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Effects of online service failure on customers' intentions to complain online

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Dissatisfied customers are increasingly voicing complaints through social media following online service failures; therefore, it is important to clarify the motivational determinants of customers' online complaint intentions (COCI). We investigated in 3 studies the influence and interaction effects of service failure types, attributions about these failures, scope of impact of the failures, and customer inoculation on both public and private online complaint intentions. Participants were 451 college students from Hainan Province, China. The results show that service failure types, service failure attributions, scope of impact of the service failure, and customer inoculation each had distinct effects on COCI and how customers complain online, and that these factors also had interactive effects on online complaint actions. Our finding that the form of COCI can predict service failure attributes offers implications for the implementation of enterprise service recovery from a consumer perspective.

Keywords
online complaint; customer complaint; complaint intention; service failure attribution; scope of impact of service failure; customer inoculation

The emergence of the Internet has given rise to a growing number of complaint websites where customers can share their experiences (Harrison-Walker, 2001). According to a report published by the E-Commerce Research Center (2018), the number of complaints received via social media rose by 66.93% during the first half of 2018. Research has shown that consumers' complaint intentions regarding physical shopping can be influenced by their attitudes (Andreassen & Streukens, 2013), brand commitment (Weitzl & Hutzinger, 2019), perceived behavioral control (Chang & Chin, 2011), and online service failure type (Jian & Ke, 2017). However, online service failure incidents differ substantially from those occurring in-person. Few studies have investigated the factors that influence customers' online complaint intentions (COCI). Therefore, exploring the factors that affect COCI and the internal mechanisms of this variable carries great theoretical and practical significance.

Literature Review and Development of Hypotheses

As suggested by Hsiao (2011), we classified customers' online complaint behaviors into public and private action types. *Public online complaint intentions* (PUOC) refer to the process through which customers rebel against firms or third parties and express a desire to seek revenge online, whereas *private online complaint intentions* (PVOC) relate to sharing negative feedback about commodities with friends or relatives online (Hsiao, 2011). We focused in this study on the effects of service failure types, attributions about these failures, the scope of impact of service failure (individual vs. group), and customer inoculation on PUOC and PVOC.

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Research has indicated that distinct types of service failure influence consumer satisfaction differently, with *outcome* failures in a service encounter relating to what customers actually receive from the service, whereas *process* failures are related to how customers receive the service, that is, the manner in which it is delivered (Smith et al., 1999). For instance, people tend to be more dissatisfied with process failures than outcome failures with respect to hotel services (Smith et al., 1999). In contrast, in the UK banking industry, only once a product or service has met a customer's expectations do process factors influence consumer satisfaction (Johnston, 1995). Although studies of service marketing have not highlighted which types of service failure are most influential on consumers' perceptions and satisfaction, scholars have found that the effects of service failure on customer behavior differ according to whether it is a process or outcome failure (Zhu et al., 2004). Although a few researchers have tested the impact of service failure types on customer behavior, the relationship between these two variables in the online domain has yet to be explored.

The concept of *service failure attribution* has garnered attention in customer complaint research, with Heider (1958) dividing this into internal and external attribution types: *Internal attribution* suggests that the reason for service failure lies with the corporation itself, whereas *external attribution* places responsibility outside the corporate environment. Iglesias (2009) examined a sample of 293 service encounters and noted that customers expressed less satisfaction when service failure was attributed to internal rather than external factors. Song and Wang (2005), Swanson and Kelley (2001), and Weitzl et al. (2018) also found that the more strongly customers attributed a service failure to internal factors, the more dissatisfied they tended to be, which increased consumers' likelihood of spreading negative information. Therefore, in this study we tested the effects of service failure attributions on customer complaints online, and investigated whether an interactional influence exists between service failure types and attributions on COCI.

Researchers have also shown that the size of the group affected by service failure influences customer complaints. In this context, *group service failure* refers to more than two customers encountering the same service failure event simultaneously; *individual service failure* refers to one customer facing a failure within a service process (Du & Fan, 2011). Previous studies have revealed that individual members of a group can experience an *emotional burden* (i.e., feeling responsible for carrying an emotion in the name of the group) when their feelings are inconsistent with those of the collective (Chen & Zhang 2014; Goldenberg et al., 2014). *Emotional transfer*, which occurs when one's negative feelings toward the in-group are transferred to the event itself, is also a potential outcome for individuals within a group (Chen & Zhang 2014; Goldenberg et al., 2014). Using the concept of emotional contagion and group dynamic theory, scholars have further shown that the effects of group service failure and individual service failure uniquely shape customers' complaint emotions and behavior based on individual interactions (Du et al., 2014). However, the behavioral patterns and psychological mechanisms influencing individuals in groups are yet to be considered in online shopping situations. Therefore, we examined the scope of impact of a service failure in an online shopping context, under the assumption that group service failure and individual service failure would exert distinct influences on COCI.

As a preemptive service recovery strategy, *customer inoculation* occurs when customers are informed of a service failure before encountering it, thereby minimizing dissatisfaction (Papageorgis & McGuire, 1961). Inoculation theory suggests that with preexposure to negative information, customers' subconscious minds prompt them to generate supporting arguments to resist counterarguments presented later (Mikolon et al., 2015; Papageorgis & McGuire, 1961). For instance, customers who are told they must wait roughly 30 minutes before dining should evaluate the service less negatively than do those who are not informed in advance of the estimated wait time. Being informed of a potential problem in advance enables customers to adapt to failure and avoid modifying their existing attitudes when confronted with actual negative information. Studies have indicated that customer inoculation causes individuals to be more resistant to subsequent attacks and sharp declines in satisfaction (Einwiller & Johar, 2013; Mikolon et al., 2015). Therefore, we anticipated that customer inoculation would influence customers' emotions and COCI.

In summary, we performed three 2 × 2 mixed design experiments to explore the interaction effects of service failure type along with the influencing factors of service failure attribution, scope of impact, and customer inoculation on consumers' PUOC and PVOC. These suppositions led to us forming the following hypotheses:
Hypothesis 1a: Service failure type (process vs. outcome) will influence customers' public online complaint intentions.
Hypothesis 1b: Service failure type (process vs. outcome) will influence customers' private online complaint intentions.
Hypothesis 2a: Service failure attributions (internal vs. external) will influence customers' public online complaint intentions.
Hypothesis 2b: Service failure attributions (internal vs. external) will influence customers' private online complaint intentions.
Hypothesis 3a: The scope of impact (individual vs. group) of a service failure will influence customers' public online complaint intentions.
Hypothesis 3b: The scope of impact (individual vs. group) of a service failure will influence customers' private online complaint intentions.
Hypothesis 4a: Customer inoculation will influence customers' public online complaint intentions.
Hypothesis 4b: Customer inoculation will influence customers' private online complaint intentions.

Study 1: Influences of Service Failure Types and Attributions on Customers' Online Complaint Intentions

Method

Study 1 had a 2 (service failure type: process vs. outcome) × 2 (attribution type: internal vs. external) mixed design. Participants were randomly separated into four groups, each of which encountered a different scenario. All scenarios simulated a real episode from a consumer complaint website, with slight modifications made between groups. Participants were told to imagine they were purchasing a pair of shoes as a gift; service failure and attribution types were manipulated. Our goals were to test (a) whether different service failure types and attributions had unique effects on customers' PUOC and PVOC, and (b) whether an interaction effect existed between service failure and attribution types on customers' PUOC and PVOC.

Participants

We recruited 149 college students from a university in Hainan Province, China. After discarding cases with a large amount of missing data, 136 samples were deemed useable (valid response rate = 91.3%). There were 65 women and 71 men (M_{age} = 19.71 years, *SD* = 1.99, range = 17–24) All participants provided informed consent, took part in the study voluntarily, and received compensation of CNY 10 (approximately USD 1.45).

Measure

COCI was measured using six items adopted from Hsiao (2011), which were divided across two dimensions: "I will speak to my friends and relatives via the Internet about my bad experience" (PVOC), "I will convince my friends and relatives via the Internet not to use this product/service" (PVOC), "I will use the Internet to warn all the people I know against buying this product/service" (PVOC), "I will seek redress for the service failure directly from company's website" (PUOC), "I will report this service failure to the consumer agency or other websites via the Internet" (PUOC), and "I will complain about the service failure to a private or government agency via the Internet" (PUOC). All items were measured on a 5-point Likert-type scale (1 = *very unlikely*, 5 = *very likely*). Cronbach's alpha values for the PVOC and PUOC item subscales were .79 and .80, respectively.

Procedure

First, participants arrived at the laboratory and were divided randomly into four groups: outcome failure × internal attribution, outcome failure × external attribution, process failure × internal attribution, and

process failure × external attribution. Then, each group viewed a different PowerPoint presentation designed to simulate a real shopping scenario. Next, each group completed the COCI measure. Study results were recorded and quantified after participants completed the questionnaire.

Results

Control and Manipulation Checks

As a control check, participants responded to the following three questions: "Have you ever had an online shopping experience?" (1 = *very few*, 5 = *many*), "Can you imagine yourself as a customer in this instance?" (1 = *very hard to do so*, 5 = *very easy to do so*), and "If this happened to you, how serious would you think it is?" (1 = *not very serious*, 5 = *very serious*). Findings indicate that the depicted scenarios were effectively controlled for: online shopping experience ($M = 4.28$, $SD = 0.61$), $t(135) = 24.67$, $p < .001$, perceived realism ($M = 4.41$, $SD = 0.58$), $t(135) = 28.54$, $p < .001$, and service failure severity ($M = 4.39$, $SD = 0.57$), $t(135) = 28.28$, $p < .001$.

Manipulation checks spanned two parts of the study. The first part, which comprised the question "If the service process of purchasing is divided into three stages: prepurchase, purchase, and postpurchase, which stage of service has failed according to you?", was intended to verify whether the manipulation of service failure types was successful. Participants rated the degree to which each stage had failed based on a 5-point Likert-type scale (1 = *do not agree at all*, 5 = *agree very much*). The manipulation check results in Table 1 reveal that service failure types were manipulated effectively.

Table 1. *Manipulation Check Results for Service Failure Type*

	Process failure *M* (*SD*)	Outcome failure *M* (*SD*)
Prepurchase failure	1.32 (0.50)	1.28 (0.45)
During purchase failure	4.50 (0.64)	1.31 (0.53)
Postpurchase failure	1.65 (0.48)	4.72 (0.45)
Analysis of variance	$F = 702.97$, $p < .001$	$F = 1492.38$, $p < .001$

The second part of the manipulation comprised the questions "Do you think the service failure occurred because of a fault in the online store itself?" and "Do you think the service failure occurred because of factors external to the online store itself?", which were rated on a 5-point Likert-type scale (1 = *not at all*, 5 = *absolutely*). The results in Table 2 show that the manipulation of attribution types was successful.

Table 2. *Manipulation Check Results for Service Failure Attribution*

	Internal attribution *M* (*SD*)	External attribution *M* (*SD*)
Online store itself as the cause	4.51 (0.59)	1.63 (0.49)
External factors as the cause	1.72 (0.67)	4.26 (0.59)
Analysis of variance	$F = 675.24$, $p < .001$	$F = 799.25$, $p < .001$

Effects of Service Failure and Attribution Types on Customers' Public Online Complaint Intentions

We observed an interaction effect between service failure and attribution on customers' PUOC on the basis

of results of a multivariate analysis of variance (see Figure 1). Results indicate that the main effect of service failure type on customers' PUOC was significant, $F(1, 134) = 100.48$, $p < .001$, $\eta^2_p = .43$, as was the main effect of attribution on customers' PUOC, $F(1, 134) = 359.26$, $p < .001$, $\eta^2_p = .73$.

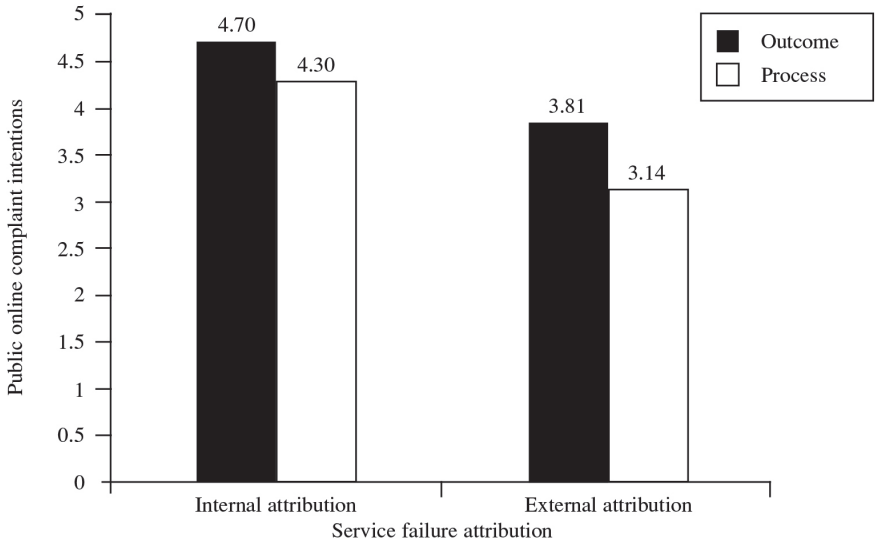

Figure 1. *Interaction Effects Between Service Failure and Attribution Types on Customers' Public Online Complaint Intentions (PUOC)*

As shown in Table 3, the effect of outcome failure on customers' PUOC was stronger than that of process failure, supporting Hypothesis 1a. The effect of internal attribution on customers' PUOC was stronger than that of external attribution, supporting Hypothesis 2a. A repeated-measures analysis of variance (ANOVA) revealed significant interaction effects between service failure type and attribution type on customers' PUOC, $F(1, 134) = 6.51$, $p = .01$, $\eta^2_p = .05$. Specifically, participants who attributed the service failure to internal factors and deemed it an outcome failure demonstrated stronger PUOC than did those who attributed the service failure to external factors and believed it to be a process failure.

Table 3. *Comparison of Effects of Service Failure and Attribution Types on Customers' Public Online Complaint Intentions*

	Public online complaint intentions		
	Process service failure	Outcome service failure	*t*
	M (*SD*)	*M* (*SD*)	
Internal attribution	4.29 (0.21)	4.70 (0.42)	$t = 5.04$, $p < .001$, $F = 7.76$, $SE = 0.08$
External attribution	3.14 (0.32)	3.81 (0.28)	$t = 9.24$, $p < .001$, $F = 1.94$, $SE = 0.72$
t test	$t = 17.57$, $p < .001$ $F = 9.69$, $SE = 0.66$	$t = 10.37$, $p < .001$ $F = 1.85$, $SE = 0.85$	

Effects of Service Failure and Attribution Types on Customers' Private Online Complaint Intentions

Figure 2 illustrates that there was a significant main effect of service failure type on customers' PVOC, $F(1, 134) = 198.67$, $p < .001$, $\eta^2_p = .60$. The main effect of attribution on customers' PVOC was also significant, $F(1, 134) = 479.06$, $p < .001$, $\eta^2_p = .78$.

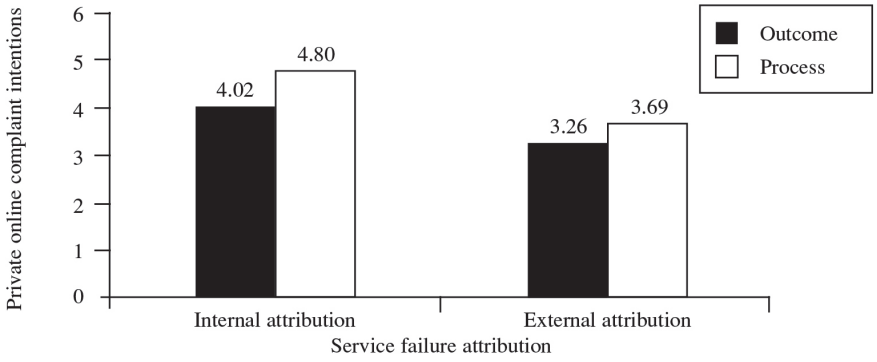

Figure 2. *Interaction Effects Between Service Failure and Attribution Types on Customers' Private Online Complaint Intentions (PVOC)*

As indicated in Table 4, the effect of process failure on customers' PVOC was more significant than that of outcome failure, supporting Hypothesis 1b. Internal attribution had a greater influence on customers' PVOC than did external attribution, supporting Hypothesis 2b. In addition, the ANOVA results indicate that the interaction effects between service failure and attribution types on customers' PVOC were significant, $F(1, 132) = 16.09$, $p < .001$, $\eta^2_p = .11$. More specifically, participants who attributed the service failure to internal factors and deemed it a process failure possessed higher PVOC than did those who attributed the service failure to external factors and believed it to be an outcome failure.

Table 4. *Comparison of Effects of Service Failure and Attribution Types on Customers' Private Online Complaint Intentions*

	Private online complaint intentions		
	Process service failure	Outcome service failure	*t*
	M (*SD*)	*M* (*SD*)	
Internal attribution	4.79 (0.22)	4.02 (0.28)	$t = -12.64$, $p < .001$, $F = 1.34$, $SE = 0.61$
External attribution	3.69 (0.26)	3.26 (0.23)	$t = -7.23$, $p < .001$, $F = 0.20$, $SE = 0.60$
t test	$t = 19.12$, $p < .001$ $F = 0.16$, $SE = 0.58$	$t = 12.15$, $p < .001$ $F = 1.02$, $SE = 0.63$	

Discussion

Our findings provide empirical evidence that outcome failure significantly predicted PUOC, whereas process failure significantly predicted PVOC. Prior studies simply tested the distinct influences of outcome and process failure types on the magnitude of customers' complaint intentions. Extending this work, we divided customer complaints across two dimensions (i.e., PUOC and PVOC) and examined these dimensions in the online shopping context. We found that internal attributions led to greater customer dissatisfaction, a result

that is in line with those obtained in prior studies (see, e.g., Song & Wang, 2005; Swanson & Kelley, 2001). However, we also conceptualized internal attribution as involving the service enterprise itself and external attribution as involving environmental factors. Our results then indicated that internal attribution inspired stronger PUOC, whereas external attribution inspired stronger PVOC.

Study 2: Influences of Service Failure Types and Scope of Impact of the Service Failure on Customers' Online Complaint Intentions

Method

Study 2 had a 2 (service failure type: process vs. outcome) × 2 (scope of impact of the service failure: individual vs. group) mixed design. The background for this study was identical to Study 1, in that we manipulated service failure types and scope of impact of the service failure. However, Study 2 was an extension of the earlier study: Our purpose was to test the differential effect of the scope of impact of a service failure on customers' PUOC and PVOC, and to investigate whether an interaction effect exists between service failure types and the scope of impact of service failure on customers' PUOC and PVOC.

Participants

We recruited 148 undergraduate students from Hainan Province, China. After deleting cases with a large amount of missing data, the final useable sample consisted of 140 respondents (valid response rate = 94.6%). There were 63 women and 77 men (M_{age} = 20.96 years, SD = 1.33, range = 17–23 years) All participants provided informed consent, took part in the study voluntarily, and received compensation of CNY 10 (approximately USD 1.45).

Measure

The measure in this study was identical to that used in Study 1. Responses to all six items were summed as PUOC and PVOC scores, with higher scores indicating stronger online complaint intentions. Cronbach's alpha values for the PVOC and PUOC item subscales in this study were .79 and .82, respectively.

Procedure

The procedure we followed was the same as in Study 1.

Results

Control and Manipulation Checks

Control check questions were the same as in Study 1. Results indicate that the depicted scenarios were effectively controlled for: online shopping experience (M = 4.39, SD = 0.52), $t(139) = 31.71$, $p < .001$, perceived realism (M = 4.39, SD = 0.51), $t(139) = 31.66$, $p < .001$, and severity of service failure (M = 4.31, SD = 0.51), $t(139) = 30.49$, $p < .001$. Regarding the two-part manipulation check, first, results in Table 5 show that the service failure types were manipulated effectively.

Table 5. *Manipulation Check Results for Service Failure Type*

	Process failure *M* (*SD*)	Outcome failure *M* (*SD*)
Prepurchase	1.36 (0.57)	1.53 (0.56)
During purchase	4.21 (0.54)	1.60 (0.58)
Postpurchase	1.51 (0.50)	4.21 (0.66)
Analysis of variance	$F = 36.03$, $p < .001$	$F = 458.43$, $p < .001$

Second, we verified whether the manipulation of scope of impact of the service failure in each scenario was successful. Participants responded to the question "When such a thing happens, do you think this is a one-off problem affecting a single customer or a more general one affecting multiple customers?" There were two response options, both rated on a 5-point Likert scale: (1) "It is a one-off problem" and (2) "It is a general problem" (1 = *not at all*, 5 = *absolutely*). The manipulation checks (see Table 6) indicate that scope of impact of the service failure was manipulated effectively.

Table 6. *Manipulation Check Results for Scope of Impact of the Service Failure*

	Individual service failure *M* (*SD*)	Group service failure *M* (*SD*)
One-off problem	4.41 (0.65)	1.39 (0.49)
General problem	1.49 (0.61)	4.39 (0.57)
Analysis of variance	$F = 760.49$, $p < .001$	$F = 1109.74$, $p < .001$

Effects of Service Failure Types and Scope of Impact of Service Failure on Customers' Public Online Complaint Intentions

Findings in Figure 3 reveal that service failure types influenced customers' PUOC, $F(1, 138) = 589.82$, $t(138) = 11.14$, $p < .001$, $\eta^2_p = .81$. These results align with those in Study 1, supporting Hypothesis 1a. The scope of impact of the failure (individual vs. group) also influenced customers' PUOC, $F(1, 136) = 376.58$, $t(138) = -7.73$, $p < .001$, $\eta^2_p = .74$, lending support to Hypothesis 3a.

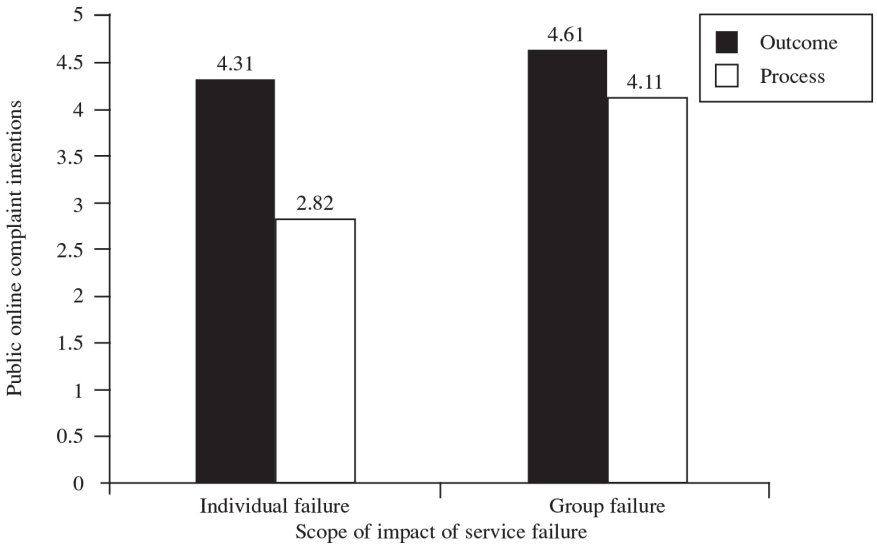

Figure 3. *Interaction Effects Between Service Failure Type and Scope of Impact of Service Failure on Customers' Public Online Complaint Intentions (PUOC)*

Group service failure had a more significant effect on customers' PUOC than did individual service failure (see Table 7). Results of a repeated-measures ANOVA indicate that there was a significant interaction effect

between service failure type and scope of impact of service failure on customers' PUOC, $F(1, 136) = 143.25$, $p < .001$, $\eta^2_p = .51$. Specifically, customers' PUOC was strongest when they experienced a group- and outcome-based service failure.

Table 7. *Comparison of the Effects of Service Failure Types and Scope of Impact of Service Failure on Customers' Public Online Complaint Intentions*

	Public online complaint intentions		
	Process service failure	Outcome service failure	*t*
	M (*SD*)	*M* (*SD*)	
Individual service failure	2.82 (0.26)	4.31 (0.22)	$t = 25.83$, $p < .001$, $F = 3.84$, $SE = 0.58$
Group service failure	4.11 (0.24)	4.61 (0.25)	$t = 8.65$, $p < .001$, $F = 0.16$, $SE = 0.50$
t test	$t = -25.52$, $p < .001$ $F = 0.77$, $SE = 0.60$	$t = -5.43$, $p < .001$ $F = 0.37$, $SE = 0.06$	

Effects of Service Failure Types and Scope of Impact on Customers' Private Online Complaint Intentions

Our results in Figure 4 also support Hypothesis 1b, in that service failure type influenced customers' PVOC, $F(1, 138) = 374.49$, $t(138) = -10.98$, $p < .001$, $\eta^2_p = .73$. This conclusion was again the same as in Study 1. The scope of impact of the service failure (group or individual) also significantly affected customers' PVOC, $F(1, 138) = 290.40$, $t(138) = 8.84$, $p < .001$, $\eta^2_p = .68$, supporting Hypothesis 3b.

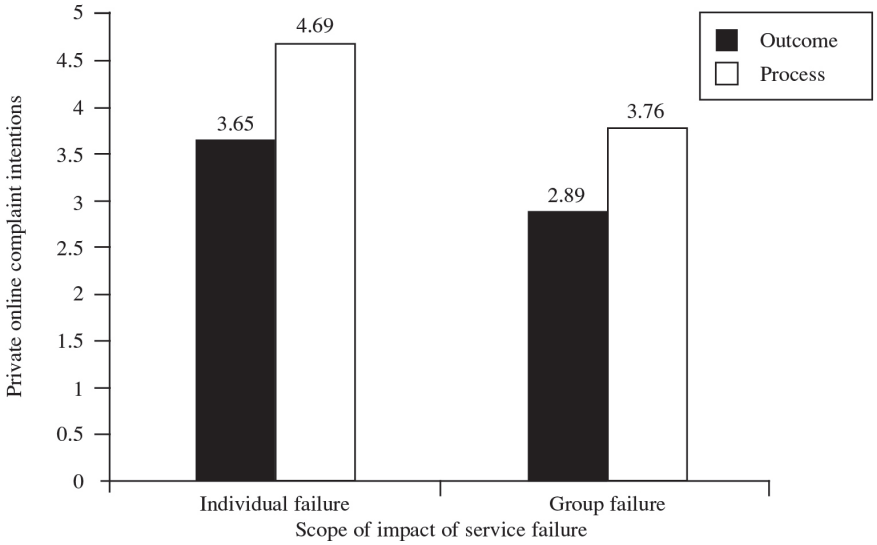

Figure 4. *Interaction Effects Between Service Failure Type and Scope of Impact of Service Failure on Customers' Private Online Complaint Intentions (PVOC)*

Individual service failure had a more significant effect on customers' PVOC than did group service failure (see Table 8). The ANOVA results indicate that there was a nonsignificant interaction effect between service

failure type and the scope of impact of the service failure on customers' PVOC, $F(1, 136) = 2.68$, $p = .10$, $\eta^2_p = .02$.

Table 8. *Comparison of Effects of Service Failure Types and Scope of Impact of Service Failure on Customers' Private Online Complaint Intentions*

	Public online complaint intentions		
	Process service failure	Outcome service failure	*t*
	M (*SD*)	*M* (*SD*)	
Individual service failure	4.69 (0.21)	3.65 (0.20)	$t = -21.16$, $p < .001$, $F = 0.18$, $SE = 0.05$
Group service failure	3.76 (0.28)	2.87 (0.43)	$t = -10.20$, $p < .001$, $F = 11.97$, $SE = 0.09$
t test	$t = 13.84$, $p < .001$	$t = 9.58$, $p < .001$	
	$F = 5.73$, $SE = 0.06$	$F = 35.70$, $SE = 0.08$	

Discussion

In Study 2 we investigated the associations between service failure types, scope of impact of the failure, and COCI. Our findings substantiate Mackie and Smith's (2018) argument that when customers share a similar experience, they are more likely to express greater dissatisfaction due to emotional contagion. We have also demonstrated that customers who experienced a group (vs. individual) service failure were more likely to complain publicly to receive compensation and warn other customers, as they believed that the service failure may not have been accidental and would be likely to happen again. Customers who experienced an individual service failure were more inclined to complain privately because they considered the service failure a one-time misstep.

Study 3: Influences of Service Failure Types and Customer Inoculation on Customers' Online Complaint Intentions

Method

Study 3 had a 2 (service failure type: process vs. outcome) × 2 (customer inoculation: inoculation vs. no inoculation) mixed design. Service failure types and customer inoculation were manipulated to (a) examine the effect of customer inoculation on customer complaints online, and (b) explore whether an interaction effect exists between service failure type and customer inoculation on customers' PUOC and PVOC.

Participants

We recruited 154 undergraduates from a university in Hainan Province, China; 148 provided useable data (valid response rate = 96.1%). There were 73 women and 75 men (M_{age} = 20.31 years, SD = 1.82, range = 18–24) All participants provided informed consent, took part in the study voluntarily, and received compensation of CNY 10 (approximately USD 1.45).

Measure

The measure was the same as in Study 1. Responses to all six items were again summed as PUOC and PVOC scores, with higher scores reflecting stronger online complaint intentions. Cronbach's alpha values for the PVOC and PUOC subscales were .89 and .78, respectively.

Procedure

The procedure for Study 3 was the same as in Studies 1 and 2.

Results

Control and Manipulation Checks

For control checks, the questions were the same as those in Studies 1 and 2. Results reveal that the depicted scenarios were effectively controlled for: online shopping experience ($M = 4.36$, $SD = 0.51$), $t(147) = 32.49$, $p < .001$, perceived realism ($M = 4.37$, $SD = 0.51$), $t(147) = 32.58$, $p < .001$, and severity of service failure ($M = 4.32$, $SD = 0.54$), $t(147) = 29.99$, $p < .001$. In terms of manipulation checks, the first question was the same as in Study 1. Table 9 shows that the service failure types were effectively manipulated.

Table 9. *Manipulation Check Results for Service Failure Type*

	Process failure *M* (*SD*)	Outcome failure *M* (*SD*)
Prepurchase	1.34 (0.48)	1.28 (0.45)
During purchase	4.62 (0.49)	1.30 (0.46)
Postpurchase	1.36 (0.49)	4.47 (0.50)
Analysis of variance	$F = 1130.46$, $p < .001$	$F = 1117.80$, $p < .001$

The second part was designed to investigate whether the manipulation of customer inoculation was successful. Participants responded to the question "Imagining you are the customer, did the merchant inform you that this event might happen?" by rating the following response: "Online shop staff told me that such an event may occur" (1 = *not at all*, 5 = *absolutely*). Table 10 indicates that the manipulation of customer inoculation was successful.

Table 10. *Manipulation Check Results for Customer Inoculation*

	Inoculation *M* (*SD*)	No inoculation *M* (*SD*)	Analysis of variance
Customer inoculation	4.46 (0.50)	1.26 (0.44)	$F = 1704.92$, $p < .001$

Effects of Service Failure Types and Customer Inoculation on Customers' Public Online Complaint Intentions

The results of Study 3 (see Figure 5) support Hypothesis 1a, $F(1, 144) = 661.50$, $t(146) = 18.86$, $p < .001$, $\eta^2_p = .82$. The effect of service failure type on customers' PUOC was the same as in Study 1. Customer inoculation was found to influence customers' PUOC, $F(1, 144) = 127.44$, $t(146) = -4.81$, $p < .001$, $\eta^2_p = .47$, lending support to Hypothesis 4a.

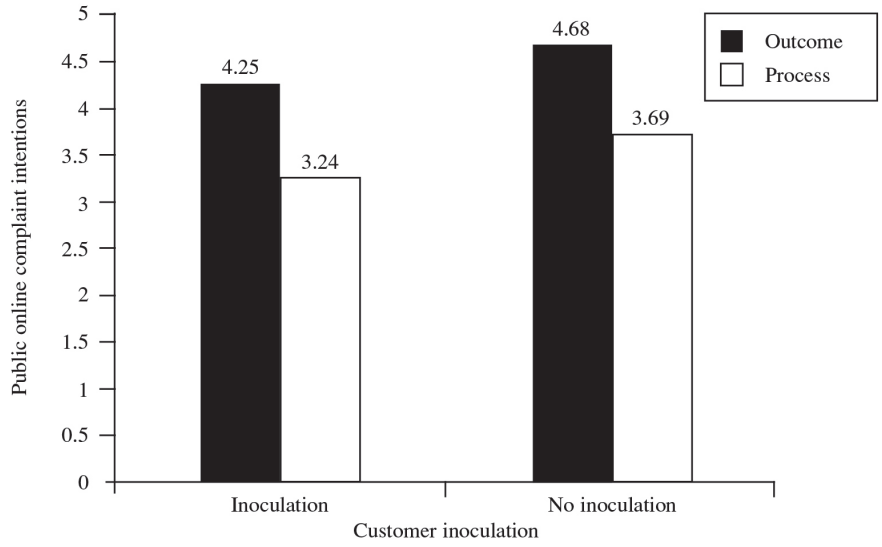

Figure 5. *Interaction Effects Between Service Failure Types and Customer Inoculation on Customers' Public Online Complaint Intentions (PUOC)*

Customers who were not inoculated expressed greater intentions to complain publicly than inoculated customers did, in the event of both outcome and process failures (see Table 11). Results of a repeated-measures ANOVA indicate that the interaction effect between service failure type and customer inoculation on customers' PUOC was nonsignificant, $F(1, 144) = .12$, $p = .727$, $\eta^2_p = .00$.

Table 11. *Comparison of Effects of Service Failure Type and Customer Inoculation on Customers' Public Online Complaint Intentions*

	Public online complaint intentions		
	Process service failure	Outcome service failure	*t*
	M (*SD*)	*M* (*SD*)	
Inoculation	3.24 (0.22)	4.25 (0.23)	$t = 19.50$, $p < .001$, $F = 0.28$, $SE = 0.05$
No inoculation	3.69 (0.29)	4.68 (0.20)	$t = 17.06$, $p < .001$, $F = 8.48$, $SE = 0.06$
t test	$t = -7.61$, $p < .001$ $F = 2.71$, $SE = 0.06$	$t = -8.46$, $p < .001$ $F = 4.41$, $SE = 0.05$	

Effects of Service Failure Types and Customer Inoculation on Customers' Private Online Complaints Intentions

The results in Figure 6 support Hypothesis 1b, $F(1, 144) = 1252.63$, $t(146) = -30.71$, $p < .001$, $\eta^2_p = .90$.

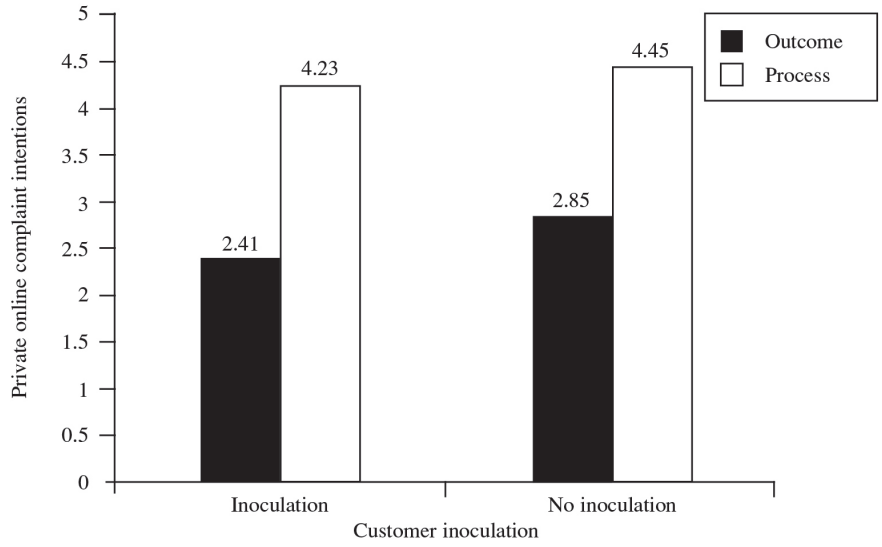

Figure 6. *Interaction Effects Between Service Failure Types and Customer Inoculation on Customers' Private Online Complaint Intentions (PVOC)*

The effect of a process failure on customers' PVOC was more significant than that of an outcome failure (see Table 12). Customer inoculation also influenced customers' PVOC, $F(1, 144) = 374.49$, $t(138) = -10.98$, $p < .001$, $\eta^2_p = .24$, supporting Hypothesis 4b. Customers who were not inoculated were more inclined to complain privately than were inoculated customers (see Table 12). ANOVA results reveal that the interaction effect between service failure type and customer inoculation on customer PVOC was significant, $F(1, 144) = 5.00$, $p = .03$, $\eta^2_p = .03$. The process failure and no-inoculation scenarios resulted in the highest levels of customers' PVOC.

Table 12. *Comparison of Effects of Service Failure Type and Customer Inoculation on Customers' Private Online Complaint Intentions*

	Private online complaint intentions		
	Process service failure	Outcome service failure	t
	M (SD)	M (SD)	
Inoculation	4.23 (0.27)	2.41 (0.24)	$t = -30.55$, $p < .001$, $F = 1.02$, $SE = 0.06$
No inoculation	4.45 (0.28)	2.85 (0.37)	$t = -21.04$, $p < .001$, $F = 4.25$, $SE = 0.08$
t test	$t = -3.41$, $p < .001$ $F = 0.00$, $SE = 0.06$	$t = -5.92$, $p < .001$ $F = 8.80$, $SE = 0.07$	

Discussion

Our findings show that the interaction between service failure type and customer inoculation was significantly associated with customers' PVOC, particularly in the context of a process failure when customers had not been inoculated. Service failure type and customer inoculation also each had a separate

significant influence on PUOC; however, the interaction term of service failure type × customer inoculation did not have a significant influence on customers' PUOC. This demonstrates that customer inoculation can decrease customers' dissatisfaction after a service failure. In other words, when customers have been informed of an upcoming service failure, they may become immune to the failure and express less dissatisfaction than do those who were not inoculated, which is consistent with the findings of Papageorgis and McGuire (1961).

General Discussion

This research makes several contributions to the customer behavior literature by clarifying how service failure types, attributions, scope of impact of service failure, and customer inoculation can influence COCI. First, we are the first to conduct empirical tests within the customer complaint domain to investigate the interaction effect between service failure and these factors on COCI. Second, we divided COCI into two dimensions (PUOC and PVOC) to further investigate the different effects of the above factors. Our findings enhance understanding of customer complaint behavior in online shopping settings. Thus, our work provides a new perspective for further research on factors influencing COCI.

Our study also has practical implications for enterprises. Service businesses should monitor online reviews, especially those by customers who are complaining online publicly. To reduce the negative influence of these online complaints, businesses should respond publicly and in a timely manner, so that these customers perceive they are being taken seriously. Additionally, online business managers should formulate training manuals to help employees recognize potential impending service failures and inform customers in advance of these, which may mitigate patrons' negative reactions to some extent.

One limitation in this study is that all participants were college students, which may have influenced the external validity of our findings. Future research could include more diverse samples (e.g., office workers, civil servants, farmers) to ensure greater internal and external validity. Second, all three experiments were conducted in a laboratory setting. Subsequent studies could replicate our experimental scenarios in reality (e.g., in the setting of a hospitality service failure) for enhanced authenticity.

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A full description of the research manipulations used in this paper can be obtained by writing to the authors.

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