

# Touch Versus Tech: When Technology Functions as a Barrier or a Benefit to Service Encounters

Interpersonal exchanges between customers and frontline service employees increasingly involve the use of technology, such as point-of-sale terminals, tablets, and kiosks. The present research draws on role and script theories to demonstrate that customer reactions to technology-infused service exchanges depend on the presence of employee rapport. When rapport is present during the exchange, the use of technology functions as an interpersonal barrier preventing the customer from responding in kind to employee rapport-building efforts, thereby decreasing service encounter evaluations. However, during service encounters in which employees are not engaging in rapport building, technology functions as an interpersonal barrier, enabling customers to retreat from the relatively unpleasant service interaction, thereby increasing service encounter evaluations. Two analyses using J.D. Power Guest Satisfaction Index data support the barrier and beneficial effects of technology use during service encounters with and without rapport, respectively. A follow-up experiment replicates this data pattern and identifies psychological discomfort as a key process that governs the effect. For managers, the results demonstrate the inherent incompatibility of initiatives designed to encourage employee–customer rapport with those that introduce technology into frontline service exchanges.

*Keywords:* rapport, service encounters, frontline employees, self-service technology, technology infusion

Historically, “high-touch, low-tech” has been an accurate description of social interactions, including those between customers and frontline employees. This reality, however, is rapidly changing due to the practice of frontline technology infusion, or the deployment of technology interfaces into employee–customer service encounters (Bitner, Brown, and Meuter 2000). These interfaces can include any firm-deployed technology, such as point-of-sale terminals, tablets, and kiosks, which require a customer’s attention and use during the employee–customer exchange. It is increasingly rare for customers to experience a retail transaction in which they do not swipe their own credit cards. Moreover, in what has been labeled a record-setting technology rollout, two major casual dining chains installed more than 100,000 tablet computers at tables to assist customers with ordering and bill payment (Brustein 2013; Konrad 2013). Technology is especially prominent in

the travel industry, in which kiosks and scanning devices often accompany face-to-face interactions with frontline personnel (Nicas and Michaels 2012). In North America alone, self-service kiosk transactions have been forecast to surpass one trillion dollars per year by 2014 (Holman and Buzek 2012). Notably, a hospitality industry study reports that 92% of hotels cite a desire to improve customer service as the primary motivation for switching to technology-infused interactions (Hospitality Technology 2011). It would seem that the technology-is-beneficial perception is present in academic research as well. For example, prior research (e.g., Bitner, Brown, and Meuter 2000; Salomann et al. 2007) has suggested that companies view technology as a way to enhance service exchanges and has posited that the increasing role of technology in such encounters offers benefits to both customers and firms.

Several companies, however, are expressing dissatisfaction with their attempts to add technology to frontline service encounters. Two large retailers eliminated self-checkout stations from all locations to promote employee–customer interaction and improve customer service (Anand 2011; Mullins 2012). Similarly, research in higher education (e.g., Wurst, Smarkola, and Gaffney 2008) has suggested that infusing face-to-face interactions with technology (e.g., laptops in the classroom) decreases student satisfaction.

Considering the prevalence of technology in frontline service encounters and the conflicting viewpoints about its merits, it seems that clarity is needed with respect to when technology functions as a barrier or benefit to service exchanges.

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The present research draws on role and script theories to demonstrate that customer reactions to technology-infused service exchanges depend on the valence of employee–customer interactions. Multiple independent analyses of J.D. Power Guest Satisfaction Index (GSI) data and one controlled experiment provide support for this assertion. The J.D. Power data demonstrate an interaction between employee rapport-building behaviors and frontline technology such that the use of technology erodes some of the positive effects of a pleasant encounter and, at the same time, offsets some of the negative effects of an unpleasant encounter on overall service evaluations. The net result is that customer reactions to (un)pleasant service encounters tend to be drawn toward the midpoints of customer service assessments. A follow-up experiment replicates this data pattern and provides evidence that the effects are mediated by psychological discomfort.

This research contributes to theory and practice in at least four ways. First, it is the first to make a connection between the self-service technology and rapport literature streams. Our results suggest this is a key void that plays out in interesting data patterns and sheds new light on the boundaries of prevailing theory. Second, our research extends role and script theories by demonstrating when technology usage interrupts service encounter scripts and affects subsequent customer evaluations. Third, findings from conditions in which rapport-building efforts are absent demonstrate the beneficial qualities of frontline technology in mitigating poor frontline performance and, in this way, offer managers an important means by which to offset some of the negative effects of poor service delivery. Fourth, findings from the conditions in which rapport is present demonstrate how two common strategic initiatives—the infusion of frontline technology and encouraging employee rapport-building behaviors—are fundamentally incompatible.

## Theoretical Background

### *Service Encounters as Social Interactions*

McCallum and Harrison (1985, p. 35) argue that service encounters are “first and foremost social encounters.” Indeed, much of the research addressing the dyadic interaction between a customer and frontline employee has noted the social nature of these encounters (see Brady, Voorhees, and Brusco 2012; Price and Arnould 1999; Surprenant, Solomon, and Gutman 1983). It follows that, during these encounters, customers place a high priority on social outcomes, or what Bradley et al. (2010) term “pleasing relations” with the other party.

In the marketing literature stream, such pleasing relations are often explored under the heading “customer rapport” (Gremler and Gwinner 2008; Hennig-Thurau et al. 2006), defined as “a customer’s perception of having an enjoyable interaction with a service provider employee, characterized by a personal connection between the two interactants” (Gremler and Gwinner 2000, p. 92) and a primary factor in the long-term success of customer–firm relationships (Gremler and Gwinner 2008). Specific behaviors, such as smiling, initiation of a pleasant conversation, attentive cus-

tomers service, and knowledge sharing, have been identified as techniques employees use to build rapport with customers (Gremler and Gwinner 2008).

Although it is often the case that academic researchers choose to focus on one aspect of the rapport-building process, in reality it is rare for these behaviors to occur in isolation. Gremler and Gwinner (2008) find two or more rapport-building behaviors are described in more than two-thirds of critical incident reports involving rapport building. In addition, they find that although customers’ perceptions of rapport seem to increase as rapport behaviors increase, there is no statistically significant difference between encounters that include one, two, three, or more rapport-building behaviors. In summary, encounters between customers and frontline employees are social interactions, the valence of which are influenced by the presence (or absence) of rapport-building behaviors, including smiling, eye contact, and knowledge sharing. As such, we should expect customer responses to these behaviors to be influenced by the same mechanisms that mediate other social interactions. We suggest that frontline technology infusion is a mitigating factor that plays a key role in how employee-to-customer exchanges unfold, and we look to role and script theories for guidance in disentangling its effects on customer service evaluations.

### *Role and Script Theories*

The social exchange behaviors that frontline employees and customers exhibit during a service encounter can be explained by role and script theories (Halpern 1997; Wang, Beatty, and Liu 2012). According to these theories, employees and customers each assume roles during service encounters that play out according to an established script (Solomon et al. 1985). As an example, from the moment a customer enters a store, he or she assumes the “customer” role, and the role-defined scripted exchange begins. The roles and script therein serve the purpose of providing socially defined structure to a transaction and guide expected behaviors during the exchange so that the encounter proceeds smoothly (Leigh and Rethans 1984; Schank and Abelson 1977). It follows that service encounters are described as “role performances” (Solomon et al. 1985, p. 101) in which both parties in the dyad display learned behaviors that comport with the defined script.

According to script theory, customers organize their previous experiences in script formations that are used as normative standards to help them understand familiar or new situations. Scripts provide a set of norms or standards that set script-relevant expectations and ultimately serve as a “powerful influence upon affect and behavior” within the exchange (Leigh and Rethans 1984, p. 23). Scripts are generated by learned behaviors based on previous service encounters. They are used to ensure a smooth exchange by dictating how the consumer and employee should behave and how actions should be ordered (Solomon et al. 1985). The degree to which the script is upheld is a critical determinant of evaluations of a service encounter and known to be an important determinant of frontline service assessments (Solomon et al. 1985).

Consumers are familiar with their roles during routine service encounters and possess commonly understood scripts for a wide variety of service exchanges. Routine service encounters such as paying for groceries, ordering food at a restaurant, and checking in to a hotel tend to be characterized by well-defined roles and common scripts (Solomon et al. 1985). Thus, the outcomes of these common activities may depend on whether customers and frontline service employees uphold their roles and follow their respective scripts. For example, when an employee acknowledges customers and engages them in rapport building, we suggest that he or she has upheld employee norms and behaviors expected during interpersonal service exchanges. Conversely, when an employee ignores a customer or, alternatively, fails to engage in or reciprocate rapport-building behavior with a customer, we suggest that the employee has violated the normative script for the service encounter. Although such departures from the script are known to affect service encounters, an important, and as of yet unresolved, question pertains to what happens to service encounter evaluations when technology becomes a barrier and diverts from the script.

As a starting point, we note that face-to-face interactions between customers and frontline service employees are social interactions and, as such, should be guided by social norms. Borrowing from research in social psychology (e.g., Wilson and O’Gorman 2003), when people take part in an exchange in which another party has violated a norm, they experience psychological discomfort, defined as reported feelings of uncomfortable tension (Elliot and Devine 1994; Williams and Aaker 2002). Taken together with our discussion on established roles and normative scripts, it is reasonable to expect that when customers perceive themselves to be violating the script associated with a frontline exchange or view the employee as having violated the script, their emotional response will be characterized by feelings of psychological discomfort.

### ***The Effect of Technology on Service Exchanges***

In addition to being a relevant issue for managers, frontline technology infusion provides a unique vantage point from which to view the psychology of customer–employee interactions. In the extant research examining these interactions, we are aware of no study that investigates how attention to technology interfaces restricts or interferes with the customer’s ability to reciprocate social interactions with employees. Introducing technology into this interaction, we argue, creates a unique situation in which the customer is unable to respond in kind to the employee’s rapport-building behaviors. Next, we discuss how technology interacts with rapport to influence service encounter evaluations.

*Technology as a barrier to pleasant interactions.* Positive rapport that emerges in interactions between employees and customers is a key factor that drives service assessments and long-term financial returns (Gremler and Gwinner 2008). As such, firms train employees to engage in positive rapport-building behaviors, including smiling, offering a warm greeting, and engaging in consistent eye contact. In turn, customers expect these behaviors, and they become

part of the service exchange script. When an employee smiles at a customer or makes small talk, per the script, the customer feels obligated to respond in kind (Foa and Foa 1976; Nowak 2006). This sense of obligation, known as reciprocity, is fundamental in social relations and is both subtle and automatic (Bagozzi 1995). Notably, reciprocity comes into play more in exchanges between people who do not know one another, such as most frontline service interactions, than when the people are acquainted (Halpern 1997).

Technology can be a complicating factor in the service encounter script because it tends to pull customers’ attention away from enacting their roles and fulfilling their script. Certainly this is true for self-service kiosk transactions, in which customers are required to navigate the technology on their own. Nonetheless, even commonplace technologies, such as point-of-sale terminals (i.e., debit/credit card self-scanners) require the dedication of a customer’s cognitive resources. Customers must select card type, orient the magnetic stripe, swipe at the appropriate speed, indicate whether the card is debit or credit, confirm the purchase amount, and provide a signature within the appropriate space. Furthermore, this process is not identical at all service providers. Sometimes signatures are not required; at other times, the point-of-sale terminal might solicit a charitable donation or prompt customers to show their card to the employee or ask them to enter their postal code. As customers complete these tasks, attention is devoted to the technology and away from reciprocating the pleasant social discourse required by their assigned role and associated script. Because mutual attention is essential to positive social interactions (Tickle-Degen and Rosenthal 1990), and drawing on research that specifies how customers react to their own script violations, we expect the juxtaposition of having to attend to technology devices while carrying on a mutually agreeable social interaction will create psychological discomfort that emerges in the form of feeling generally uncomfortable, conflicted, and confused (Edell and Burke 1987; Williams and Aaker 2002), which, ultimately, will lower service encounter evaluations.

*Technology as a retreat from negative rapport.* Research has shown normative employee behavior to be a key component of customer satisfaction with service encounters (Bitner, Booms, and Tetreault 1990). In general, satisfactory encounters are associated with norms being upheld, whereas dissatisfactory encounters tend to be associated with violations of normative behavior. Unfortunately, in service settings, there are instances when employees have negative attitudes, are unfriendly, or act inappropriately (Brady et al. 2008), thereby breaking established service exchange norms. Consistent with our previous rationale with respect to service encounter scripts, this deviation leads to psychological discomfort (Williams and Aaker 2002; Wilson and O’Gorman 2003) and results in unfavorable service encounter evaluations (Bitner, Booms, and Tetreault 1990).

However, prior research has documented that scripts may experience interference from outside events that are of sufficient salience to be distracting (Abelson 1981). In

some instances, customers might welcome the opportunity to focus on something other than an unpleasant frontline employee. It is evident from research in psychology that people will divert their attention away from negative stimuli to protect a positive mood (Wegener and Petty 1994). As an example, Kaplan et al. (1983) find that, with regard to visual contact between people, reciprocity occurred with a likeable interviewer, whereas gaze avoidance occurred with an unlikeable interviewer. Similarly, Huppertz, Arenson, and Evans (1978) find that customers commonly exited an exchange in an effort to reduce negative affect.

We argue that self-service technology may offer the kind of barrier that has benefits for customers in the midst of an unpleasant service encounter. Technology in the service environment is known to generate a “loss of human contact and personal interaction” (Bitner 2001, p. 375), which, when mixed with negative rapport behaviors, may offer respite from negative encounter stimuli. More specifically, the opportunity to focus attention on the technology interface may decrease psychological discomfort caused by the script violation on the part of the employee. To the extent that people can divert their attention away from the negative rapport behaviors, the downward push on service encounter evaluations should be reduced.

### Summary and Predictions

We point out, as have many others, that interactions between employees and customers are social exchanges. We further suggest that technology creates a barrier that can inhibit this social exchange. When a service encounter is characterized by negative employee rapport-building behaviors (violated script), the technology barrier provides customers with a means of leaving the exchange (Huppertz, Arenson, and Evans 1978) and thus lowers psychological discomfort experienced during the unpleasant interaction. We expect this benefit effect of technology to play out in service encounter evaluations that are less negative than if the technology were not used during the encounter. Alternatively, when frontline employees exhibit positive rapport-building behaviors, the barrier imposed by technology prevents customers from reciprocating and shifts the script violation to the customer. In accordance with script theory and reciprocity norms, this sense of norm breaking will generate psychological discomfort, ultimately resulting in service encounter evaluations that are less positive than if the technology were not used. Therefore,

- H<sub>1</sub>: During face-to-face service encounters, there is an interaction between employee rapport-building and technology infusion in determining service encounter evaluations. When employees fail to build rapport, customers using technology interfaces evaluate the service encounter more favorably than when they do not use technology interfaces. However, when employees build rapport, customers using technology interfaces evaluate the service encounter less favorably than when they do not use technology interfaces.
- H<sub>2a</sub>: When employees fail to build rapport, the positive effect of technology infusion on service encounter evaluations is mediated by a decrease in psychological discomfort.
- H<sub>2b</sub>: When employees build rapport, the negative effect of technology infusion on service encounter evaluations is mediated by an increase in psychological discomfort.

## Study 1

Study 1 uses data from the J.D. Power North American Hotel GSI Study. This annual study collects data from thousands of hotel guests across the industry on more than 400 variables. The variables collected and the exact wording of the questions change slightly from year to year in response to industry feedback. In 2011 and 2012, participants were asked if they used the hotel’s self-service technology at a kiosk during check-in and checkout. In addition, the surveys for these years share several items evaluating the extent to which employees engaged in rapport building during check-in. The self-service technology and rapport-building related questions appear only in those two years, and thus, we use these data in Study 1 to evaluate the interaction of technology and employee rapport building specified by H<sub>1</sub>.

### Method

*Sample selection.* The first step of the analysis is the creation of groups to represent the “technology used” and “technology not used” conditions. In the “Check-In/Check-Out” section of the GSI survey, respondents first indicate how they checked into the hotel. Response options include “At the front desk” and “Kiosk check-in.” Respondents reporting that they checked in using a kiosk serve as the starting point for creating the “technology used” condition. Respondents who indicated that they checked in at the front desk represent the starting point for creating the “technology not used” condition. Other check-in/checkout options that were available but excluded from the study due to an inability to discern the presence or absence of technology use were “Express check-in,” “Rewards program member,” “Group check-in,” and “Club member level/Executive floor.”

*Measures.* The dependent variable for this analysis is an item that asks participants to rate the “Overall Check-In/Check-Out Experience” on a ten-point scale ranging from “unacceptable” to “outstanding,” with “average” positioned over point five. Overall check-in/checkout experience is a measure of service encounter evaluations, which are a primary factor in consumer perceptions of frontline service delivery (Bitner, Brown, and Meuter 2000). Because this item is double-barreled, it is unclear the extent to which the score is influenced by check-in versus checkout. Fortunately, the survey also includes an item that asks participants how they checked out of the hotel. This enabled us to exclude people whose check-in and checkout methods were inconsistent. Of the study participants who checked in using a kiosk, 296 ( $n_{2012} = 140$ ,  $n_{2011} = 156$ ) also checked out using this technology, qualifying them to represent the “technology used” condition. The “technology not used” condition is represented by the 86,477 ( $n_{2012} = 43,308$ ,  $n_{2011} = 43,169$ ) guests who both checked in and out at the front desk.

The next step in the analysis is to specify the employee rapport-building behavior variable. The 2011 and 2012 GSI surveys share three scaled items asking participants about established rapport-building behaviors: “Thinking about your check-in experience, how would you rate the ...” (1) courtesy of staff, (2) responsiveness of staff, and (3) knowledge of staff. Staff courtesy is consistent with Gremler and Gwinner’s (2008) third category of rapport-building behav-

ior, courteous behavior, whereas staff responsiveness is aligned with Category 1, attentive behavior. Similarly, responses to the staff knowledge item are consistent with Category 5, information-sharing behavior. The employee rapport-building behavior variable is computed as the mean of staff courtesy, responsiveness, and staff knowledge ( $\alpha_{2012} = .967$ ;  $\alpha_{2011} = .957$ ). Each of these questions was measured on a ten-point scale anchored by “Unacceptable” to “outstanding,” with an “N/A” option. We note that the strong reliability estimate for the rapport measure implies discriminant validity between it and the service evaluation measure because the most stringent discriminant validity test (e.g., Fornell and Larcker 1981) requires that the average variance extracted (a measure of reliability) must exceed the shared variance. Finally, as mentioned previously, there was a section asking participants, “How would you rate your Overall Check-In/Check-Out Experience?”

Importantly, we note that interaction between customers and employees could occur for customers who checked in using the kiosk (technology used condition). Indeed, front-line hotel employees are trained to greet and interact with all customers, regardless of check-in medium, to enhance service quality perceptions and as a security measure (Lui and Piccoli 2010). Nonetheless, we excluded from the analysis 13 people who did not respond to at least one of the rapport-building items (i.e., they answered “N/A”;  $n = 283$ ).

### Results

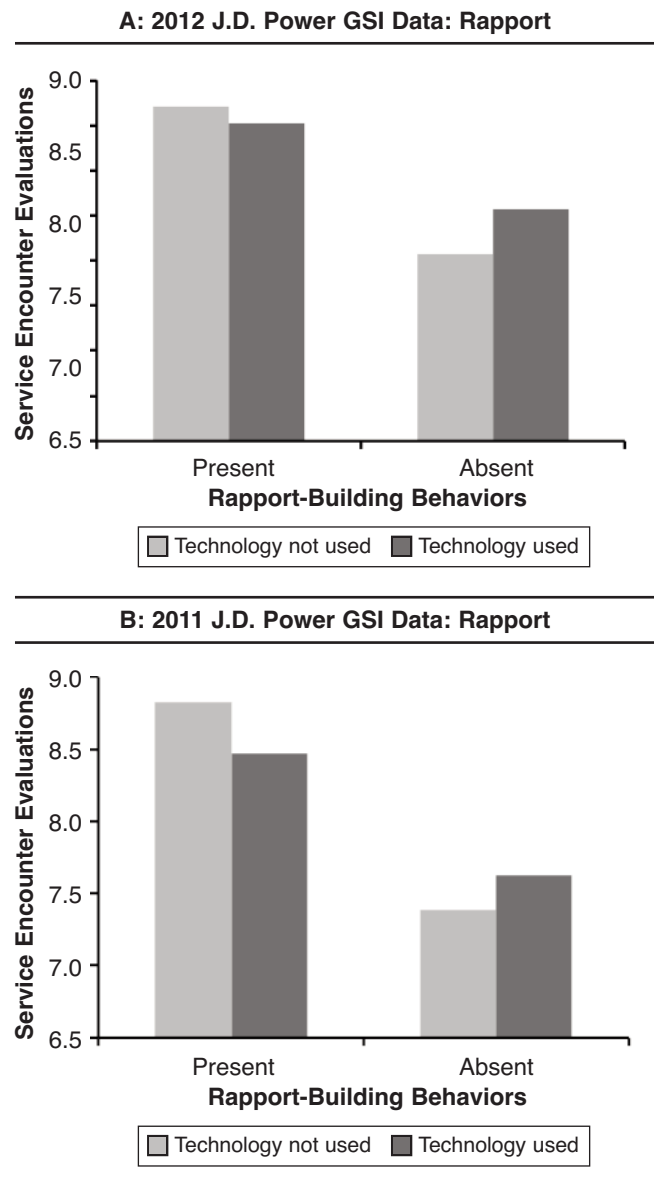
To test  $H_1$ , we conducted a simple slopes (i.e., spotlight) analysis using the composite rapport variable (courtesy, responsiveness, and knowledge). Next, we used regression analyses to examine the effect of technology use at points one standard deviation above and below the mean of the rapport measure (i.e.,  $\pm 1$  SD). For the 2012 GSI survey data (see Figure 1, Panel A), the initial regression revealed a significant interaction of technology use and rapport in determining overall evaluations of the check-in/checkout experience ( $t = -6.068$ ,  $p < .001$ ). Regarding the conditional effects, when rapport was low (i.e., one standard deviation below the mean of rapport), there was a positive effect of technology use (i.e.,  $-1$  SD; 7.62 vs. 7.38,  $b = .239$ ,  $t = 3.78$ ,  $p < .001$ ). In contrast, when rapport was high (i.e., one standard deviation above the mean of rapport), there was a negative effect of technology use (i.e.,  $+1$  SD; 8.47 vs. 8.82,  $b = -.351$ ,  $t = -4.134$ ,  $p < .001$ ).

We repeated these analyses for the 2011 GSI survey data (see Figure 1, Panel B). Again, the initial regression revealed a significant interaction of technology use and rapport ( $t = -3.809$ ,  $p < .001$ ). Regarding the conditional effects, when rapport was low, there was a significant, positive slope of technology use (i.e.,  $-1$  SD; 7.95 vs. 7.59,  $b = .3590$ ,  $t = 5.508$ ,  $p < .001$ ). When rapport was high, however, the negative effect of technology use was directionally consistent with the hypotheses but not significant (i.e.,  $+1$  SD; 8.85 vs. 8.88,  $b = -.0298$ ,  $t = -.35$ ,  $p = .36$ ).

### Follow-Up Analysis

The 2011 and 2012 J.D. Power GSI included an additional item relevant to the present research. This item asks partici-

**FIGURE 1**  
**Study 1 Results: Effects of Rapport and Technology on Service Encounter Evaluations**



pants to indicate (yes/no) whether they received “a warm welcome” during check-in. A warm welcome is consistent with Category 4 (i.e., connecting behavior) of Gremler and Gwinner’s (2008) rapport-building behavior typology. Our initial analysis evaluates employee courtesy (i.e., courteous behavior), responsiveness (i.e., attentive behavior), and knowledge (i.e., information-sharing behavior) items. We suggest that a follow-up analysis of the warm welcome item represents a replication of sorts and provides insight regarding whether the hypothesized effects generalize across another category of rapport-building behavior.

Our follow-up analysis is conceptualized as a 2 (employee rapport-building behaviors present, absent)  $\times$  2 (technology used, not used) quasi-experimental design. Assigning a “level” to a particular type of rapport-building is not a straightforward task. For example, it is reasonable

to question whether the absence of a warm welcome should be considered a negative or neutral behavior. We assert that the script for hotel front desk encounters would dictate that guests receive a warm welcome. Indeed, it is not uncommon for a hotel's website to instruct guests to "expect a warm welcome" when checking in. Thus, consistent with  $H_1$ , we expect that in the absence of a warm welcome (rapport), technology infusion will result in higher service encounter evaluations; in contrast, when a warm welcome (rapport) is present, the use of technology should result in lower encounter evaluations.

For this analysis (see Figure 2, Panels A and B), we created the technology used/not used groups using the same procedure previously employed. Thus, the technology used condition consists of people who checked in and out using

kiosk technology and answered the warm welcome question ( $n_{2012} = 133, n_{2011} = 150$ ). People in the technology not used group are those who checked in and out at the front desk and responded to the warm welcome question ( $n_{2012} = 43,224, n_{2011} = 38,800$ ). Importantly, in both of these conditions, a front desk employee was present during check-in. Assignment to the employee rapport-building behaviors absent/present conditions is based on whether the participant answered yes ( $n_{2012} = 40,658, n_{2011} = 36,798$ ) or no ( $n_{2012} = 2,699, n_{2011} = 2,152$ ) regarding receipt of a warm welcome. For the 2012 GSI survey data, a  $2 \times 2$  analysis of variance (ANOVA) demonstrates a significant interaction of employee rapport-building behavior and technology infusion ( $F(1, 43,353) = 43.69, p < .001$ ). Follow-up pairwise comparisons indicate that among customers who did not receive a warm welcome, the use of technology results in more favorable service encounter evaluations ( $M_{\text{technology not used}} = 5.01, M_{\text{technology used}} = 6.82; F(1, 43,353) = 31.31, p < .001$ ). Also consistent with  $H_1$ , when paired with a warm greeting, the use of technology decreases service encounter evaluations ( $M_{\text{technology not used}} = 8.31, M_{\text{technology used}} = 7.73; F(1, 43,353) = 12.85, p < .001$ ). For the 2011 GSI survey data, again, a  $2 \times 2$  ANOVA demonstrates a significant interaction of employee rapport-building behavior and technology infusion ( $F(1, 38,946) = 8.50, p = .004$ ). The follow-up pairwise comparisons indicate that among customers who did not receive a warm welcome, the use of technology results in more favorable service encounter evaluations ( $M_{\text{technology not used}} = 5.14, M_{\text{technology used}} = 6.15; F(1, 38,946) = 4.99, p = .026$ ). Again, when paired with a warm greeting, the use of technology decreases service encounter evaluations ( $M_{\text{technology not used}} = 8.42, M_{\text{technology used}} = 8.05; F(1, 38,946) = 7.06, p = .008$ ).

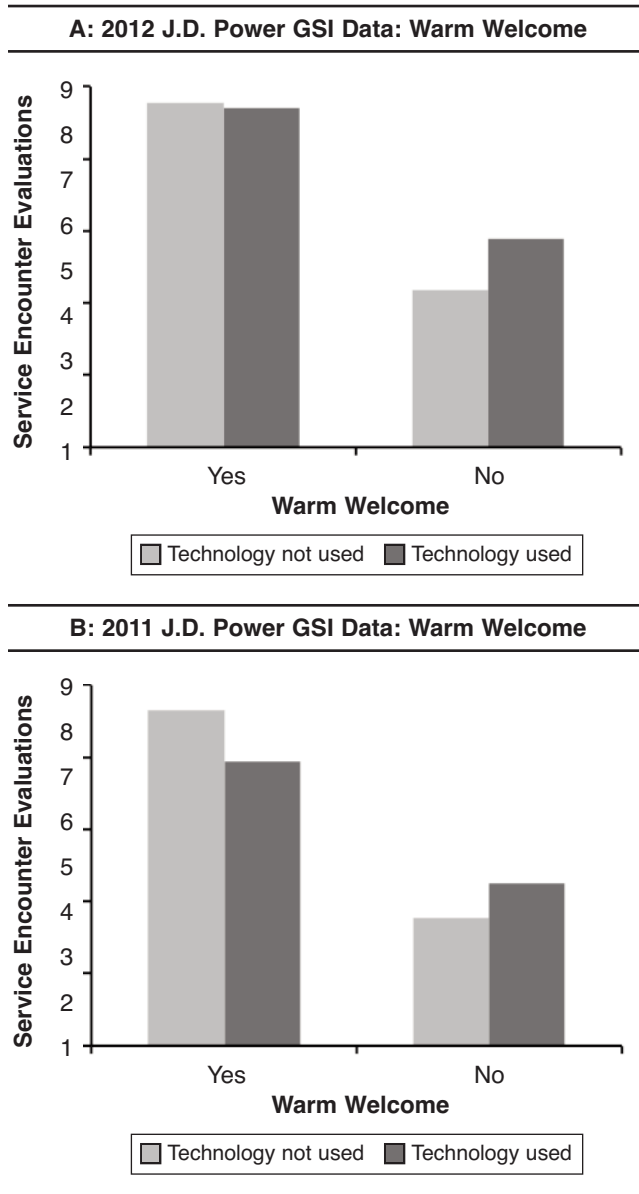
### Discussion

The results of Study 1 are encouraging. Not only do they provide support for  $H_1$ , but they do so with two years of industry data and across different dimensions of rapport. Our first analysis points to an inflection point whereby technology has a positive effect when rapport building is low, no effect at the mean value of rapport building, and a negative effect when rapport building is above average. Our follow-up analysis replicates the interaction of employee rapport building and technology infusion using a fourth category of rapport-building behavior (i.e., connecting behaviors). In this second analysis, ANOVA and follow-up pairwise comparisons again demonstrate a pattern in which service encounters characterized by negative rapport building benefit from technology infusion, whereas positive rapport building is attenuated by technology use.

Study 1, like all secondary data research, is not without challenges. One challenge is the double-barreled dependent variable. Although we were able to create groups for which the check-in and checkout experiences were equivalent, avoiding this issue altogether would be preferable. In addition, assigning meaning to the different levels of rapport building is not a straightforward process. Similarly, with the follow-up analysis, it is debatable whether the absence of a warm greeting during check-in should be considered nega-

**FIGURE 2**

**Study 1 Follow-Up Analysis: Effects of Warm Welcome and Technology on Service Encounter Evaluations**



tive rapport building or merely a lack of rapport building. These potential controversies largely stem from the fact that Study 1 uses survey data collected in an environment without controls. For example, the extent to which other rapport-building behaviors followed a warm greeting is unknown. Indeed, Gremler and Gwinner (2008) find that rapport-building behaviors rarely occur in isolation. Another challenge inherent in Study 1 is the potential for oversampling customers who may prefer technology over employee interactions and, thus, self-selected into service situations that include technology for check-in and checkout. To reduce this potential issue, we determined that an additional study with random assignment of participants into technology usage conditions is warranted. Equally important is the identification of the mediating processes responsible for this interaction. To accomplish these goals, we conducted an additional controlled study that used random assignment and collected the intervening variables specified in  $H_{2a}$  and  $H_{2b}$ .

## Study 2

Study 2 represents an experimental replication of Study 1 that permits causal inference given the controlled environment. Among other improvements, we included measures to evaluate psychological discomfort as a key intervening variable that drives the effect of the rapport–technology interaction on service encounter evaluations. Furthermore, to increase generalizability across technology and service contexts, Study 2 enables us to extend our investigation beyond the check-in/checkout kiosks used in the hotel service context of Study 1 to self-service point-of-sale terminals (debit/credit card scanning devices) commonly used in retailing contexts.

### Design

Study 2 uses a 2 (employee rapport-building behaviors present, absent)  $\times$  2 (technology used, not used) between-subjects design. Participants were recruited using Amazon.com’s Mechanical Turk (MTurk) online subject pool. Several studies (Berinsky, Huber, and Lenz 2012; Buhrmester, Kwang, and Gosling 2011) have examined MTurk in terms of population characteristics and data quality. The consensus is that MTurk represents a viable source of high-quality data. For the present study, participant ages ranged from 19 to 68 years, with a mean of 34.9 years, and 41.6% indicated that they are female.

### Method

Participants were recruited to take part in a study in which they simulated the commonplace customer experience of interacting with a frontline employee while purchasing lunch at a fast food restaurant at their local shopping mall. They were asked to place themselves in the role of the customer and provide evaluative ratings about the overall service encounter immediately after the restaurant checkout experience. During the simulation, participants were led through a series of interactive images, whereby they selected sandwiches, potato chips, and drinks and also conversed with the restaurant’s cashier.

Manipulation of employee rapport-building behaviors was accomplished through the cashier’s facial expression and dialogue, in accordance with rapport research (Gremler and Gwinner 2000, 2008). First, participants viewed a photograph of the cashier in which she displayed a smile (no smile) to represent the employee rapport present (absent) manipulation. Second, text accompanying the shopping scenario made reference to the cashier’s dialogue. In the employee rapport present conditions, the cashier greeted the customer with a warm welcome and then engaged in pleasant conversation throughout the exchange, including during the payment process (e.g., “As you use the debit/credit card machine, she chats about the weather and asks, ‘It’s a lovely day, isn’t it?’ and she asks ‘Is this your first time here?’”). In the employee rapport absent conditions, the cashier did not greet the customer with a warm welcome, and the conversation was focused on the exchange only. Finally, it is important to note there were no service outcome failures. That is, in each condition, the customer was able to successfully purchase his or her lunch with the assistance of the cashier; only the process by which the service exchange transpired was altered to be pleasant (less pleasant) by way of manipulating the presence (absence) of employee rapport-building behaviors.

We manipulated technology used/not used by having participants pay with a debit/credit card or cash. In the technology used conditions, the image of the cashier included a self-service point-of-sale terminal. Participants in this condition were instructed to (1) click where they should swipe their card, (2) click the key pad four to five times to simulate entering their personal identification number or zip code, and (3) click on the green button to confirm the amount. In the technology not used conditions, participants paid for their lunch in cash. The meal cost \$6.29, for which participants paid with a \$10 bill and were given back \$3.71. In all conditions, participants completed their purchase and were instructed that they took their lunch to a table.

Of the 160 participants recruited, 156 passed the survey quality checks and completed all of the required measures. We used the J.D. Power ten-point overall evaluation item from Study 1 to measure the dependent variable of overall evaluations of the service encounter. We conducted additional analyses using an alternative, three-item semantic differential service evaluation scale (i.e., “Overall impression of your experience during checkout: negative/positive, unappealing/appealing, bad/good”) with origins in Miniard, Sirdeshmukh, and Innis (1992). We note that this second measure had strong convergent validity with the ten-point J.D. Power item ( $r = .93$ ). Regarding the hypothesized mediator, following the methodology of Williams and Aaker (2002), participants were presented with a list of emotions and asked to rate how much they would experience such feelings during the checkout process. Embedded in the list were items measuring psychological discomfort, which included “conflicted,” “uncomfortable,” and “unsure” (Hong and Lee 2010; Williams and Aaker 2002). We averaged these three items to form the psychological discomfort index ( $\alpha = .822$ ). We also included filler items, unrelated to the conceptualization of psychological discomfort.

fort, in the list, including measures for the following emotions: “angry,” “guilty,” “frustrated,” “happy,” “confident,” “contented,” and “pleased” (based on Watson and Clark 1999).

As a check of the employee rapport-building behavior manipulation, participants rated the extent to which they found the employee to be courteous, knowledgeable, responsive, and warm (Gremler and Gwinner 2008). We averaged all four rapport measures ( $\alpha = .987$ ) to form the employee rapport index. At the end of the survey, participants responded to an optional, open-ended question regarding their general thoughts about the restaurant check-out experience and a two-item scale on which they rated the extent to which the checkout scenario was realistic (“I find this scenario to be personally relevant,” and “I can imagine myself in the same situation”;  $\alpha = .784$ ).

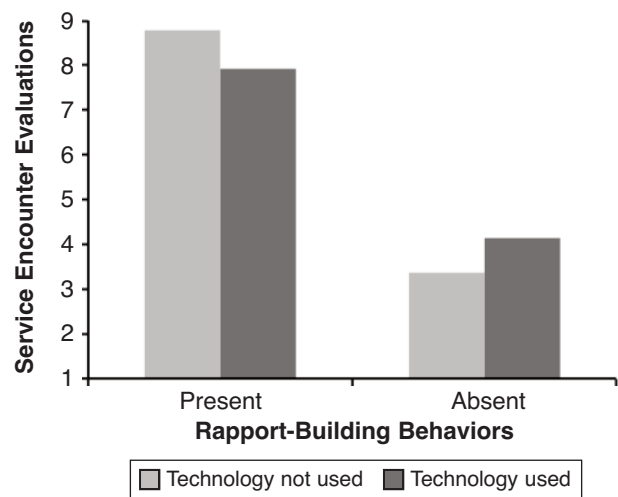
### Results

A manipulation check provides evidence regarding the success of the employee rapport-building behaviors manipulation. A  $2 \times 2$  ANOVA demonstrates a nonsignificant interaction of employee rapport-building behavior and technology infusion with the employee rapport index as the dependent variable ( $F(1, 152) = .059, p = .81$ ). As we expected, there is a main effect of the presence/absence of employee rapport building on the employee rapport index, which indicates that participants found the cashier in the employee rapport behavior present condition to be significantly more courteous, knowledgeable, responsive, and warm than the cashier in the employee rapport behavior absent condition ( $M_{\text{rapport present}} = 8.92, M_{\text{rapport absent}} = 2.38; F(1, 154) = 669.92, p < .001$ ). In addition, responses to the seven-point Likert scenario realism scale revealed that the scenarios represented a realistic exchange across employee rapport conditions ( $M_{\text{realism}} = 5.55, SD = .82$ ). Again, a  $2 \times 2$  ANOVA demonstrates a nonsignificant interaction of employee rapport-building behavior and technology infusion with the realism scale as the dependent variable ( $F(1, 140) = 1.17, p = .28$ ). Furthermore, there was strong discriminant validity between the service evaluation and psychological discomfort measures ( $r = -.65$ ).

For the primary analysis, a  $2 \times 2$  ANOVA reveals a significant interaction (see Figure 3) of employee rapport-building behaviors and technology in determining evaluations of the service encounter ( $F(1, 152) = 9.86, p = .002$ ). Consistent with  $H_1$ , when employee rapport-building is present, there is a negative effect of technology use ( $M_{\text{technology used}} = 7.92, M_{\text{technology not used}} = 8.80; F(1, 152) = 5.42, p = .011$ ), whereas when employee rapport-building is absent, there is a positive effect of technology use ( $M_{\text{technology used}} = 4.13, M_{\text{technology not used}} = 3.38; F(1, 152) = 4.45, p = .018$ ).

Moreover, as we expected but did not formally hypothesize, employee rapport behaviors alone exerted a significant main effect on service encounter evaluations ( $M_{\text{rapport present}} = 8.38, M_{\text{rapport absent}} = 3.75; F(1, 154) = 314.85, p < .001$ ). In contrast, technology use by itself did not exert an effect on service encounter evaluations ( $M_{\text{technology used}} = 5.96, M_{\text{technology not used}} = 6.05; F(1, 154) = .039, p = .84$ ).

**FIGURE 3**  
Study 2: Effects of Rapport and Technology on Service Encounter Evaluations



Analysis of the three-item semantic differential service evaluation scale yielded similar results. Specifically, we observed a significant interaction between employee rapport-building behaviors and technology use ( $F(1, 152) = 7.44, p = .007$ ), and patterns of the means were consistent across both measures. As previously, when employee rapport building was present, there was a negative effect of technology use ( $M_{\text{technology used}} = 7.64, M_{\text{technology not used}} = 8.23; F(1, 152) = 3.72, p = .028$ ), and when employee rapport building was absent, there was a positive effect of technology use ( $M_{\text{technology used}} = 3.36, M_{\text{technology not used}} = 2.75; F(1, 152) = 3.73, p = .028$ ).

To establish that psychological discomfort mediates the interactive effect of employee rapport behaviors and use of self-service technology on service encounter evaluations, we conducted a mediated moderation analysis (Hayes 2013; Muller, Judd, and Yzerbyt 2005). Specifically, we estimated a path analysis model that included direct paths from employee rapport behaviors, technology use, and their interaction to service encounter evaluations. Using 5,000 bootstrap samples, the procedure indicated that a significant indirect path was mediated by psychological discomfort ( $b = -.3304, t = -4.1426, p = .0001$ ), suggesting that psychological discomfort mediated the employee rapport behaviors  $\times$  technology used effect on service encounter evaluations. A 95% bootstrap confidence interval for this indirect effect is wholly below zero ( $-1.0347, -.1101$ ). More specifically, as  $H_{2a}$  predicts, when employee rapport-building behaviors are negative, psychological discomfort is decreased when technology is used compared with when technology is not used ( $M_{\text{technology used}} = 4.03, M_{\text{technology not used}} = 4.62; F(1, 78) = 2.87, p = .047$ ). Conversely, as  $H_{2b}$  posits, when rapport-building behaviors are positive, psychological discomfort is increased when technology is used compared with when technology is not used ( $M_{\text{technology used}} = 2.41, M_{\text{technology not used}} = 1.71; F(1, 74) = 4.14, p = .023$ ). Furthermore, because previous research has uncovered guilt and anger as reac-



tions to severely violated norms (Ortony, Clore, and Collins 1988; Wilson and O’Gorman 2003), we also conducted separate mediated moderation tests (Hayes 2013) for these emotions, along with each of the other filler emotions included in our questionnaire. The results revealed no support for any of the additional measures. Thus, we are able to rule out several other emotions, beyond those experienced in psychological discomfort, as alternative underlying explanations for our effects.

### **Discussion**

The results of Study 2 provide a replication of the hypothesized interaction between employee rapport-building behaviors and technology infusion in an experimental setting that allowed for control over the technology usage assignment, consistency of employee rapport-building behaviors, and measurement of the underlying mechanism. Our findings are notable because they provide a broader look at the effect of frontline technology use on overall service encounter evaluations. Prior research on self-service technology (e.g., Dabholkar and Bagozzi 2002; Meuter et al. 2005; Meuter et al. 2000) has focused on customer evaluations of the technology alone, without consideration of how it interacts with other aspects of the service exchange process. Our results suggest that the effect of technology use on service encounter evaluations is subtle, and our findings underscore the need to adopt a broad view of the exchange process to avoid the misperception that technology use has no effect on service encounter evaluations. Study 2 is also valuable in that it provides support regarding the hypothesized underlying mechanism of psychological discomfort. The mediation analyses reveal that when employee rapport-building behaviors and technology use are both present during a service encounter, customers feel more psychological discomfort, including feeling conflicted, uncomfortable, and unsure. Reciprocity norms, role and script theories, and anecdotal evidence drawn from the thought listings indicate that the discomfort likely occurs because attention to technology acts as an interpersonal barrier between the customer and the pleasant service exchange. For example, consider the following comment from a participant in the pleasant/technology used condition: “This cashier seems like a lovely person, and I wish my attention weren’t so split by trying to handle payment while chatting.” In contrast, when technology is used and rapport-building behaviors are absent, customers may feel less psychological discomfort because they can retreat from the relatively unpleasant social situation by focusing on the technology barrier. As an example, a participant in the unpleasant/technology used condition commented: “She’s rude...at least there was a self-debit machine.”

## **General Discussion**

Frontline service encounters are an integral part of everyday consumption in which people assume roles as customers or employees and follow established scripts in accordance with social exchange norms. Prevailing thought suggests the infusion of technology should enhance service encounters by making them more expedient, efficient,

smooth, and, thus, satisfying (Bitner, Ostrom, and Meuter 2002; Meuter et al. 2000). The present work demonstrates that the interplay between frontline technology use and service encounter evaluations may be more complex than it seems and that a key to unlocking the effect involves the nature of the exchange itself. In particular, we find that as employees engage in more rapport-building behaviors, the effect of technology use on service encounter evaluations begins to reverse from positive to negative. From a theoretical perspective, these findings explain how technology infusion can interrupt service scripts, which may strengthen or weaken overall service evaluations depending on the valence of the encounter.

In the case of high-rapport encounters, the use of technology results in psychological discomfort felt by the customer and, ultimately, lower service encounter evaluations than if the technology were not present. The exploration of factors affecting customer evaluations at the intersection of technology use and positive rapport should be of interest to researchers and managers because both service components are believed to enhance the customer experience, but without regard for their potential interactive effects. Our findings suggest that the combination of technology usage and employee rapport may cause a suppression effect on otherwise positive service evaluations. In these cases, attention to and use of technology causes the customer to deviate from the service script and, thus, violate social norms for the encounter. Notably, findings from the low-rapport service encounter conditions reveal the opposite pattern. That is, when use of frontline technology is combined with a lack of employee rapport building, the interpersonal barrier it provides serves to dilute experienced psychological discomfort, thus increasing service encounter evaluations relative to transactions in which the customer does not use technology. In these cases, technology provides the customer with a barrier from the violated script and offers a means for temporarily exiting the service exchange. The identification of factors that mitigate poor employee performance is especially important for service managers and researchers because these kinds of inoculation strategies are known to be particularly effective for failure management (Brady et al. 2008); yet the topic remains understudied to date.

### **Managerial Implications**

Any firm that decides to infuse technology into its service system must fully consider the ramifications of such a strategy (Ostrom et al. 2010). Our findings suggest that a firm’s adoption of frontline technologies should be determined, to some extent, by the desired nature of the service interaction between the employee and customer. If the nature of the firm’s service strategy is to provide customer encounters rich in interpersonal rapport (Gremler and Gwinner 2000), warmth, and personalization (Suprenant and Solomon 1987), our results indicate that firms should be aware that technology use may cause downward pressure on service encounter evaluations. Such knowledge would be particularly valuable for firms that tie employee performance bonuses to targeted metrics, such as top-box satisfaction scores. Notably, attaining scores at the very top of a scale

may be especially difficult for employees who are most in line with a firm's rapport-building service strategy.

For many companies, frontline technology infusion is already well under way. In these situations, the results of this research suggest employees should be informed of technology's effect on rapport-building efforts and be instructed to avoid creating a situation in which the consumer must choose between attending to a technology device and reciprocating rapport-building behaviors. A solution might be to simply give customers space and time to attend to the device outside the social exchange. Alternatively, service technology interfaces might be designed to integrate seamlessly into the interpersonal customer-employee exchange. To the extent that such practices are effective, it is entirely possible that pleasant, rapport-building employee behaviors can coexist with technology. Along these lines, a fruitful area for further research would be to evaluate specific strategies for seamlessly integrating frontline technology with positive employee-customer interactions.

### **Research Implications**

This research also makes important contributions to the marketing literature stream. Prior work has viewed frontline technology use as a way to enhance service exchanges and suggested that increasing the role of technology has substantial benefits for both sides of the customer-firm dyad (Bitner, Brown, and Meuter 2000; Salomann et al. 2007). Our findings demonstrate that although self-service technology may offer efficiency and productivity benefits (Meuter et al. 2000), its implementation does not always lead to higher customer satisfaction scores. Thus, our studies add an important caveat to the known positive effects of frontline technology and offer an explanation for the mixed technology implementation results observed in practice.

Along similar lines, this research adds depth to extant literature examining strategies that offset service failures and other negative information about a firm. Prior work in this vein has tended to focus on the buffering effects of factors such as brand personality (Aaker, Fournier, and Brasel 2004), commitment (Ahluwalia, Burnkrant, and Unnava 2000), brand equity (Brady et al. 2008), and relationship type (Mattila 2001) in offsetting negative events. We find that use of frontline technology has similar buffering qualities; however, unlike prior works, we extend the scope of the technology effect to include its influence on positive service exchanges. Our finding that frontline technology use dampens both positive and negative service exchanges offers a more nuanced view of the technology effect. More generally, the present research makes an important connection between previously disparate literature streams and, in this way, answers a call for research that examines how the subfields of information technology, service operations, and service marketing interrelate to affect the overall service system (Ostrom et al. 2010; Rust 2004).

From a theoretical standpoint, the introduction of social reciprocity as an underlying driver of script theory represents an important contribution to the study of the employee-customer emotional exchange. Our findings highlight how technology elements interrupt pleasant and unpleasant ser-

vice exchanges in a way that has countervailing effects on psychological discomfort and, thus, service encounter evaluations. As such, the results explain how attending to technology devices causes customers to depart from the service script and thus violate social reciprocity norms when employees are engaging in pleasant, rapport-building behaviors. Moreover, the results also explain how customers might use technology devices to retreat from unpleasant service exchanges caused by employees who violate social norms by not engaging in rapport-building behaviors. These findings extend role and script theories, as prior work does not acknowledge how technology use can interrupt the continuity of scripts to either detract from or enhance the interpersonal exchange and the emotions people experience therein. In contrast, previous research regarding the effect of employee displays on consumer emotions has drawn almost exclusively on contagion theory for guidance (Hennig-Thurau et al. 2006). Contagion theory posits that consumers, to a greater or lesser extent, subconsciously absorb emotions displayed by service employees. It does not, for example, allow for deliberation over the roles being played—or not being played—by customers using technology interfaces during the exchange. Nonetheless, it is clearly the case that more research is necessary to disentangle the roles of scripts, emotions, and contagion during technology-infused service exchanges.

### **Limitations and Future Research Directions**

Although this work provides substantial evidence of an interaction between employee rapport-building behaviors and frontline technology infusion, there are limitations. One limitation is that these studies do not isolate all individual employee rapport-building behaviors. For the analyses using the J.D. Power data, it is impossible to determine whether other rapport-building behaviors were at work but not measured by the GSI survey, beyond the employee's warm welcome. Similarly, the experimental manipulations of employee rapport-building behaviors in Study 2 incorporate smiling, a warm greeting, and pleasant conversation. Although these manipulations are consistent with Gremler and Gwinner's (2008) finding that service encounters rarely include only one category of rapport-building behavior, this comes at a price of not being able to address the effect of any particular behavior. Related to this issue, it is difficult to provide specific recommendations regarding the inflection point at which the effect of technology use on service encounter evaluations switches from positive to negative. More generally, forcing a diverse mix of employee behaviors into generic categories such as "negative" or "positive" is an inherently ambiguous task. An area for further research would be to isolate the effect of specific rapport-building behaviors or otherwise examine how different categories of employee rapport building interact. Another fruitful research avenue would be to examine how individual difference variables, such as technology readiness (Parasuraman 2000), interact with rapport and use of self-service technology. Yet another area for further research is to investigate how barriers in the customer-employee exchange affect the script and outcomes of the service

exchange. Whereas our research explored the role of technology use as one such barrier, further research might investigate other barriers caused by customer participation activities, such as cocreation, or physical barriers that may exist in the service environment (e.g., counters, displays, customer seating arrangements). Furthermore, prior work has suggested that employees are personally affected by social interactions with customers (Adelman, Ahuvia, and Goodwin 1994); therefore, further research should investigate the effect of frontline technology infusion on employee-focused measures to provide a broader view of its implications for the firm. Finally, whereas our research highlighted technology infusion in transactional service exchanges in which employees and customers did not know one another, future studies that investigate relational

exchanges between frontline employees and longtime customers may be a worthwhile pursuit.

Despite its limitations, we argue that this article is successful in laying a foundation for further research regarding the interaction of employee behavior and technology use during frontline service encounters. We observed the beneficial and barrier effects of technology use in both real-world and more controlled data as well as across a variety of employee rapport-building behaviors, technology interfaces, and service contexts. Although additional research is needed to further understand the nature of this phenomenon, the results of the present research suggest the interactive effects of “high-tech” and “high-touch” initiatives have significant effects on customers’ overall assessments of technology-infused service encounters.

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