (e.g., using a mirror), thus increasing product valuation.

We designed another study to test more directly for the underlying mechanism of value inferences. We predict that the presence of people behind someone in a queue signals personal accomplishment, which in turn increases this person's evaluation of a product. Thus, the perception of making progress in the line should mediate the effect of directing attention backward (versus forward) on value. In addition, Study 4 extends the previous findings by employing a different manipulation of attentional focus on the presence of people behind (versus ahead). To this end, we studied a "take-a-number" system that retailers, government, health providers, and airlines, among others, all successfully use. Using this queuing system, service providers distribute numbers to people in a queue to manage the order of service. We explored two structures of this system. In one structure, the number being served was indicated (e.g., "Now Serving Number X"), which made the presence of people ahead of the participant salient. In the other structure, the number taken by the next person who joined the queue was indicated (e.g., "Please Take a Number"), which made the presence of people behind the person salient. We predicted that a focus on the number to be taken by the next person (behind) would increase people's perceived value of their queuing goal more than a focus on the number being served (ahead).

STUDY 4: THE TAKE-A-NUMBER QUEUING SYSTEM

This study used another taste test to examine whether a focus on the presence of people behind (versus ahead of) someone increases perceived progress, which in turn increases the attractiveness of the food sample. We distributed numbered tickets to participants who were waiting to sample an unfamiliar cookie. In our take-a-number systems, participants saw either the number to be taken by the next person to join the line or the number being served.

Specifically, in the system focused on the people behind, participants saw what number was available for the next person to join the line. In the system focused on the people ahead, participants saw what number was being served at the moment. For the dependent variables, participants indicated their perceived progress in line and expected enjoyment of the sample cookie. We predicted that a queue structure that emphasized the presence of people behind (versus ahead) would increase the perception of progress in the queue and, consequently, the expected enjoyment of the sample cookie.

Method

This study employed a 2 (queuing system: behind versus ahead) between-subjects design. Forty-seven participants (27 women, 20 men) were invited to participate in a taste test in return for monetary compensation. We advertised the study among undergraduate students, who participated on a walk-in basis at a midwestern U.S. university.

We conducted the study in an experimental lab with two rooms: one for waiting and the other for the actual taste test. Participants first entered a waiting room to pick a numbered ticket (from 15 to 30) that marked their position in the line to the taste test. In the room, a confederate played the role of a participant waiting to be called. After that confederate was called for the taste test, he left the room, and the experimenter invited another person, also a confederate, to enter the waiting room and receive a number while the participant was waiting. Using this method, all participants had one person ahead of them and another person behind them. The confederates were all undergraduate male students.

We swapped the queue system four times during the experiment to ensure that participants were randomly assigned to the two focus conditions. In the focus on the people behind queue system, the number available for the next person who joined the line was posted on a 10 × 10-inch white board set up in the center of the waiting room. When the participant entered the waiting room, he or she picked a number from the white board, which immediately revealed the number for the next person to join the line. The confederate who came in after the participants did the same. The participants handed the number to the experimenter when called in to the taste test. This queue system allowed the participants to view the two numbers right after them on the board.

In the focus on the people ahead queue system, the number being served at the moment was posted on the board. Experimenters gave each participant a numbered ticket when he or she joined the line, and the participant posted it on the board when called in to the taste test. This queue system allowed participants to view the two numbers right before them.

While participants were waiting for the taste test, they completed a survey, which included the main dependent variables. Each participant completed this survey about five minutes after arriving in the waiting room, when he or she was next in line to be served. In the survey, participants first provided some demographic information and reported how often they ate snacks (we obtained similar ratings across conditions; $t < 1$). They then read that they were going to taste a new type of chocolate-covered cookie with orange filling. Next, to measure perceived progress in the queue, participants indicated how far along they believed they were in line at the time they completed the survey (i.e., "I completed this survey …"; seven-point scale: 1 = "immediately after joining the line," and 7 = "after making some progress in the line"). Recall that everyone received the survey about five minutes after they joined the line. Thus, their answers reflected their perceived progress in the queue. Finally, participants indicated the extent to which they expected to enjoy the sample cookie (seven-point scale: 1 = "not at all," and 7 = "very much").

The participants completed the actual taste test in a different room. After eating the cookie, they reported their actual enjoyment of it on the same scale, were debriefed, and were dismissed.

Results and Discussion

An analysis of perceived progress supported our prediction: Participants in the focus-behind queuing system indicated making more progress in line (M = 4.28, SD = 1.37) than those in the focus-ahead queuing system (M = 3.14, SD = 1.55; t(45) = 2.68, $p < .01$). Another analysis of expected enjoyment supported our expectation about value: Participants in the focus-behind queuing system indicated that they expected to enjoy the sample cookie more (M = 4.72, SD = 1.24) than those in the focus-ahead queuing system (M = 3.86, SD = 1.58; t(45) = 2.08, $p < .05$). The absolute number participants received (between 15 and 30) did not affect their value estimates (r = .00, n.s.).

The perception of accomplished progress mediated the effect on expected evaluation (see Figure 4). Specifically, the focus on the people behind (versus ahead) directly increased participants' expected enjoyment of the sample cookie (b = .30, t(45) = 2.08, $p < .05$). In addition, the focus on the people behind (versus ahead) increased perceived progress (b = .37, t(45) = 2.68, $p < .01$), which in turn increased expected enjoyment (b = .43, t(45) = 3.19, $p < .01$). When we controlled for perceived progress, the path between the focus manipulation and the expected enjoyment became nonsignificant (b = .16, t(44) = 1.09, $p > .20$), whereas the path between focus and perceived progress remained significant (b = .37, t(44) = 2.56, $p < .05$). The Sobel test statistic indicated that the reduction of the focus effect on expected enjoyment was marginally significant (z = 1.87, $p = .06$).

Participants' actual enjoyment of the sample cookie after they tasted it did not vary across focus conditions (t < 1). Recall that in Study 2, participants' expectations were further reflected in their posttasting evaluations, such that those who had others lined up behind them actually liked the sampled smoothie more. In contrast, in this study, the taste experience washed out the effect of the focus manipulation, which we speculate is because the sampled cookie was more unique than the rather neutral smoothie drink; thus, participants were less ambiguous about their evaluations. We assume that when participants have a clear and strong opinion about the taste of a sample, they are less likely to infer taste from their queuing experience.

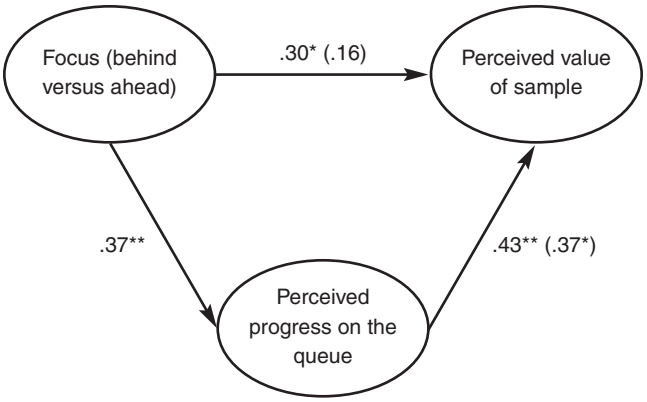
These results extend our previous findings. We found that participants' focus on the presence of people behind (versus ahead of) them increased their perceived progress in the line, which in turn increased their expected enjoyment from the cookie. These results further offer clear implications for marketers who want to design a queuing system that increases the value of products. In a take-a-number system, emphasizing the number that is available for the next person who joins the line is more effective than emphasizing the number that is currently being served.

Thus far, our studies have assessed the value of a product for which participants were waiting, which should have downstream consequences for consumption. Accordingly, in Study 5, we tested for the implications of more positive evaluation on increased consumption.

STUDY 5: IMPLICATIONS FOR EXPENDITURES

An implication of improved evaluations is that consumers should increase their expenditures on products, such as by consuming more items, purchasing an upgrade, or choosing an improved model. Accordingly, Study 5 tests whether an increase in the number of people who joined a line at a university cafeteria increased patrons' expenditures when they reached the end of the line.

Figure 4
STUDY 4: PATH MODEL OF THE EFFECT OF THE FOCUS ON PEOPLE BEHIND VERSUS AHEAD ON PERCEIVED PROGRESS AND PERCEIVED VALUE OF THE FOOD SAMPLE



*$p < .05$.
**$p < .01$.
Notes: Numbers not in parentheses are standardized betas. Numbers in parentheses are zero-order standardized betas.

Method

This study employed a within-subject design with one factor: the number of people behind versus ahead of a patron. An experimenter unobtrusively recorded the behavior of 80 customers (37 women, 43 men) who joined a line at a university cafeteria of a large midwestern U.S. university campus during a busy lunchtime.

The study was conducted at a university cafeteria where students and faculty members purchase lunches, snacks, and coffee drinks for immediate consumption. The cafeteria is organized such that most of the items for purchase are off the shelf (e.g., soda, salad, packaged sandwiches) and available along the line to the cashier, constituting self-service items. Customized coffee drinks and several bakery items can also be ordered toward the end of the line, just before each customer reaches the cashier stand. Because customers decide on most of their purchases while progressing in line, we were able to assess the simultaneous influence of the people behind and ahead of the participants on their purchase decisions.

Specifically, an experimenter tracked each participant from the time he or she entered the line until he or she reached the end of the line and made a purchase. No participants in this study left the queue. During this time, queue lengths varied from 3 to 15 people, and the total wait time was up to five minutes. While waiting, participants picked their food and ordered coffee drinks before reaching the end of the queue.

To test our prediction, we noted three pieces of information for each participant: (1) the number of people ahead when he or she joined the line (total length at the joining moment), (2) the number of people behind when he or she

made a purchase at the end of the line (total length when the participant reached the cashier), and (3) the amount of money he or she spent.

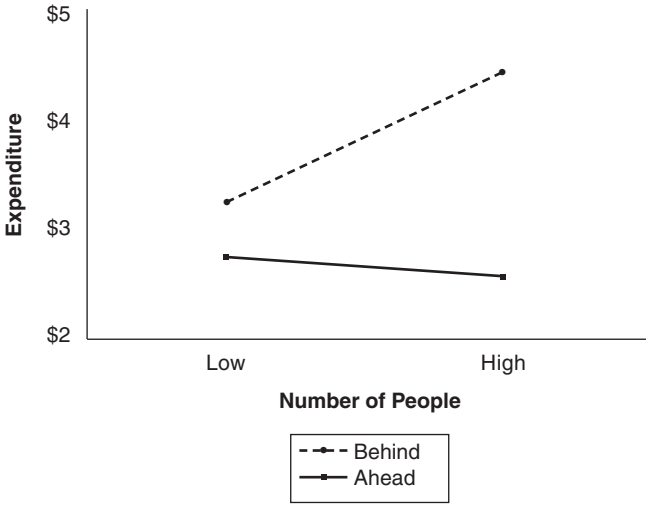
Results and Discussion

We tested the effect of the number of people behind participants when they reached the cashier (M = 5.73, SD = 3.56) and ahead of participants when they joined the line (M = 6.43, SD = 2.52) on monetary expenditures. Notably, the two independent variables were positively correlated (r = .38, $p < .001$) as a result of changes in consumer density (i.e., how crowded the line was) over time. We statistically controlled for the effect of the number of people ahead of the participants by including it as another factor in the regression analysis.

In support of our predictions, a regression of the amount of money spent on the number of people behind and ahead of the participant yielded a positive effect for the number of people behind (b = .33, t(77) = 2.83, $p < .01$) but not for the number of people ahead (b = –.05, $|t| < 1$; see Figure 5). Thus, when we controlled for the number of people ahead of the participant when he or she joined the queue, more people behind the participant at the end of the line resulted in a greater amount of money spent. The zero-order correlations yielded a similar pattern; we predicted expenditures by the number of people behind (r = .31, $p < .01$) but not by the number of people ahead of (r = .07, $p > .50$) the participants.

The number of people ahead of a participant when he or she joined the line did not affect expenditures; thus, it was unlikely that participants spent more money because they had more time to select products. This null effect further ruled out an alternative explanation that the presence of others increased perceptions of scarce resources (i.e., products might run out soon) or induced participants to combine two consecutive purchases in one visit to save time; both the people behind and the people ahead of the participant could convey this information. It could still be argued that only the number of people behind a person was salient at the purchase point, when participants reached the cashier. However, because participants chose most of their products while standing in line, the numbers of people behind and ahead of them were similarly salient during the selection period. Therefore, we can conclude that the presence of people behind the participants increased their perception of accomplishment, which is associated with value, and caused the increase in expenditures.

Figure 5
STUDY 5: EXPENDITURES AS A FUNCTION OF THE NUMBER OF PEOPLE BEHIND AND AHEAD



Notes: Following Aiken and West (1991), we present the value predicted by the regression model to obtain a ±1 standard deviation from the means.

GENERAL DISCUSSION

Waiting in line has both economic and psychological costs (Bateson and Hui 1992; Becker 1965). Thus, the majority of prior research on queuing has focused on the negative consequences of queues (Katz, Larson, and Larson 1991; Larson 1987) and, in particular, on how queuing reduces evaluations of service quality (Houston, Bettencourt, and Wenger 1999; Taylor 1994). In contrast with previous research, we view queuing as a goal-directed behavior and examine a positive downside of queuing, that is, how standing in lines provides information about the value of the queuing goal (i.e., products). We propose that when people are part of a queue, the presence of others behind them is a proxy for accomplished actions. Because people infer value from their accomplished actions (Bem 1972; Higgins 2006; Koo and Fishbach 2008), the presence of others behind them signals that the queuing goal is more valuable. In contrast, the presence of others ahead is a proxy for unaccomplished actions and therefore does not increase the perceived value of the queuing goal. Rather, the presence of others ahead in a queue signals required effort.

The results across the five studies support this analysis. Study 1 demonstrated that as the absolute number of people behind a person increased, the perceived value of a bagel sandwich increased. Conversely, number of people ahead of a person did not affect the perceived value but rather increased the perceived effort to reach the purchase point. Study 2 further showed that an experimental manipulation of the presence (versus absence) of people behind a person in a queue increased the expected value of a food sample, but there was no effect for the presence (versus absence) of people ahead of a person.

Studies 3 and 4 showed that the attentional focus on the presence of people behind (versus ahead of) a person in a queue increased perceived value, regardless of the actual number of people in the queue. Specifically, Study 3 revealed that drawing attention to the presence of people behind (versus ahead of) a person in a line for an amusement park ride increased the perceived value of the ride. This study further showed that the effect on value depended on whether the value of the queuing goal was somewhat ambiguous. When the value of the ride was ambiguous, attentional focus on the people behind the participant increased perceived value more than attentional focus on the people ahead of the participant. Study 4 tested for the underlying mechanism of inferring value from the people behind. It revealed that a queue structure that emphasized the people behind (versus ahead of) a person led to greater perceived progress in the queue, which translated into more favorable expectations about enjoying a product—in this case, a food sample. Finally, Study 5 investigated the down-

stream behavioral consequences of making inferences about the perceived value and showed that a larger number of people behind someone in a queue resulted in greater money expenditures at a store.

Taken together, these studies demonstrate the silver lining of standing in line: Consumers standing in a queue derive information about value from the people behind them. The presence of people behind has a unique effect on value, which is not driven by the effect of the total number of people in line. We further found no effect for the presence of people ahead of a person on value. Notably, the total length of the line may still influence evaluations before joining the line by suggesting that the product is popular (Cialdini 1985). However, our results indicate that when people join the line, they infer value only from the presence of people behind them. Then, because consumers tend to form their evaluations mainly on the basis of their experience at the end of the queue, where their progress is at its maximum and their evaluation is at its peak (Ariely and Carmon 2000; Carmon and Kahneman 1995), it is likely that queuing experiences have a net positive impact on their retrospective evaluations of products.

In general, the motivation to adhere to a goal can be a function of estimates of value or, alternatively, the size of the discrepancy between a person's current state and goal attainment (Carver and Scheier 1998; Higgins 1987). Accomplished actions drive goal pursuit because they increase the person's positive evaluation of the goal, which increases her or his sense of commitment to goal pursuit. Conversely, unaccomplished actions drive goal pursuit because they create a sense of a lack of sufficient progress, which increases the desire to reduce the discrepancy between the current position and goal attainment. In a queue context, the presence of people behind a person signals value, and the presence of people ahead of a person signals effort. It follows that "backward-looking" people may pursue the queuing goal because they infer greater value, whereas "forward-looking" people may pursue the goal because they infer that the required effort is not too high. Therefore, backward-looking people may end up enjoying their queuing experience more than forward-looking people.

In several important ways, our findings extend previous research on the effect of the number of people behind someone in a queue on the decision to renege (Zhou and Soman 2003). First, we investigate the effect of people behind someone in a queue on perceived value, which is distinct from the decision to renege. Motivation to act (e.g., renege) is often a joint function of several variables, including perceived value, estimated cost, and expectancy of attainment (Feather 1982; Lewin et al. 1944; Tolman 1955; Vroom 1964). Distinguishing among these separate effects by observing reneging decisions is difficult, which is why we measured people's evaluations and purchase decisions. In addition, whereas reneging decisions can be explained in terms of downward social comparisons, a comparison between the participant's position and others' positions only applies to inferences about effort (i.e., "I need to invest less time and effort than others behind me"). It does not apply to inferences of value, because consumers need not subscribe to a lay theory that relates evaluations to their position in the line (i.e., "I value the product more than others behind me"). Instead, downward social comparisons can be a source of increased perceived accomplishment, which increases value. Specifically, consumers may infer higher value from the presence of people behind them because they believe that they have accomplished more than others who just joined the line. In this way, social comparison influences evaluation by creating a sense of personal accomplishment (Kivetz and Simonson 2003). For example, Fishbach and Dhar (2005) employ a social comparison standard (downward versus upward) to manipulate participants' perceived goal accomplishment and increase their commitment to a goal.

Second, our findings extend previous research on illusionary progress. People work harder on a goal if they believe they have made progress toward it (Kivetz, Urminsky, and Zheng 2006; Nunes and Dreze 2006). For example, Kivetz, Urminsky, and Zheng (2006) find that consumers who received a 12-stamp coffee card with 2 preexisting bonus stamps—illusionary progress—showed greater motivation to collect stamps than those who received a regular 10-stamp card. However, because motivation is a function of several variables (e.g., value, expectancy, estimated cost), it has been unclear in previous studies whether illusionary progress increases value. Participants' greater motivation in previous studies could result from their heightened goal expectancy or estimation of less effort to achieve the goal. Forster, Higgins, and Idson (1998) provide an account of the "goal-looms-larger" effect, which does not assume changes in evaluation. According to these researchers, the increased motivation as a person approaches a goal end state reflects the person's perception that less effort is needed to complete the goal; thus, the increase in motivation is due to a lower cost estimate. In contrast, in the context of queues, we demonstrate that illusionary progress increases value estimates, which increases the motivation to adhere to a goal, independent of the effect of effort estimates.

MANAGERIAL IMPLICATIONS

This research has important implications for managing and designing a queue structure to maximize consumers' evaluation of products (see also Rothkopf and Rech 1987). We find that the greater the number of people behind consumers in line, the greater is their product valuation, especially when the consumers are not familiar with the product. It follows, for example, that for a newly opened bakery, a single line (with more people behind the consumer) can increase the perceived value of the bakery more than multiple lines (with fewer people behind the consumer). As a related anecdote, a gourmet supermarket chain has recently begun employing a new queuing system in which customers form a long single line that feeds into a passel of cash registers rather than the generally favored one-line-per-register system (Barbaro 2007). As we would predict, this queuing system seems to increase sales and customer satisfaction, presumably because customers have more people lining up behind them on average, though it also may deter new customers from joining the line (Carmon and Kahneman 1995; Gibson 1998).

More intriguing, we find that an emphasis on the presence of people behind a person in a queue signals greater accomplishment and leads to a higher perceived value of a queuing goal, regardless of the actual number of people in the queue. In Study 3, we demonstrated that directing atten-

tion toward the presence of people behind versus ahead of the participants in a queue increased the perceived value of an amusement park ride. Using the take-a-number system, Study 4 showed that emphasizing the number to be taken by the last person to join the queue increased participants' evaluations of a food sample. These findings imply that a queue structure that highlights the presence of people behind a person increases the perceived value of the queuing goal without changing the total number of people in a queue. In turn, this can increase consumer expenditure, as we showed in Study 5.

These findings have several practical implications. For example, using mirrors, store designers can shape queues so that customers get a good view of the presence of those behind them. In addition, service providers that have consumers wait on the telephone should find it more effective to emphasize information about the number of callers behind (versus ahead of) the caller. We predict that people are more likely to value the service if their attention is drawn to others who called after them than to those who called before them.

In practice, marketers often try to minimize consumers' attention to the size of the queue (Lovelock and Wirtz 2004). In many amusement parks, for example, queue designers try to make the length of a queue less salient to people (e.g., shaping it jaggedly) to distract or disguise people's perception of it. Queue researchers have also attempted to discover strategies for reducing the negative effects of the perception of time by creating distractions, such as a news board or television (Katz, Larson, and Larson 1991). However, our research suggests that these efforts could diminish the positive role of the presence of people behind a person—namely, as a signal of the value of a queue object. As Katz, Larson, and Larson (1991) show, distraction may increase happiness about the queuing experience in general by decreasing perceptions of time, but we propose that it could also decrease the perceived value of the queue object. A queue structure that emphasizes actual or illusionary accomplished actions (i.e., people behind a person in a queue) will be effective in increasing the perceived value of a queue object, especially when people are not familiar with it.

As a final note, we believe that these findings have general implications for research on self-regulation and for understanding how people infer the value of their goals. We expect that a sense of accomplishment and the resultant increase in value are not limited to effortful acts of self-regulation, such as standing in lines. Rather, a similar process of inferring value from prior engagement appears in the pursuit of hedonic and intrinsic goals, including playing an instrument, going on a vacation, or, we hope, reading this article.

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