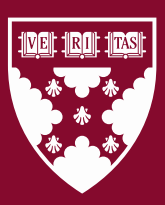
Working Paper 19-089

Mitigating the Negative Effects of Customer Anxiety through Access to Human Contact

Michelle A. Kinch
Ryan W. Buell



Harvard Business School

Mitigating the Negative Effects of Customer Anxiety through Access to Human Contact

Michelle A. Kinch
Dartmouth College

Ryan W. Buell
Harvard Business School

Working Paper 19-089

Funding for this research was provided in part by Harvard Business School.

Mitigating the Negative Effects of Customer Anxiety through Access to Human Contact

Michelle A. Kinch[1]
Tuck School of Business, Dartmouth College, Hanover, New Hampshire 03755

Ryan W. Buell
Harvard Business School, Harvard University, Boston, Massachusetts 02163

Abstract:

Prior research in social psychology has shown that when people feel anxious, they seek advice from others. However, companies that operate in high-anxiety settings (like financial services, health care, and education) are increasingly deploying self-service technologies (SSTs), through which anxious customers transact without access to human contact. The impact of customer anxiety in self-service is neither well understood, nor consistently factored into service design. In a field experiment conducted within the context of a credit union's SST loan-approval process, a reminder of access to a human loan agent increases the customer uptake rate of approved loans by 24%, suggesting that access to human contact in high-anxiety settings might improve service performance. Subsequent controlled laboratory experiments, which explicitly investigate the linkages among anxiety, choice satisfaction, and firm trust during SST encounters show that anxious participants are consistently less satisfied with their choices and report lower levels of trust in the firm. When anxiety is related to the SST encounter, we find that providing the opportunity for access to a human service provider dampens anxiety's negative effects on choice satisfaction and, by extension, increases firm trust. We also find that granting customers access to a human peer can mitigate anxiety in SST settings where anxiety is endemically high.

[keywords: anxiety, self-service, empirical operations, behavioral operations]

1. Introduction

Many service interactions are rife with anxiety. Patients must often consider medical treatment options at the same time that they are processing the news of a serious condition. Airline passengers may be distressed about missing a flight or may simply be nervous about flying. Individuals may experience a heightened sense of worry during car repair interactions because they are not sure about whether they can trust the mechanic's recommendations. The anxiety people experience may be stimulated in the moment and dissipate (state anxiety), related to the service or not, or it may be dispositional (trait anxiety) (Marteau and Bekker 1992) but, it wields at least some influence in many customer service contexts.

Research in social psychology has shown that when people experience anxiety, a negative emotion related to uncertainty about future outcomes, their perspectives on risk and decisions shift, (Lerner et al. 2015, Loewenstein and Lerner 2003, Pham 2007, Raghunathan and Pham 1999), and they may proactively seek advice (Gino et al. 2012, Lebel 2017). However, in a broad array of service settings, companies have

[1] Corresponding Author: michelle.a.kinch@tuck.dartmouth.edu

introduced self-service technologies (SSTs), which oblige customers to serve themselves without service employees who could support their decision-making (Bitner et al. 2002, Meuter et al. 2000) – even in settings that themselves are wrought with anxiety, such as financial services and healthcare. This trend accelerated during the COVID-19 pandemic, as companies rapidly deployed SSTs to meet social-distancing mandates. Ironically, we observed through our own research that baseline anxiety levels in the United States almost doubled, and as of October 2023 remain elevated more than 20% over pre-pandemic levels[2]. In sum, companies may be implementing SSTs that pull employees away from customers at precisely the moment anxious customers need their support.

Although OM scholars have acknowledged that customer anxiety may be deleterious to technology-based service performance (Balasubramanian et al. 2003, Bavafa et al. 2018, Hatzakis et al. 2010), a concerted effort to investigate its connection to service costs, and in particular, to a need for human contact in self-service encounters remains outstanding. Engaging with technology may, on its own, provoke anxiety and reduce customer satisfaction (Meuter et al. 2003). Moreover, without a human service provider curating which options may be most relevant, customers in SSTs may be overwhelmed by the sheer number of options they're left to consider on their own (Botti and Hsee 2010, Broniarczyk and Griffin 2014). We focus our empirical investigation on customer interactions with financial services, an important sector of the U.S. economy with a long history of SST deployment (Hatzakis et al. 2010, Yang and Ching 2014) where aspects of the service tasks or environments – such as outcome uncertainty, high stakes choices, and information asymmetries – may stimulate customer anxiety.

In this paper, we take an operational perspective and ask two primary research questions. First, how does customer anxiety affect SST service performance, in terms of choice satisfaction and trust? Although SSTs offer the promise of greater efficiencies through the reduction of labor costs, gains in scalability, and improved customer access (Bitner et al. 2000, Dabholkar 1996, Hitt and Frei 2002, Xue et al. 2007), studies have shown that SST deployment in high-anxiety settings such as financial services and healthcare may stimulate higher use of live-contact channels (Bavafa et al. 2018, Campbell and Frei 2010, Kumar and Telang 2012), but have yet to explicitly consider the effects of anxiety or the impact of lost human contact on service relationships in these settings. For example, Bavafa et al. (2018) acknowledge that worry may motivate patients to seek assurance through frequent e-visit appointments, but the authors do not investigate it directly in their research**.** We submit that anxieties among customers during SST encounters may introduce service costs that firms have not factored into their operational design – namely, an erosion of

[2] Experiments were conducted to test a variety of manipulations – both to induce anxiety from sources related and unrelated to the investing task, and, as baseline anxieties rose while conducting this research, to induce calm. We also ran tests of differing investment paths and incentive structures to isolate potential sources of anxiety. (See the Experiment Log and corresponding increases of baseline anxiety in **Appendix 7**).

choice satisfaction and trust. Second, we consider: when and how does the availability of human contact during SST encounters impact service outcomes in the presence of customer anxiety? Recent operations management research has drawn connections between service provider assistance and trust formation in service relationships (Özer et al. 2018). We extend this line of research by investigating whether merely having the option for human interaction may be sufficient to enhance choice satisfaction and trust, particularly among anxious SST customers.

We begin with a field experiment to test the value of human contact in a setting likely to be anxiety-laden – a credit union's SST loan application process. We manipulate the access to human contact messaging embedded in a status-tracking self-service application and examine differences in loan uptake rates among customers who are subsequently approved for a loan. Through a series of four laboratory studies set in a self-service online investing context, we next trace our hypothesized links among anxiety, access to human contact, the satisfaction customers feel with their own choices during SST use and the trust they feel toward the service provider (**Figure 4**).

This paper makes two specific contributions. First, we show that state anxiety, a critical and ubiquitous customer emotion that any customer may experience, can be an unobserved source of variation that influences firm trust through the substantive negative influence it has on choice satisfaction in self-service settings. Although we are not the first to identify anxiety as an influencing factor in customer willingness to use SSTs (Dabholkar and Bagozzi 2002, Meuter et al. 2003), we add to the nascent study of the role of emotions in operations (Altman et al. 2020, Ding et al. 2010, Karmarkar 2015, Urda and Loch 2013) by exploring how the effects of customer anxiety on decision-making during SST use spills over to affect firm trust in the presence and absence of human contact. By demonstrating how anxiety's negative short-term effect on choice satisfaction during SST encounters can undermine trust in the service provider, we also add to a growing body of literature on the spillover effects of emotion in economic decision-making (Lerner et al. 2004, 2015) and we extend research into the operational drivers of customer satisfaction and trust in online financial services (Balasubramanian et al. 2003, Hatzakis et al. 2010, Krishnan et al. 1999). Second, although satisfaction and trust are widely considered critical ingredients to firm profitability, our understanding of how operational design influences the formation of trust in service relationships, and the role of human assistance in that process, remains underdeveloped (Donohue et al. 2020, Özer and Zheng 2018). We show that spillover effects from endogenous customer anxieties can be disrupted by re-incorporating the availability of human contact into SST encounter design.

Of course, the promise of lower labor costs is an advantage of SSTs, so it may seem counterintuitive to suggest that companies invest in the opportunity for human contact in such settings. However, our results suggest that the incorporation of human contact need not require firms to add costly service personnel. In our studies, few experimental subjects took advantage of the opportunity to interact with a person when

presented. Moreover, our results suggest that firms may be able to improve customer choice satisfaction in high-anxiety settings by providing access to *other customers*, which may be virtually costless. Prior research has shown that the presence of other people may help or hurt customer-firm relationships during self-service interactions (Collier et al. 2015, Li et al. 2013).

Taken together, we show that the *option* to connect with another person - whether an expert or peer - and not necessarily the act of connecting with them – can be a significant driver of choice satisfaction and trust, in settings where the service task makes customers anxious. On the other hand, when the source of anxiety is exogenous to the service context, we find that providing access to human contact through the SST interface does not have the same effect.

2. Experiment 1: Preliminary Field Evidence

As an initial test of our supposition that access to human contact may improve SST outcomes in environments that are likely to engender anxiety, we partnered with a federal credit union in the Northeastern United States, with four locations and over 10,000 members. The credit union was pilot testing a new SMS messaging system to keep applicants abreast of updates to their financial loan application. By randomly assigning whether loan applicants would receive update messages, and whether those update messages included access to human contact, we were able to investigate whether providing human contact in this potentially high-anxiety SST setting increased subsequent engagement with the firm – namely, whether those who were approved for loans were more likely to move forward with them.

Although evaluative processes and wait uncertainty, as would exist in a loan approval context, are both known to be anxiety-provoking (Osuna 1985, Sweeny and Falkenstein 2015, Zeidner and Matthews 2005), we were unable to directly measure customer anxiety in the field. Instead, we conducted an ex-post experiment, presented in **Appendix 1** to support the notion that notifying customers through real-time messaging when their credit report was being reviewed could elevate anxiety.

2.1 Participants. All customers and prospective customers who applied for a consumer loan with our partner credit union during a 20-week period during the Summer and Fall of 2016 were eligible for this study. 359 loan applications were received. We excluded applications for credit cards (N=53), which had a different approval process. Moreover, we believed that credit card application processes may not induce as much customer anxiety as more conventional consumer loan applications due to their easy accessibility. Of the 306 remaining eligible applications, we further excluded loan applications from our analysis that were incomplete (N=5), withdrawn by the customer before the approval process was initiated (N=9), or that were denied by the credit union (N=54). During our period of analysis, 78.29% of applications for eligible loans were ultimately approved. The resulting sample included 238 applicants. No inducements were offered for

participation in this experiment, and although applicants in all experimental conditions were contacted 30 days after their loan was decisioned and given the opportunity to opt out of our analysis, none withdrew.

2.2 Design and procedure. The loan approval process at our partner institution had three stages. First, customers completed a loan application. Second, a loan officer was assigned to complete the underwriting process, which took an average of two business days. This included reviewing the application, requesting additional documentation (if needed), verifying the applicant's income, and pulling their credit report to establish creditworthiness, before issuing a decision – which, if the loan was approved, included the loan amount, as well as its term and interest rate. Finally, the loan decision was communicated to the customer, who could choose whether to move forward with the loan.

Upon submission, applications were randomly assigned to one of three experimental conditions, which varied the level of messaging and access to human contact the customer received during the review process. Eligible applicants in the control condition (N=99) received no messaging or supplemental access to human contact during the decisioning process. Those in the messaging only condition (N=104) received SMS messages that provided status updates of actions taken by the credit union as the application progressed through the underwriting process (see **Figure 1** for the full text of each communication), but no supplemental access to human contact. Three messages were delivered: 1) a communication acknowledging receipt of the application and introducing the loan officer, 2) a communication informing the applicant that the underwriting process was underway and that their credit report was being reviewed, and 3) a communication of the loan decision. These SMS messages were pre-programmed and pushed out manually by the loan officer as the application's status changed throughout the review process. As a part of this implementation, all applicants were also given access to a web portal where they could see the status of their loan at any time.

Finally, those in the messaging with human contact condition (N=101) received the same SMS messages above, with the addition of the loan officer's telephone number, along with an invitation to reach out should the customer have any questions. The provision of a phone number and the invitation for customers to contact the loan officer served as our experimental manipulation.

2.3 Dependent measure. We use *loan acceptance* as our measure of customer engagement since moving forward with the loan required action by the customer and was a definitive step toward deepening the service relationship with the credit union. We also note that one's willingness to move forward with a loan could be viewed as a behavioral indicator of trust in the firm. Ozer et al. (2018) defined trust in part as a voluntary acceptance of vulnerability based on the expectation of a positive outcome, and the finance literature defines trust as a belief in a lending counterparty's reliability (Hagendorff et al. 2023). We coded *loan acceptance* as a binary measure, depending on whether loan proceeds had been disbursed to the customer as of March 2017, three months after the last loan application in our study was completed, to

allow plenty of time for the loans to be approved and closed. We note that random assignment was unrelated to the probability of loan approval and confirm that there were no statistical differences in the approval status among treatment cells (χ^2 (2, N = 304) = 0.20, p = *NS*).

Process Stage	Messaging Only	Messaging with Access to Human Contact
Application Receipt	Hi *John*, my name is *Rachel* and I will be working on your loan application. A decision will be returned to you by *Wednesday* and I'll text you updates along the way. Thank you for working with us!	Hi *John*, my name is *Rachel* and I will be working on your loan application. A decision will be returned to you by *Wednesday* and I'll text you updates along the way. Feel free to contact me at *555-5555* with any questions. Thank you for working with us!
Document Review	Hi *John*, just letting you know that I've pulled your credit report and am reviewing your request as a part of our process. If I need additional information, I'll give you a call. Thanks, *Rachel*.	Hi *John*, just letting you know that I've pulled your credit report and am reviewing your request as a part of our process. If I need additional information, I'll give you a call. If you need anything in the meantime, you can reach me at 555-5555. Thanks, *Rachel*.
Decision Reached	Congratulations, *John*! Your request has been approved. I will reach out to you to arrange a time to close. Thank you again for your business. *Rachel*	Congratulations, *John*! Your request has been approved. I will reach out to you to arrange a time to close. Thank you again for your business. *Rachel 555-5555*

Figure 1: Text messages sent to customers in messaging only and the messaging with human contact conditions during each stage of the loan approval process (Experiment 1). Access to human contact was manipulated by inviting customers to reach out to the loan officer at each stage of the process, and by providing readily available contact information. Note: the customer name, agent name, and telephone numbers provided are masked in the example above.

2.4 Independent measures. To estimate the distinct effect of providing access to human contact on the customer's decision to proceed with an approved loan, we created indicator variables denoting whether the customer was in the baseline condition (no messaging or human contact), the messaging-only condition (messaging without access to human contact), or the messaging and human contact condition (messaging with a phone number and invitation to connect). The identification of the effect of access to human contact in this estimation arises from directly comparing loan acceptance of participants in the messaging only condition with the loan acceptance of those in the messaging with human contact condition. Hence, the messaging-only condition is modelled as the excluded category in our specification, facilitating a direct interpretation of the relevant coefficients.

2.5 Control measures. Although we rely on random assignment to control for any unobserved differences among our experimental groups, we were able to capture the applicant's *credit score*, a crucial factor in the loan approval process and a potential driver of customer anxiety made salient in our messaging treatments, as well as the *loan amount*, the *loan term (in months),* and the *loan interest rate (in percentage points),* where applicable, which we believe are factors that may affect a customer's decision to accept the loan. Although treatment assignment was based on the order of application submission, we do observe significant differences when conducting means comparison tests among the average interest rate levels across our treatment cells. For this reason, we include control variables in our estimations.

2.6 Analysis and results. In **Table 1**, we model loan acceptance as a logistic function of indicators for the messaging and human contact, and baseline conditions, as well as a vector of controls, as described above. The fully specified model shows that providing status updates do not, on their own, improve loan uptake rates. The probability of uptake is nominally higher for customers in the baseline condition than for customers who receive messaging without human contact ($\beta = 0.21$, $p = NS$). Controlling for other factors, providing messaging without human contact reduces the predicted loan acceptance percentage from 68.43% to 64.51%. However, adding an invitation for human contact increases the predicted probability that an applicant will accept the loan if offered to 80.29% ($\beta = 0.93$, $p < 0.05$), an increase in loan acceptance of 24.46% over baseline rates in the messaging only condition.

2.7 Discussion. Taken together, the pattern of results in Experiment 1 provides preliminary field evidence consistent with the idea that consequential service outcomes, like trust and willingness to engage with the service provider, may be compromised by anxiety in self-service settings and helped by subtle reminders of access to human assistance during SST use, setting the stage for further inquiry. The reduction in acceptance probability that we see in the messaging only condition, while not a statistically significant difference from baseline in our full-specified model, was intriguing given the long-held belief that providing real-time information during a waiting process would alleviate anxiety (Osuna 1985) and the more recent studies showing that operational process transparency, as was provided through the SMS messages, positively impacts customer engagement (Buell et al. 2021, Buell and Norton 2011). Consistent with our ex-post study (Appendix 1), we surmise that the process transparency here – notifying customers that their credit reports were being reviewed – served to mildly stimulate further anxieties that were left unabated in the messaging only condition where there was no reminder of access to a loan officer. The laboratory experiments that follow allow us to explore the connections between anxiety, service performance and the role of human assistance in a more controlled setting, directly testing the hypotheses we generate from these insights.

	Loan Acceptance
Messaging and human contact condition	0.927**
	(0.426)
Baseline condition	0.205
	(0.436)
Credit Score	0.015***
	(0.003)
Loan Amount	0.000
	(0.000)
Loan Term (in Months)	-0.018*
	(0.010)
Loan Rate (in percentage points)	12.503**
	(5.514)
Constant	-9.604***
	(2.416)
Observations	195
Pseudo R-squared	0.136
Pr(Accept|Baseline)	68.43%
Pr(Acceptance|Messaging)	64.51%
Pr(Accept|Messaging and contact)	80.29%

Table 1: Increasing access to human contact improved the probability of loan acceptance (Experiment 1). Model is estimated with logistic regression, and robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively. Note: The messaging only condition is the excluded category. Marginal effect estimations for each condition are provided.

3. Related Literature and Hypothesis Development

In the present research, we explore how making the availability of human contact salient in SST interactions shapes customer perceptions and behaviors in high-anxiety service settings. SSTs have grown in prominence as firms have sought to improve productivity, service quality, and profitability (Campbell and Frei 2010, Hitt and Frei 2002, Xue et al. 2007). Because of these potential benefits, technology-based self-service has become a key delivery model across industries – even those that have been associated with high levels of anxiety such as healthcare and financial services (Berry and Bendapudi 2007, Botti and Iyengar 2006, Meuter et al. 2000) – a rich stream of marketing literature studying the drivers of customer acceptance of and willingness to adopt technology-based service channels has developed. However, questions remain about how customers productively use these technologies and navigate simultaneously digital and social experiences in service – especially with virtual assistance models (Bolton et al. 2018).

From an operational perspective, the findings on the realized costs and benefits of SST deployment due to customer behavior changes in these settings has been mixed. SST adopters exhibit greater product acquisition (Hitt and Frei 2002, Xue et al. 2011) and higher retention rates over longer time horizons (Buell et al. 2010), but on average, research in these settings shows that SST adoption may result in lower

satisfaction for some types of customers (Ding et al. 2010, Meuter et al. 2003). In this section, we trace out one possible explanation for this equivocality – that the anxiety that customers feel in these settings undermines choice satisfaction and trust in the firm in the absence of human service providers and stimulates higher demand for live contact service channels which results in the increases in service cost that OM scholars have noted in prior empirical research (Bavafa et al. 2018, Campbell and Frei 2010, Kumar and Telang 2012). In so doing, we add to the body of operations management literature on optimizing trade-offs between operational efficiency goals and service performance through service design (Frei 2006, Zhang et al. 2017) and extend prior research on the drivers of customer satisfaction and trust in automated financial service delivery (Balasubramanian et al. 2003, Krishnan et al. 1999). Having observed that making human contact availability salient in SST interactions shapes behaviors in a financial services sector, we next develop a set of hypotheses to better understand what may be driving our field results.

3.1. The effect of customer anxiety on choice satisfaction in self-service interactions. Intense emotions, such as anxiety, can crowd out cognition (Loewenstein and Lerner 2003), negatively influencing the quality of decisions people make and their experiences of making them (Lerner et al., 2015 offers a comprehensive review). Anxiety has been shown to shape our risk perceptions and cause us to expect poorer outcomes (Brooks and Schweitzer 2011, Gino et al. 2012). It greatly reduces our level of attention and our ability to process and evaluate information (Eysenck et al. 2007, Forgas and George 2001), lengthening the time it takes for us to make logical inferences (Pham 2007, Rick and Loewenstein 2008). Moreover, in high-stakes settings, anxiety has been shown to alter individual risk preferences, making people more risk averse (Raghunathan and Pham 1999) or more risk seeking (Mano 1994), depending on their emotional state – which could undermine choice satisfaction and confidence.

The effects of anxiety may be especially acute in co-productive service settings where customers are conducting self-directed transactions or engaged in self-help, the outcomes of which rely on customer ability to contribute key information (Roels 2014). The empowerment that can attract customers to self-service options may also lead to increased decision difficulties – particularly in contexts marked by task complexity and low levels of consumer knowledge (Broniarczyk and Griffin 2014). Unmitigated choice freedom may result in an exhaustive search for the "best" outcome, which may increase the likelihood of feelings of regret, further confounding decision making (Bell 1985), undermining perceptions of choice quality (Carmon et al. 2003), and reducing satisfaction with decision outcomes – regardless of how well those outcomes meet objective goals (Iyengar et al. 2006). Thus, we hypothesize:

Hypothesis 1 (H1): Anxiety reduces choice satisfaction in self-service settings.

3.2. The effect of customer anxiety on trust in self-service interactions. Trust fosters relationship commitments and customer cooperation (Morgan and Hunt 1994) leading customers to engage more deeply

with the service provider over time and enhancing loyalty (Porter and Donthu 2008). Scholars have noted the heightened importance of trust as a facilitating factor in economic and social exchange in online environments (Gu and Zhu 2021), yet the study of customer trust formation in online service contexts (Balasubramanian et al. 2003, Porter and Donthu 2008) and in business management more broadly remains underdeveloped (Özer and Zheng 2018). Most directly related to our study, Balasubramanian et al (2003) investigates the relationship between trust and satisfaction in online investing, noting that the loss of human interaction in self-service technology contexts may reduce the relationship-building capacity of customer-firm interactions and may leave online investors "plagued by doubts," but the authors do not explicitly model these factors. As we saw in our motivating field study, loan applicants only receiving process status updates through an SMS messaging platform were least likely to move forward with an approved loan. Thus, we predict that anxiety in self-service encounters that rely on technology alone will have a negative effect on trust in the firm. Moreover, choice satisfaction in SST interactions has critical implications for the trajectory of customer-firm relationships, since satisfaction in the broader sense is a precursor to customer trust (Garbarino and Johnson 1999) - as is a sense of control over service outcomes (Dunn and Schweitzer 2005), which is directly impaired by anxiety. Accordingly, we hypothesize:

Hypothesis 2 (H2): Choice satisfaction mediates the relationship between anxiety and firm trust in self-service technology settings.

3.3. The costs and benefits of human presence in self-service interactions. An important source of the profitability and productivity gains that firms experience by introducing SSTs is the reduction of labor cost as a part of the service encounter. Although SSTs may be preferred by customers specifically to avoid service personnel (Dabholkar et al. 2003, Meuter et al. 2000), studies have shown that SST adopters may simultaneously increase their use of traditional service channels (Bavafa et al. 2018, Campbell and Frei 2010), perhaps because self-service use provokes more complex needs or customer ambiguity (Kumar and Telang 2012). Moreover, customers may seek out live contact channels for help with the technology during SST use (Dabholkar et al. 2003), as a fallback option in case of SST failure (Dabholkar and Spaid 2012), to alleviate computer or technology anxiety (Meuter et al. 2003), or for social interaction (Zeithaml and Gilly 1987).

To balance heterogeneous customer needs while preserving the efficiency potential of self-service, firms offer employee-assisted self-service (Froehle 2006) – adding back a portion of the cost of human servers that SST options are intended to reduce – but the lack of privacy engendered by the presence of store employees may in some cases exacerbate feelings of time pressure, perceived crowding and other social anxieties in interpersonal service settings (Collier et al. 2015, Dabholkar and Spaid 2012). Although most of the prior research on the role of human interaction during self-service use has focused on the

physical presence of employees, other studies have shown that making their virtual presence salient in SST environments can fundamentally alter customer experiences and behaviors. For example, the incorporation of online chat may increase customer feelings of control and positively influence satisfaction (van Dolen et al. 2007), service robots and anthropomorphism may improve trust (van Pinxteren et al. 2019), and the incorporation of operational transparency, providing a window into the work being conducted by human service providers, can enhance customers' willingness to engage with the service (Buell et al. 2021). Research has even suggested that other customers may serve as stand-ins for employees, with similarly positive implications for customer-firm relationships. For example, when customers provide social support for each other at a gym, the establishment may benefit from higher customer loyalty (Rosenbaum and Massiah 2007). Patients in shared medical appointments with other patients exhibit higher levels of verbal and non-verbal engagement, higher satisfaction, and higher medication compliance (Buell et al. 2023). The tenor of peer exchanges during self-service (positive or negative) spills over to affect service quality perceptions, and the influence of other customers is greatest during SST use (Li et al. 2013).

Most pertinent to the present study, the absence of human contact in SST channels may be especially discomforting for customers in high-anxiety settings. Although scholars have drawn connections between situational anxieties and personality-driven needs for human interaction to intentions to use technology-based self-service (Dabholkar and Bagozzi 2002, Li and Huang 2022), our study explicitly analyzes the pathway from anxiety to firm trust, as mediated by choice satisfaction, and investigates the moderating role of human assistance during anxiety-laden SST encounters. We leverage research that suggests connections between anxiety and proactive advice-seeking behaviors (Gino et al. 2012, Lebel 2017), and acknowledges that customer comfort, defined by both reduced anxiety and increased calm, plays an important role in the creation and maintenance of service relationships (Spake et al. 2003) to hypothesize that:

Hypothesis 3 (H3): Access to human contact moderates the negative effect of customer anxiety on choice satisfaction in self-service settings.

In the experiments that follow, we examine the influence of anxiety on choice satisfaction and trust formation in SST interactions and investigate whether offering customers access to human contact in such settings can mitigate anxiety's potentially harmful effects.

4. Presentation of laboratory experiments

Experiment 1 provided preliminary field evidence that access to human contact can improve firm trust and customer engagement among SST users. Although we believe that anxiety may have been an influencing factor during the field experiment, and a supplemental experiment presented in **Appendix 1** provides converging evidence, it was infeasible to directly measure anxiety in the field. To address this,

and to better trace out the interrelationships among anxiety, choice satisfaction, and firm trust hypothesized above, we conduct a series of four controlled lab experiments.

Our lab experiments are set in online investing where high-stakes decisions are made based on complex and uncertain future scenarios (Kaufmann et al. 2013, Looney and Hardin 2009), which may induce anxious feelings, affect trust formation and increase the need for human interaction (Balasubramanian et al. 2003, Krishnan et al. 1999). In Experiment 2A, we examine our hypothesized links when the source of anxiety is related to the service task – namely, when making investment decisions during a volatile stock market. In Experiment 2B, we introduce access to human contact – to both an expert and a peer – to this endogenous anxiety service context, where the anxiety and thus potential desire for human contact would be expected to endure. At the other end of the spectrum, in Experiments 3A and 3B, we test whether these relationships persist when the source of anxiety is exogenous and unrelated to the service task. **Figure 2** provides an overview of these experiments. In the presentation of experiments that follow, we note how we determined our sample size, all data exclusions, and all measures collected (Simmons et al. 2012). **Appendix 2** provides a summary of balance checks among pre-treatment variables performed for each analysis sample between our anxiety treatment and control groups across the four experiments. For all experiments we report the results of controlled estimations.

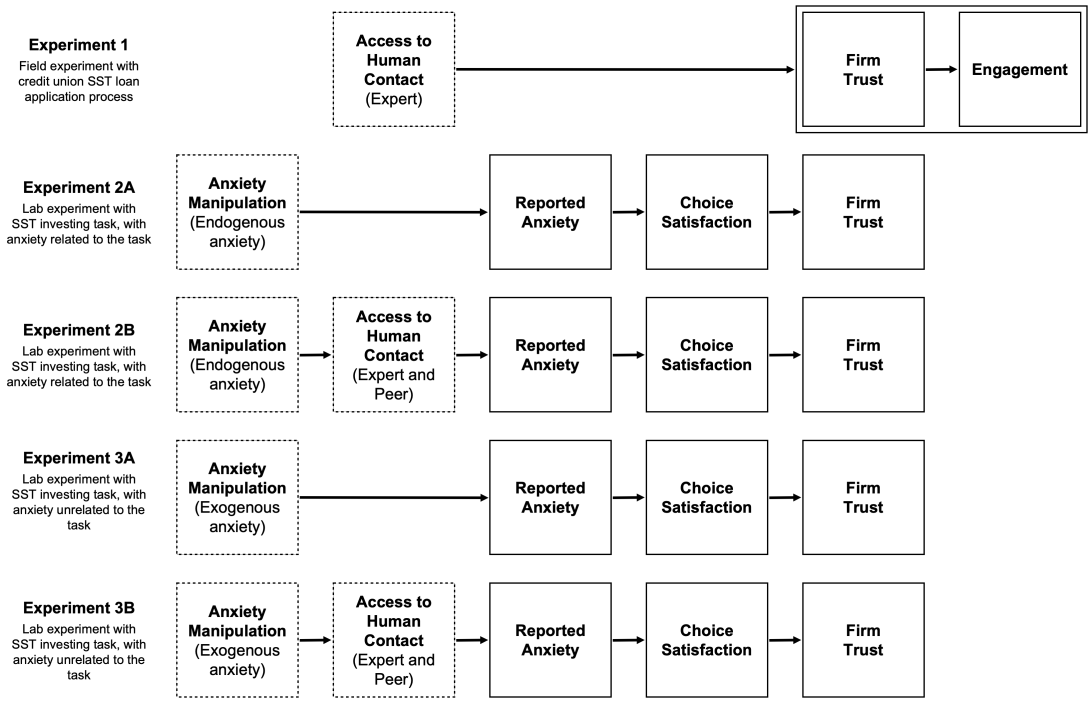


Figure 2: Overview of primary experiments. Boxes with dotted lines represent experimental manipulations with random assignment and boxes with solid lines represent measured variables. Experiment 1 was conducted in the field. Experiments 2A, 2B, 3A, and 3B were conducted in the lab. Together, these studies trace relationships among anxiety, choice satisfaction, firm trust and engagement, and the role of access to human contact to mitigate anxiety's negative effects on service performance.

4.1 Experiment 2A: Endogenous Anxiety, Choice Satisfaction and Trust in SST Interactions

To fully investigate how and why access to human contact during SST encounters affects choice satisfaction and trust, we begin with a baseline study of the effects of customer anxiety in the absence of human contact. We recruited participants to an online investing task where we manipulated anxiety by varying the nature of the market conditions participants faced.

4.1.1 Participants. 160 participants were recruited on the Amazon Mechanical Turk platform to engage in an online investment simulation in exchange for a $2.00 participation fee plus a bonus of $0.25 for every $100,000 earned during the investment simulation. Hence, gains and losses in the task directly influenced participants' real compensation. Participants were informed that any bonus earned would be paid after the study concluded, but were not informed in advance of the precise number of rounds in order to minimize end effects (Rapoport and Dale 1966). As this was an initial study, the target sample size of 160 participants was chosen with the goal of capturing 75 observations per condition after exclusions. Participants who did not complete all tasks and questionnaires were dropped from the sample, resulting in a final dataset of 157 observations (M_{age} = 34.43, 44.23% Female).

4.1.2 Design and procedure. At the outset of the experiment, participants were told to imagine that they had an investment portfolio of $100,000 to allocate across stocks, bonds, and cash for a long-term investment goal. The task consisted of a series of 12 rounds, where each round simulated a year of investing.

During each round, participants could review their portfolio, research the historical performance and characteristics of different asset classes, and change their allocations to stocks, bonds, and cash. Mirroring real-world investment planning applications, the interface consisted of three pages – *Your Portfolio*, *Research*, and *Take Action* - and provided updated information after each round to inform their choices (**Figure 3**). On the *Your Portfolio* Screen (Panel A), participants saw their balances, a pie chart of their portfolio as divided among the asset classes, investment commentary associated with the prior year's returns, and the portfolio's overall growth history. On the *Research* Screen (Panel B), participants were given an opportunity to learn about certain characteristics of each investment choice based on a rolling 20-year window that began with historical returns for each option and was updated based on the returns drawn by the simulation. The investment characteristics shown were average annual return, standard deviation, risk category of the fund, best / worst annual returns, and the percentage of years with positive returns. Finally, the *Take Action* Screen (Panel C) allowed participants to enter their chosen percentage allocations in whole numbers from 0 to 100. After participants submitted their decisions in each round, they experienced a brief pause to simulate the passage of time before progressing to the next round and seeing how their portfolio fared in the market.

A. Your Portfolio

Participants could use this screen to track their asset allocation, portfolio balance and portfolio growth over time as the simulation progressed. With each round, participants received commentary about economic forces that drove their investment results.

B. Research

Participants were given information about the historical performance characteristics of each asset class (e.g. cash, bonds, and stocks) to aid their decision making.

C. Take Action

Participants concluded each round by updating their portfolio allocation among cash, bonds, and stocks.

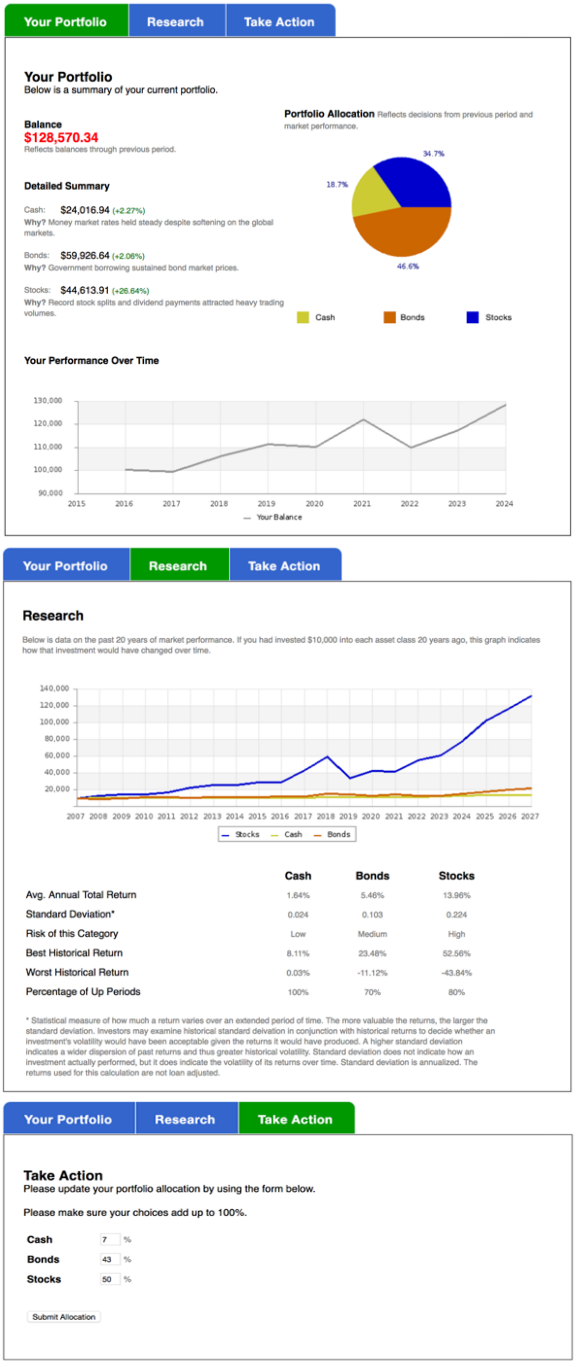


Figure 3: Screenshots of the participant experience in the investment simulation. During each round, participants could review their portfolio (Panel A), research the performance of various asset classes (Panel B) and update their portfolio allocation (Panel C). Note: To facilitate the human contact manipulation in Experiment 2B and 3B, the interface was augmented as depicted in Figure 6. We note that in the original interface used in Experiments 2A and 2B, there was a typographical error in the first sentence of the footnote on Panel B that said "valuable" instead of "variable," as shown. The error was corrected prior to running Experiments 3A and 3B. As the typo was consistent across experimental conditions, it could not have accounted for the pattern of results we observe.

Since experiencing stock market downturns has been linked to anxiety in previous research (Engelberg and Parsons 2016), we manipulated anxiety by varying the probability that participants would face aversive market conditions. For participants in the low-anxiety condition, the simulation randomly drew a year between 1928 and 2014 with uniform probability, and applied the historical returns for stocks, bonds, and cash from that year against the participant's balance and portfolio allocation, to calculate their starting position for the next round. For example, if the year 1946 was drawn, the application applied -8.43% to stocks, 3.13% to bonds and 0.38% to cash. In the high-anxiety condition, the simulation randomly drew a year between 1928 and 2014 with 50% probability, and randomly drew from the set of years where the stock market declined by 5% or more with 50% probability. **Appendix 3A** shows the full array of stock market returns that participants may have experienced in our endogenous anxiety investment simulation (Experiments 2A and 2B). Indeed, participants in the low-anxiety condition experienced average returns of 12.81% for stocks, 5.14% for bonds, and 3.46% for cash, while participants in the high-anxiety condition experienced returns of -3.12% for stocks, 5.41% for bonds, and 3.22% for cash. Note that the difference between conditions is driven by potential stock market returns.

After submitting allocation decisions in rounds 3, 6, and 9, and before seeing how those choices performed, participants were asked to report their levels of anxiety and calmness, as well as their satisfaction with the investment allocation choice they just made. After completing the 12th round, participants were shown a final portfolio screen, and after 15 seconds, were redirected to the exit survey where they were asked to rate their feelings of trust toward the firm that provided the investment platform and to provide their demographic information.

4.1.3 Manipulation check. The six-item Spielberger State-Trait Anxiety Inventory STAI (Marteau and Bekker 1992) instrument was used to measure pre-treatment levels of anxiety and calm and as a manipulation check to ensure that anxiety was indeed elevated in the high-anxiety condition. We subtracted the level of calm (ratings of feeling "content", "relaxed" or "calm") from the level of anxiety (ratings of feeling "worried", "tense" or "upset") during each measurement round to arrive at our *Reported Anxiety* measure. By the end of the simulation, participants in the high-anxiety condition ($M = 2.26$, $SD = 4.82$, $N = 78$), reported over two and a half times the increase in anxiety relative to their pre-treatment levels than participants in the low-anxiety condition ($M = 0.86$, $SD = 3.20$, $N = 79$; $t(155) = -2.14$, $p < 0.05$). However, owing to the anxiety-provoking nature of the investment task, participants in both conditions reported elevated anxiety levels over their baseline rates ($ts(78) > 2.39$; $p < 0.02$).

4.1.4 Dependent measures. Prior research suggests that anxiety leads to a deterioration of self-confidence (Gino et al. 2012) and that outcome satisfaction and confidence are highly correlated with each other (Iyengar et al. 2006). Following the approach in Iyengar et al, 2006, we asked participants to separately rate, "how satisfied are you with the choice you just made?" and "how confident are you that the

decision you just made will produce a gain?" These two-items were rated on a scale of 1-7 (1 = Extremely dissatisfied/Not at all confident, 7 = Extremely Satisfied/Completely confident). Consistent with prior literature and confirmed by a Cronbach's Alpha ($\alpha = 0.85$) indicating a high correspondence between these two measures, we used the average of these two responses as our *choice satisfaction* measure for each participant. At the end of the investment simulation, we asked participants to rate, on a 4-point Likert scale (1-None, 4-A Lot) "Based on this experience, how much do you trust the firm that offered this investment tool?" We use this single-item measure to capture *firm trust*.

4.1.5 Control measures. Although random assignment should negate the need to include individual-level controls, we nevertheless include them to control for potential failures of random assignment and for demographic influences on risky decision-making: age, gender, income and education (Kaufmann et al. 2013). Since our manipulation directly influenced investment opportunity, we cannot use participant balances or raw investment returns to control for investment outcomes. Instead, we calculated a measure of *relative underperformance* for each participant, subtracting their personal rate of return (the linear combination of the performance of each asset class weighted by their allocation choices) from the return of the highest performing asset class for any given round. We believe that by controlling for the difference between the best a participant could have achieved, which is salient with each round, we control for feelings of disappointment or regret, negative emotions that may influence their ratings of choice satisfaction and confidence (Bell 1985). As expected, the relative underperformance between groups is statistically significant ($M_{Low} = 0.10$, $SD_{Low} = 0.03$ vs. $M_{High} = 0.11$, $SD_{High} = 0.04$; $t(155) = -2.18$, $p < 0.05$). In addition, we include ex-ante *anxiety* and *calm* to account for pre-manipulation levels of emotion.

4.1.6 Structural Equation Model[3]. To formalize the relationships and test the theory that anxiety increases choice satisfaction, which in turn reduces trust, we used structural equation modelling to conduct a path analysis. Because the experiment is conducted over multiple rounds and we measure anxiety, choice confidence and choice satisfaction for each individual at intervals across the rounds, we have a panel of data for each participant. However, because *firm trust*, our final dependent variable, is collected at the end of the study, we collapse the data set using the means of our intervening variables. We use bootstrapping to estimate robust standard errors and confidence intervals, to alleviate power concerns regarding possible asymmetric or non-normal sampling distributions of indirect effects (MacKinnon et al. 2007) and jointly estimate the equations to address potentially correlated error terms associated with endogenous variables. As shown in **Figure 4**, participants in the high-anxiety condition, who experienced a higher probability of stock market downturns, were more anxious during their interactions with the investment simulator (β =

[3]Although we present structural equation models in each subsequent analysis to ease the comparability of our results, OLS and ordinal probit model estimations for each lab study are available, where applicable, in **Appendix 8.**

1.14, $p < 0.05$). This higher level of anxiety was in turn associated with diminished choice satisfaction throughout the task ($\beta = -0.19$, $p < 0.01$), confirming support for Hypothesis 1. Because choice satisfaction has a positive influence on trust in the firm ($\beta = 0.21$, $p < 0.05$), our model demonstrates that higher levels of anxiety are associated with lower levels of firm trust through diminished choice satisfaction, which is consistent with Hypothesis 2. Our result shows that the bias-corrected confidence interval for the pathway of interest from anxiety to trust through choice satisfaction (95% CI: [-0.08, -0.01]) does not contain zero.

Interestingly, lower levels of choice satisfaction among participants assigned to the high-anxiety condition existed despite decisions that aligned with their incentive of producing portfolio gains. Although these participants faced a higher likelihood of stock market downturns, they outperformed the stock market they experienced by increasing their allocations to bonds and cash, thereby generated an average portfolio gain of 1.73% while the stock market on average fell by almost twice that amount, -3.12% across the 12 rounds. In contrast, those in the low-anxiety condition under-performed with an average portfolio return of 8.80% while their stock market on average went up by 12.81%.

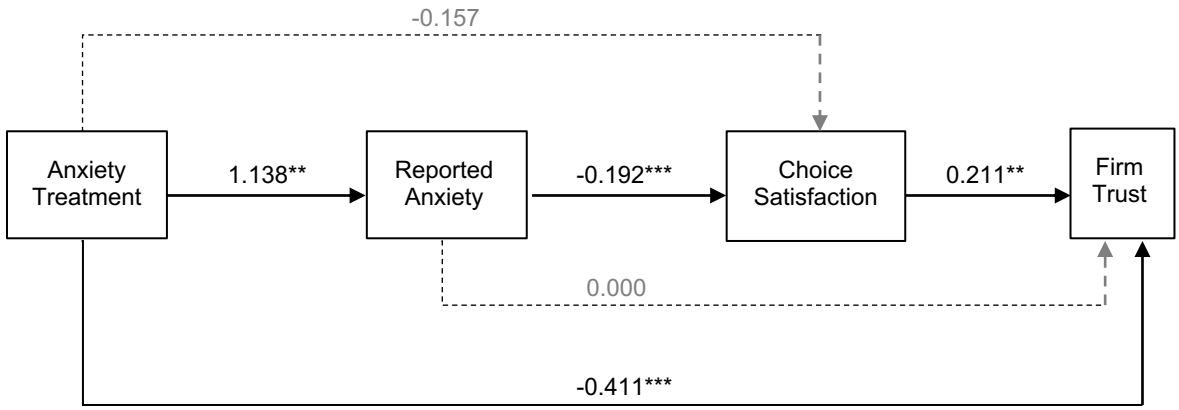


Figure 4: Links among anxiety, choice satisfaction, and firm trust (Experiment 2A). Model controls for age, gender, income, education, pre-treatment anxiety, pre-treatment calm, and relative underperformance, and was estimated with bootstrapped standard errors with 1,000 repetitions. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively. Insignificant links between variables are shown with dashed lines.

4.2 Experiment 2B: Access to Human Contact in SST Interactions with Endogenous Anxiety

Having shed light on the linkages between customer anxiety and service performance, we now test the effects of two potentially cost-effective ways to introduce human contact into the design of SSTs using an online chat feature to connect customers to expert assistance or to peer support. Our tests differentiate the

benefit of access to qualified support from the service firm, which may increase labor costs and connote higher efficacy, from access to chat with another customer engaged with the SST, which does neither.

4.2.1 Participants. 266 participants were recruited to a university research laboratory in the Northeastern United States to engage in a series of unrelated experiments in exchange for $15.00. Although we did not have direct control over the number of participants who attended these laboratory sessions, we sought at least 30 participants per experimental condition. Participants that did not complete all tasks due to time constraints as well as those that did not report their anxiety levels during the simulation were dropped from the sample, leaving 219 participants (M_{age} = 23.45, 50.92% Female) in the analysis. As with Experiment 2A, participants were paid a bonus of $0.25 for every $100,000 earned during the investment simulation.

4.2.2 Design and procedure. We replicated the design of Experiment 2A with three important modifications. First, we incorporated three additional conditions in a factorial design, such that Experiment 2B featured a 2(anxiety: high, low) x 3(human contact: none, peer, expert) design. Anxiety was manipulated in a manner consistent with Experiment 2A, by randomly drawing from actual historical returns of U.S. stock, bond, and cash markets. Human contact was manipulated by means of a chat button, introduced in the top right corner of every page of the investment management platform for the two human-contact conditions (**Figure 5**). In the "peer" condition, the button read "Chat with Another Investor" and in the "expert" condition, the button read, "Chat with an Expert". Clicking the button would open a separate chat window where they could correspond with another participant, or with a research assistant, blind to our hypotheses and limited to providing scripted responses. (See **Appendix 4** for a copy of the instructions and script for the expert role). Although it was not disclosed to participants, the "expert" could only reiterate information that was already available to all participants within the platform, so as not to inadvertently alter participant decision making across conditions.

Second, to increase the probability that in-lab participants who were in the "peer" condition would have other participants still working on the task if they wished to chat, we extended the length of the simulation to 30 rounds, which mirrored a typical retirement investment horizon (Benartzi and Thaler 1999), and mapped appropriately with the degree of focus and attention afforded by the in-lab participants. Furthermore, extending the investment simulation to 30 rounds more carefully approximated a long-term perspective provided participants with a longer period of time during which to evaluate the investment platform itself and form a basis for their rating of firm trust. Third and finally, we added a "Frequently Asked Questions," section to the header of every page of the website, which included all of the information on the research assistant's script for the "expert" condition. This addition ensured that all participants had access to the same information across conditions, such that the only differences experimentally manipulated were the level of anxiety inherent in the service interaction and access to human contact.

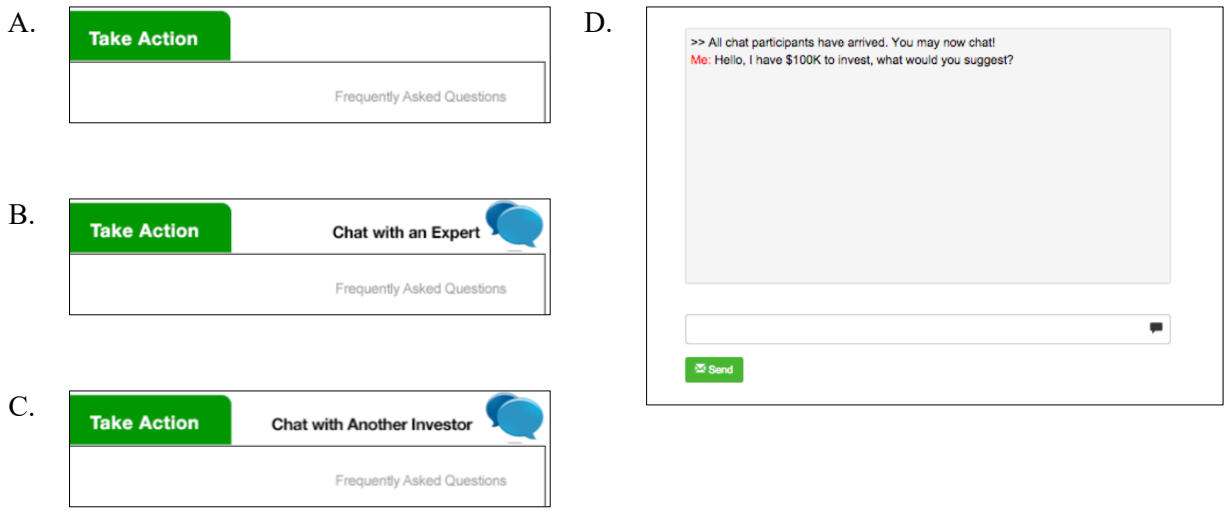


Figure 5: Screenshots of human contact manipulation (Experiment 2B and 3B). Participants were randomly assigned to one experimental condition in a 2(Anxiety: low, high) x 3(Human contact: none, expert, peer) design. Human contact was introduced by adding a clickable icon in the upper right-hand corner of every page of the investment simulation. Participants who did not have access to human contact (Panel A) saw no icon. Participants in the expert condition (Panel B) saw an icon that read "Chat with an Expert." Participants in the peer condition (Panel C) saw an icon that read "Chat with Another Investor." Clicking these icons would open a pop-up window (Panel D), which facilitated a real-time chat interaction. To ensure all participants had access to the same information, a Frequently Asked Questions link was also provided in the upper right-hand corner of each screen of the simulation.

4.2.3 Manipulation check. As in Experiment 2A, we used the short-form STAI to compare ex-ante levels of anxiety and calm with levels of anxiety intermittently, this time after every five rounds of the investment simulation. Again, participants in the high-anxiety condition (M = 2.51, SD = 3.48) reported more than twice the increase in anxiety over their baseline levels than participants in the low-anxiety condition (M = 0.92, SD = 2.56 ; $t(217) = -3.80$, $p < 0.01$) at Round 5 and at Round 10 (M_H = 2.33, SD_H = 3.47 vs. M_L = 1.14 , SD_L = 2.59 ; $t(217) = -2.86$, $p < 0.01$).

Owing to the 30-round length and endogenous anxiety in this experiment, participants in the low-anxiety condition exhibited increasing levels of anxiety as the simulation progressed while those in the high-anxiety condition maintained the sharp increase in anxiety they initially reported throughout. As such, we observed converging levels of change in net anxiety after round 10, consistent with acclimation and learning effects (Gupta et al. 2016). Indeed, by the end of the task, participants in both the high-anxiety condition (M = 2.68, SD = 3.91 ; $t(108) = 7.16$, $p < 0.01$) and the low-anxiety condition (M = 1.71, SD = 3.08 ; $t(109) = 5.81$, $p < 0.01$) reported significant increases in anxiety over their baseline levels.

4.2.4 Dependent and control measures. We use the same dependent measures as in Experiment 2A, *choice satisfaction* and *firm trust*. Since choice satisfaction and confidence were shown to be highly

correlated in Experiment 2A, we felt that simply asking about choice satisfaction would streamline the participant experience in the context of a 30-round experiment without materially affecting the integrity of our results, so we dropped the choice confidence question in Experiment 2B. As before, we measure choice satisfaction counterbalanced with our STAI questionnaire every 5 rounds. We again use *firm trust* as our final dependent variable, measured at the end of the simulation, and control for demographics, pre-treatment emotion, and relative underperformance in our estimations.

4.2.5 Analysis and results. We first replicate the structural relationships from Experiment 2A and observe a full mediation through choice satisfaction, between anxiety and firm trust (**Appendix 5A**) before we begin to analyze how the presence of human contact channels affects these relationships. In accordance with our prior results, participants in the high-anxiety condition again reported higher levels of anxiety and lower choice satisfaction, despite having produced positive investment returns. Participants in the high-anxiety condition produced returns of 2.10% on average, relative to a downward-trending environment where stocks returned -2.71%. Participants in the low-anxiety condition reported higher levels of choice satisfaction but lagged with an average return of 7.59% versus their stock market average of 11.37%.

In **Figure 6**, we present a structural equation model that sheds light on the main and moderating effects of our human contact interventions. The model reveals that although access to an expert has a marginally significant reductive effect on reported anxiety (Expert: β = -0.84 , $p < 0.10$), access to a peer does not (Peer: β = -0.79, $p = NS$). Although anxiety still hinders choice satisfaction in the interaction (β = -0.15, $p < 0.01$), the ability to access an expert has no significant baseline effect on choice satisfaction (Expert: β = -0.19, $p = NS$), while having access to another investor has a negative impact (β = -0.40 , $p < 0.05$). In sum, the two types of human contact seem to exert different main effects: access to expertise seems to affect customer emotion while access to a peer seems to affect decision satisfaction under baseline, low-anxiety conditions. However, when we examine interaction effects, we see that both forms of human contact have a positive effect on choice satisfaction during market downturns when anxiety is greatest (Expert×AnxietyTreatment: β = 0.75, $p < 0.05$; Peer×AnxietyTreatment: β = 0.79, $p < 0.05$). Supporting Hypothesis 3, having access to human contact makes people feel more satisfied with their decision making in the presence of anxiety. By offsetting declines in choice satisfaction, losses to firm trust can be stemmed, as the only direct impact to firm trust that we observe is through choice satisfaction (β = 0.22, $p < 0.01$). In **Figure 7**, we can see the differential – and mitigating – effect of access to human contact on choice satisfaction during high-anxiety service conditions more clearly.

Interestingly, most participants that had access to human contact *did not actually opt to interact* with an expert or peer during the investment task. In the expert condition, 8 unique participants of the 71 that were assigned access (11.27%), evenly split between the anxiety conditions, actually chatted. Most asked for investment recommendations or predictions such as “What do you think will happen in the stock

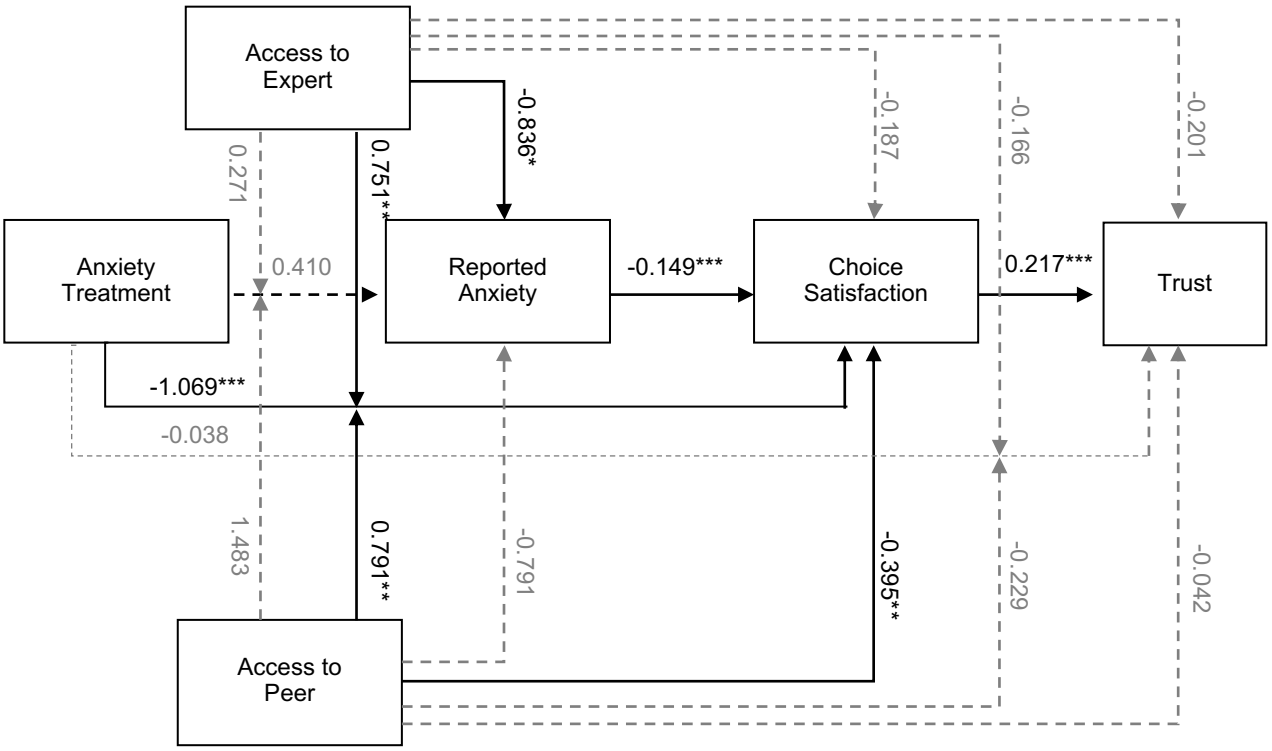


Figure 6: Links among anxiety and choice satisfaction differ among those granted access to human contact (Experiment 2B). Access to human assistance influences firm trust through choice satisfaction in high-anxiety settings. Model controls for age, gender, income, education, pre-treatment anxiety, pre-treatment calm, and relative underperformance, and was estimated with robust standard errors with 1,000 repetitions. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively. Insignificant links between variables are shown with dashed lines. We note that as described earlier, the anxiety manipulation held in the replicated baseline model, with participants in the high-anxiety condition reporting more than twice the increase in anxiety over their baseline levels than participants in the low-anxiety condition.

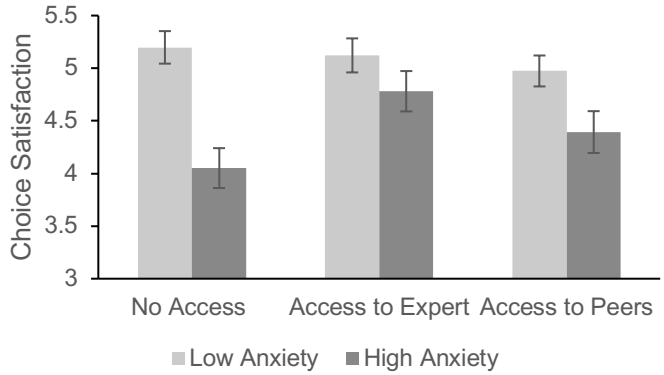


Figure 7: Access to human contact has a differential effect on choice satisfaction during high-anxiety service conditions (Experiment 2B).

market?", "Any thoughts on what I should do next?" and "In your opinion, what do you believe is the likelihood of a stock downturn similar to 2001 and 2007?", which our research assistant was instructed not to provide. In the peer condition, the level of interaction was even lower, with a single chat of the 73 assigned (0.01%) where the participant, who was assigned to our down-market condition, remarked "wow, I wasn't expecting the stock market to crash so hard". The mitigating effects of access to human contact documented above are therefore attributable to the mere opportunity to interact, rather than actual interaction.

Further, a logistic regression modelling the choice to pursue human contact, if offered, as a function of the full panel of control variables used in Study 2B showed that the greatest and only statistically significant predictor of whether a participant would take advantage of the option to chat was how anxious he or she felt before beginning the investment simulation ($\beta = 0.74$, $p < 0.01$). A description of this analysis and a full results table are presented in **Appendix 6**. This result dovetails with the earlier finding that access to human contact may be beneficial even to customers experiencing low levels of anxiety associated with the service task itself – hinting at the potential for a broad array of firms to improve customer experiences through the integration of human access in their self-service offerings.

Taken together, Experiments 2A and 2B revealed that anxiety that is endogenous to the service task undermines choice satisfaction and in turn, firm trust, consistent with H1 and H2. We find support for H3, that providing customers with access to human contact in high-anxiety settings can mitigate anxiety's deleterious effects on choice satisfaction in Experiment 2B. However, customers experience anxiety from a wide variety of sources, many of which fall outside the service task itself. In Experiments 3A and 3B, we explore the extent to which anxiety that is exogenous to the service task also influences choice satisfaction and trust, and whether offering access to human contact may similarly ameliorate potential negative effects.

4.3 Experiment 3A: Exogenous Anxiety, Choice Satisfaction and Trust in SST Interactions

In this experiment, we repeat Experiment 2A using a source of anxiety that is exogenous to the service task – an anxiety-provoking movie clip – to test whether unmitigated anxiety external to the service context also diminishes choice satisfaction and trust in self-service settings.

4.3.1 Participants. Using a power analysis from a pilot test to determine our sample size, 250 participants were recruited on Amazon Mechanical Turk to complete an investment simulation task in exchange for $3.00 plus the opportunity to earn a bonus of $0.25 for every $100,000 earned during the task. The difference in participant compensation from Experiment 2A was designed to ensure that participants who had less to gain from a relatively calm stock market still received fair compensation for their time. Participants who did not complete all tasks and questionnaires were dropped from the sample, resulting in a final dataset of 246 observations ($M_{age} = 36.22$, 38.15% Female).

4.3.2 Design and procedure. After reading the instructions for the investment task, participants were randomly assigned to watch one of two video clips used in previous studies to manipulate state anxiety (Brooks and Schweitzer 2011) in a between-subjects design. Each video was approximately 4 minutes long. The anxiety-inducing video clip featured the opening scene of the movie Vertical Limit, which depicts an intense interaction between a father and his two adult children during a mountain climbing accident. The neutral video clip featured a National Geographic video of marine life. To ensure that participants watched the video and to reinforce the emotion induction, we asked them to write a few sentences about the video they saw before beginning the investment task. The interface of the investment platform was unchanged from Experiment 2A. However, we modified the simulation in two ways to minimize its potential to stoke anxieties. First, we chose a dampened and fixed investment return path, where stock returns ranged from –1.20% to 2.10%, to minimize the magnitude of financial losses that might occur. Second, we assigned all participants to experience the same investment return path. Participants were again asked to report their choice satisfaction and confidence levels after rounds 3, 6, and 9, and to respond to a debrief survey after completing 12 rounds of investment decisions.

4.3.3 Manipulation check. As before, we used the STAI to measure and compare state anxiety levels between our treatment ($N = 127$) and control ($N = 119$) groups. An independent means test of pre-treatment net anxiety between groups shows balance ($M_T = -4.26$, $SD_T = 3.60$ vs. $M_C = -4.33$, $SD_C = 3.67$; $t(244) = -0.15$, $p = NS$). Since our anxiety manipulation in this experimental design is exogenous, we expect it to have a weaker effect on customer anxiety and that its effect will decay more quickly as participants shift their focus and acclimate to the investing task. Accordingly, we use the first measure of anxiety, taken immediately after participants enter their decisions for round 3 of the investment task, but before they see their results, for our manipulation check. We see a striking difference in anxiety increases between our treatment and control groups ($M_T = 1.62$, $SD_T = 3.71$ vs. $M_C = 0.11$, $SD_C = 2.81$; $t(244) = -3.60$, $p < 0.01$). As both groups face the same investment returns, this difference can be attributed to our treatment videos.

4.3.4 Dependent and Control Measures. As in Experiment 2A, Choice Satisfaction is measured by asking participants to rate both satisfaction and confidence in their immediate past decision just after rounds 3, 6, and 9. We again confirm Cronbach's Alpha ($\alpha = 0.78$) and average the two items in our model. Due to the weaker anxiety manipulation and shortened length of this study, we strengthen our dependent measure of trust to a three-item scale asking participants to rate the following statements about the investment company, on a scale of 1-7: "I can trust the company that provided this investment platform", "I believe that the investment company is reliable" and "I believe that this investment company is honest" as used in prior literature (Buell et al. 2021). We confirm the Cronbach's Alpha ($\alpha = 0.93$) and average the ratings as the measure of *firm trust* we use for our analysis. We again control for demographics, pre-treatment emotion, and relative underperformance.

4.3.5 Structural Equation Model. We repeat our SEM analysis to evaluate the paths among our anxiety treatment, choice satisfaction and firm trust, controlling for age, gender, income level and education level. Although all participants experienced the same investment returns, their allocation choices affected their portfolio balances, so we continue to control for relative investment performance in our estimations. **Figure 8** provides converging evidence that anxiety reduces choice satisfaction (β = -0.10 , $p < 0.01$), which again supports H1, and that trust in service providers will also be negatively impacted since choice satisfaction

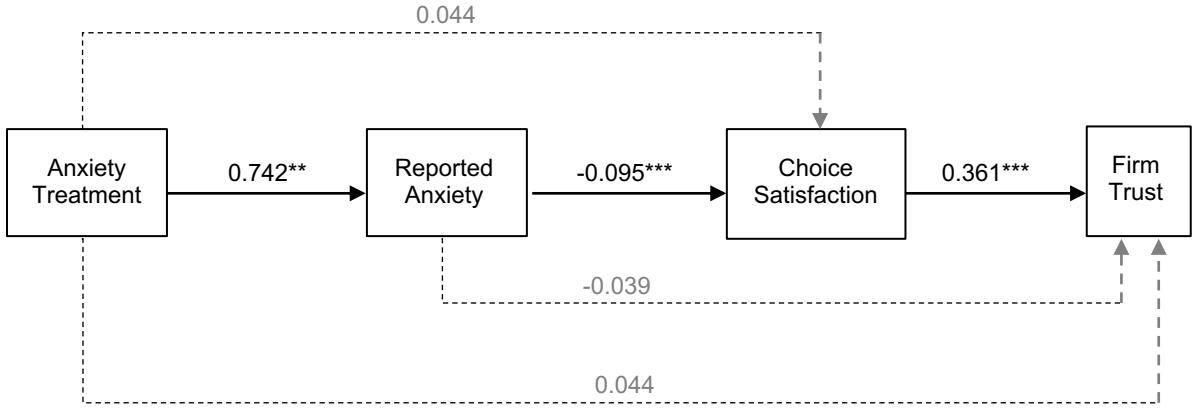


Figure 8: Links among exogenous anxiety, choice satisfaction, and firm trust (Experiment 2B). Model controls for age, gender, income, education, pre-treatment anxiety, pre-treatment calm, and relative underperformance, and was estimated with bootstrapped standard errors with 1,000 repetitions. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively. Insignificant links between variables are shown with dashed lines.

and firm trust are positively related to each other (β = 0.36 , $p < 0.01$), again supporting H2. The bias-corrected confidence interval for our pathway of interest from reported anxiety to trust through choice satisfaction (95% CI: [-0.06, -0.02]) does not contain zero. The observation that the direct linkage between watching an anxiety-producing movie clip and trust in the firm the investment firm is insignificant (β = 0.44 , $p = NS$) supports our research findings: customer anxiety reduces choice satisfaction and in so doing, deters trust. Although our anxiety manipulation in this study is wholly unrelated to the task at hand, we can see that unaddressed customer emotion spills over to color service performance.

4.4 Experiment 3B: Exogenous Anxiety Manipulation with Access to Human Contact

In our final experiment, we combine the investment task design from Experiment 3A with the human contact chat features used in Experiment 2B to test whether access to human contact has the same mitigating effect when the source of anxiety is external to the service environment.

4.4.1 Participants. We recruited 300 participants on Prolific in exchange for a $5.00 participation fee and the opportunity to earn a bonus of $0.25 for every $100,000 in portfolio gains. Accounting for our factorial design, we chose this sample size targeting 50 observations per cell. After dropping participants that failed to follow the instructions of the study (N = 8) we proceed with a final sample of 292 participants (M_{age} = 37.58 , 51.03% Female).

4.4.2 Design and procedure. The experimental design for this study is a 2(anxiety: treatment, control) x 3(human contact: none, expert, peer). Again, participants are randomly assigned to watch and write about either the Vertical Limit (treatment) or National Geographic (control) video clip and all face an identical, muted investment return path over a series of 12 rounds. A second randomization assigns participants to either access to an expert, access to another investor or no chat, and a hypothesis blind research assistant is available to respond to participants in the expert condition. All participants have access to an FAQ that mirrors the "expert" script. We recruited participants in batches of 50 to ensure that they would not incur any unreasonable wait time should they seek to use either chat feature.

4.4.3. Dependent and Control Measures. We use the same dependent and control measures as described in Experiment 3A to conduct our analysis, again creating an average rating for our two-item *choice satisfaction* measure Cronbach's Alpha ($\alpha = 0.81$) and an average rating for our 3-item *firm trust* measure ($\alpha = 0.95$). We again control for demographics, pre-treatment emotion, and relative underperformance.

4.4.4 Manipulation check. We again use the STAI measure taken just after the 3rd round to check our anxiety manipulation. Here, participants in our treatment group experience an increase in anxiety while those in our control group report a decrease in anxiety relative to baseline (M_T = 1.75, SD_T = 3.49 vs. M_C = -0.62 , SD_C = 2.46 ; $t(290) = -6.69$, $p < .01$).

4.4.5 Structural Equation Model. We begin with a replication of Experiment 3A (**Appendix 5B**) to confirm that our main mediation model linking heightened anxiety to reduced firm trust through choice satisfaction holds, consistently in support of H1 and H2. Again, since trust is measured at the end of the simulation and anxiety and choice satisfaction are measured repeatedly, we collapse our data set and use mean values for the intervening variables for our analyses. Accounting for access to human contact in our joint estimations, **Figure 9** reveals that our pathway of interest is unaffected by access to human contact and Hypothesis 3 is not supported. The negative effects of customer anxiety on choice satisfaction and firm trust, when the source of anxiety is unrelated to the service environment persist, even as access to human contact appears to blunt the effects of our anxiety manipulation. Being granted access to chat, whether with an expert or a peer, significantly reduces reported anxiety among those who watched an anxiety provoking video (Expert×AnxietyTreatment: β = -1.95, $p < 0.01$; Peer×AnxietyTreatment: β= -1.38, $p < 0.10$), but neither human contact condition has an effect on choice satisfaction (Main effects: β_{expert} = 0.01 , p = *NS ;* : β_{peer} = 0.14 , p = *NS)*. Further, our earlier finding that it is anxious customers that are more satisfied with

their choices with access to human contact does not replicate (Expert×AnxietyTreatment: $\beta = 0.126$, $p =$ *NS ;* : $\beta = 0.08$, $p =$ *NS).* As we saw in Experiment 2B, very few participants – only 8 of the 99 assigned (8.08%) – used the expert help feature that was available to ask for investment advice that our research assistant could not provide (5 of the 8 were in our anxiety condition) while only 2 of the 97 (2.06%) attempted to connect with a peer (1 in the anxiety condition and 1 in the control group). Interestingly, we also see a significant increase in reported anxiety ($\beta = 0.92$, $p < 0.05$) and marginally significant decrease in trust ($\beta = -0.42$, $p < 0.10$) among those with access to an expert. This may result may correspond with recent research demonstrating that subtle cues designed to signal increased security on websites may instead increase feelings of vulnerability and undermine trust (Brough et al. 2022). Perhaps granting access to expertise signaled that the investing task was meant to be difficult and served to heighten participant anxieties, but we leave further investigation of when and how access to human contact stimulates anxiety to future researchers.

Taken together, the results across the experiments presented in this paper suggest that customer anxiety exerts an important negative influence on choice satisfaction and trust in service providers, whether the source of anxiety is connected to the service or not, supporting Hypothesis 1 and 2. However, only when anxiety is endogenous to the service task, as is the case in areas such as financial services or healthcare, does having access to human contact have a mitigating effect on anxiety's impacts to the service relationship, providing partial support for Hypothesis 3.

5. General discussion

The field of service operations has long recognized that customers can be viewed as "partial employees" whose participation in service production and delivery is a source of input uncertainty and whose management is therefore critical to maintaining the integrity of operational performance (Chase 1981, Kelley et al. 1990, Larsson and Bowen 1989). Within service operations, scholars have refined theoretical frameworks to define service models (Sampson and Froehle 2006) and optimize the design of these "co-productive services" (Roels 2014), but these frameworks have not yet considered the ways that customer emotions, like anxiety, influence an individual's experience of co-production, and how it may affect their trust in and willingness to engage with the firm. The present research contributes to this literature by revealing how emotional factors like anxiety can undermine choice satisfaction and trust in SST interactions, and how its deleterious effects can be mitigated by the re-incorporation of access to human contact in high-anxiety service settings.

We begin with a field experiment, studying customers engaging in a self-service loan application process with a credit union – a context in which we hypothesize evaluative processes and wait uncertainty are likely to engender anxiety. We find that providing applicants in this setting with access to human contact

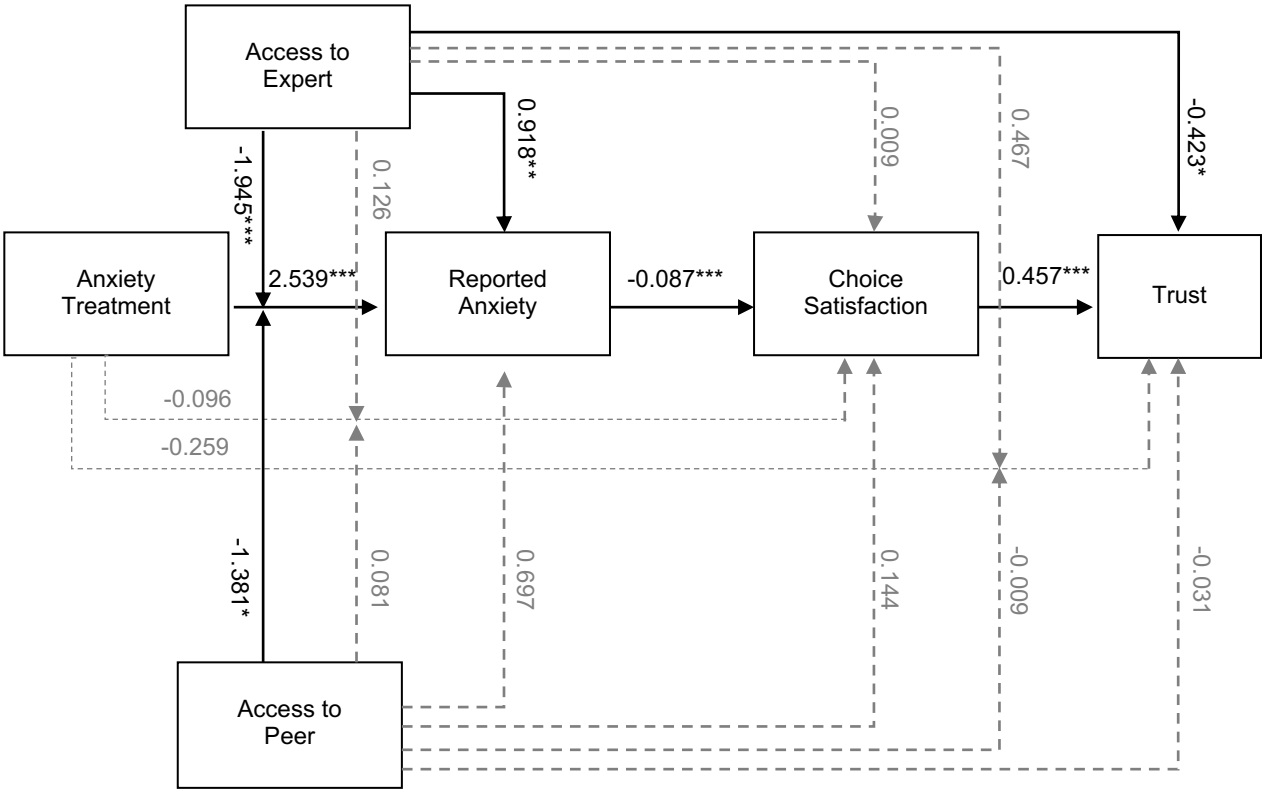


Figure 9: Structural links among unrelated anxieties and choice satisfaction are unaffected by access to human contact (Experiment 3B). Model controls for age, gender, income, education, pre-treatment anxiety, pre-treatment calm, and relative underperformance and was estimated with bootstrapped standard errors with 1,000 repetitions. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively. Insignificant links between variables are shown with dashed lines.

increased the probability of loan uptake by more than 24% over baseline rates – a sign of increased customer trust in and willingness to engage with the firm (**Experiment 1**). Motivated by this preliminary evidence and hypotheses developed from the literature, we turn to a series of laboratory experiments to explore the role of anxiety in influencing choice satisfaction and trust, and to investigate the potential for human contact to improve service performance on these dimensions. These experiments, which were set in an online investing SST context, enabled us to directly manipulate anxiety and access to human contact, while carefully instrumenting the outcomes of interest. We find that when the source of anxiety is related to the service context itself, anxiety can undermine the choice satisfaction of customers engaging with SSTs, which in turn undermines their trust in the firm (**Experiment 2A**). We further find that when the source of anxiety is endogenous to the service context, introducing access to human contact can mitigate anxiety's negative effects on customer satisfaction and trust (**Experiment 2B**). In a pair of additional experiments,

we explore these relationships in the context of anxiety that is exogenous to the service context. We find that although exogenous sources of anxiety can undermine choice satisfaction and firm trust (**Experiment 3A**), its negative effects are not mitigated by offering access to human contact (**Experiment 3B**). We further show that improving choice satisfaction and trust by reincorporating access to human contact in high-anxiety SST settings need not be expensive to implement.

Our results suggest that the benefits may accrue to organizations that provide access employees or even to other customers (**Experiment 2B**). These results are consistent with recent work in operations that demonstrate how shared medical appointments, in which a doctor meets with multiple patients who have the same chronic condition can boost satisfaction, learning, and medication compliance, in part because patients have the capacity to learn from one another (Buell, Ramdas, and Sonmez, 2023). Future research can investigate the conditions under which peer versus expert support may be most efficacious for bolstering the choice satisfaction and even decision outcomes of anxious customers.

We additionally find in our experiments that despite the increase in choice satisfaction, very few participants actively engage expert and peer support, which could suggest that the costs of adding the option to access human support may be lower than many firms expect **(Experiment 2B).** Even though participants in this research largely did not avail themselves of the opportunity to engage with the human contact offered to them, future research could examine whether and how actual human contact influences customer emotion and behaviors differently from the mere access to human contact. Prior studies in social psychology have indicated that subtle forms of social support may be more effective in alleviating distress than the actual receipt of support because the act of getting help cause recipients to internalize a sense of helplessness (Bolger and Amarel 2007), but more work is needed to fully unpack these dynamics in SST contexts. Moreover, future research could investigate the optimal timing and approach to introducing human contact options during a self-service experience.

Although we conduct our analyses in the financial service industry, we believe our findings generalize to other anxiety-laden domains like healthcare, education, and certain government services, where customer participation in the service process directly influences the quality of service outcomes. As automated service processes are becoming more commonplace across a range of emotional service settings – from insurance sales, to investment advice, to telehealth – an acute need to understand how best to balance technology with human contact in order to deliver satisfying, yet efficient service experiences, is upon us. We hope that this paper serves to spark a more robust avenue of inquiry – for the mutual benefit of customers and the companies that serve them.

References

Altman D, Yom-Tov GB, Olivares M, Ashtar S, Rafaeli A (2020) Do Customer Emotions Affect Agent Speed? An Empirical Study of Emotional Load in Online Customer Contact Centers. *Manuf. Serv. Oper. Manag.*

Balasubramanian S, Konana P, Menon NM (2003) Customer satisfaction in virtual environments: A study of online investing. *Manage. Sci.* 49(7):871–889.

Bavafa H, Hitt LM, Terwiesch C (2018) The Impact of E-Visits on Visit Frequencies and Patient Health: Evidence from Primary Care. *Manage. Sci.* 64(12):5461–5480.

Bell DE (1985) Disappointment in decision making under uncertainty. *Oper. Res.* 33(1):1–27.

Benartzi S, Thaler RH (1999) Risk aversion or myopia? Choices in repeated gambles and retirement investments. *Manage. Sci.* 45(3):364–381.

Berry LL, Bendapudi N (2007) Health care: A fertile field for service research. *J. Serv. Res.* 10(2):111–122.

Bitner MJ, Brown SW, Meuter ML (2000) Technology infusion in service encounters. *J. Acad. Mark. Sci.* 28(1):138–149.

Bitner MJ, Ostrom AL, Meuter ML (2002) Implementing successful self-service technologies. *Acad. Manag. Perspect.* 16(4):96–108.

Bolger N, Amarel D (2007) Effects of social support visibility on adjustment to stress: Experimental evidence. *J. Pers. Soc. Psychol.* 92(3):458–475.

Bolton RN, McColl-Kennedy JR, Cheung L, Gallan A, Orsingher C, Witell L, Zaki M (2018) Customer experience challenges: bringing together digital, physical and social realms. *J. Serv. Manag.* 29(5):776–808.

Botti S, Hsee CK (2010) Dazed and confused by choice: How the temporal costs of choice freedom lead to undesirable outcomes. *Organ. Behav. Hum. Decis. Process.* 112(2):161–171.

Botti S, Iyengar SS (2006) The dark side of choice: When choice impairs social welfare. *J. Public Policy Mark.* 25(1):24–38.

Broniarczyk SM, Griffin JG (2014) Decision difficulty in the age of consumer empowerment. *J. Consum. Psychol.* 24(4):608–625.

Brooks AW, Schweitzer ME (2011) Can Nervous Nelly negotiate? How anxiety causes negotiators to make low first offers, exit early, and earn less profit. *Organ. Behav. Hum. Decis. Process.* 115(1):43–54.

Brough AR, Norton DA, Sciarappa SL, John LK (2022) The Bulletproof Glass Effect : Unintended Consequences of Privacy Notices. 59(4):739–754.

Buell RW, Campbell D, Frei FX (2010) Are self-service customers satisfied or stuck? *Prod. Oper. Manag.* 19(6):679–697.

Buell RW, Norton MI (2011) The labor illusion: How operational transparency increases perceived value. *Manage. Sci.* 57(9):1564–1579.

Buell RW, Porter E, Norton MI (2021) Surfacing the Submerged State: Operational Transparency Increases Trust in and Engagement with Government. *Manuf. Serv. Oper. Manag.* 23(4):781–802.

Buell RW, Ramdas K, Sönmez N, Srinivasan K, Venkatesh R (2023) Shared Service Delivery Can Increase Client Engagement: A Study of Shared Medical Appointments. *Manuf. Serv. Oper. Manag. Forthcom.* (21-001)(October).

Campbell D, Frei F (2010) Cost structure, customer profitability, and retention implications of self-

service distribution channels: Evidence from customer behavior in an online banking channel. *Manage. Sci.* 56(1):4–24.

Carmon Z, Wertenbroch K, Zeelenberg M (2003) Option attachment: When deliberating makes choosing feel like losing. *J. Consum. Res.* 30(1):15–29.

Chase RB (1981) The customer contact approach to services : Theoretical bases and practical extensions. *Oper. Res.* 29(4):698–706.

Collier JE, Moore RS, Horky A, Moore ML (2015) Why the little things matter: Exploring situational influences on customers' self-service technology decisions. *J. Bus. Res.* 68(3):703–710.

Dabholkar PA (1996) Consumer evaluations of new technology-based self-service options: An investigation of alternative models of service quality. *Int. J. Res. Mark.* 13:29–51.

Dabholkar PA, Bagozzi RP (2002) An attitudinal model of technology-based self-service: Moderating effects of consumer traits and situational factors. *J. Acad. Mark. Sci.* 30(3):184–201.

Dabholkar PA, Bobbitt LM, Lee EJ (2003) Understanding consumer motivation and behavior related to self-scanning in retailing: Implications for strategy and research on technology-based self-service. *Int. J. Serv. Ind. Manag.* 14(1):59–95.

Dabholkar PA, Spaid BI (2012) Service failure and recovery in using technology-based self-service: Effects on user attributions and satisfaction. *Serv. Ind. J.* 32(9):1415–1432.

Ding DX, Hu PJH, Verma R, Wardell DG (2010) The impact of service system design and flow experience on customer satisfaction in online financial services. *J. Serv. Res.* 13(1):96–110.

van Dolen WM, Dabholkar PA, de Ruyter K (2007) Satisfaction with online commercial group chat: The influence of perceived technology attributes, chat group characteristics, and advisor communication style. *J. Retail.* 83(3):339–358.

Donohue K, Özer Ö, Zheng Y (2020) Behavioral Operations: Past, Present, and Future. *Manuf. Serv. Oper. Manag.* 22(1):191–202.

Dunn JR, Schweitzer ME (2005) Feeling and believing : The influence of emotion on trust. *J. Pers. Soc. Psychol.* 88(5):736–748.

Engelberg JE, Parsons CA (2016) Worrying about the stock market. *J. Finance* 71(3):1227–1250.

Eysenck MW, Derakshan N, Santos R, Calvo MG (2007) Anxiety and cognitive performance: Attentional control theory. *Emotion* 7(2):336–353.

Forgas JP, George JM (2001) Affective influences on judgments and behavior in organizations: An information processing perspective. *Organ. Behav. Hum. Decis. Process.* 86(1):3–34.

Frei FX (2006) Breaking the trade-off between efficiency and service. *Harv. Bus. Rev.* 84(11):93–101.

Froehle CM (2006) Service personnel, technology, and their interaction in influencing customer satisfaction. *Decis. Sci.* 37(1):5–38.

Garbarino E, Johnson MS (1999) The different roles of satisfaction, trust, and commitment in customer relationships. *J. Mark.* 63(2):70.

Gino F, Brooks AW, Schweitzer ME (2012) Anxiety, advice, and the ability to discern: Feeling anxious motivates individuals to seek and use advice. *J. Pers. Soc. Psychol.* 102(3):497–512.

Gu G, Zhu F (2021) Trust and disintermediation: Evidence from an online freelance marketplace. *Manage. Sci.* 67(2):794–807.

Gupta A Das, Karmarkar US, Roels G (2016) The design of experiential services with acclimation and memory decay: optimal sequence and duration. *Manage. Sci.* 62(5):1278–1296.

Hagendorff J, Lim S, Nguyen DD (2023) Lender Trust and Bank Loan Contracts. *Manage. Sci.*

69(3):1758–1779.

Hatzakis ED, Nair SK, Pinedo M (2010) Operations in financial services - An overview. *Prod. Oper. Manag.* 19(6):633–664.

Hitt LM, Frei FX (2002) Do better customers utilize electronic distribution channels? The case of PC banking. *Manage. Sci.* 48(6):732–748.

Iyengar SS, Wells RE, Schwartz B (2006) Doing better but feeling worse: Looking for the "best" job undermines satisfaction. *Psychol. Sci.* 17(2):143–150.

Karmarkar U (2015) The service and information economy: Research opportunities. *Manuf. Serv. Oper. Manag.* 17(2):136–141.

Kaufmann C, Weber M, Haisley E (2013) The role of experience sampling and graphical displays on one's investment risk appetite. *Manage. Sci.* 59(2):323–340.

Kelley SW, Donnelly Jr. JH, Skinner SJ (1990) Customer participation in service production and delivery. *J. Retail.* 66(3):315–335.

Krishnan MS, Ramaswamy V, Meyer MC, Damien P (1999) Customer satisfaction for financial services: The role of products, services, and information technology. *Manage. Sci.* 45(9):1194–1209.

Kumar A, Telang R (2012) Does the web reduce customer service cost? Empirical evidence from a call center. *Inf. Syst. Res.* 23(3-part-1):721–737.

Larsson R, Bowen DE (1989) Organization and customer: Managing design and coordination of services. *Acad. Manag. Rev.* 14(2):213–233.

Lebel RD (2017) Moving beyond fight and flight: A contingent model of how the emotional regulation of anger and fear sparks proactivity. *Acad. Manag. Rev.* 42(2):190–206.

Lerner JS, Li Y, Valdesolo P, Kassam KS (2015) Emotion and decision making. *Annu. Rev. Psychol.* 66(1):799–823.

Lerner JS, Small DA, Loewenstein GF (2004) Heart strings and purse strings: Carryover effects of emotions on economic decisions. *Psychol. Sci.* 15(5):337–341.

Li M, Choi TY, Rabinovich E, Crawford A (2013) Self-service operations at retail stores: The role of inter-customer interactions. *Prod. Oper. Manag.* 22(4):888–914.

Li M, Huang S (2022) Contactless but loyal customers: The roles of anxiety and sociability in the hotel service context. *J. Retail. Consum. Serv.* 66(November 2021):102910.

Loewenstein GF, Lerner JS (2003) The role of affect in decision making. *Handb. Affect. Sci.* 619–642.

Looney CA, Hardin AM (2009) Decision support for retirement portfolio management: Overcoming myopic loss aversion via technology design. *Manage. Sci.* 55(10):1688–1703.

MacKinnon D, Fairchild A, Fritz M (2007) Mediation Analysis. *Annu. Rev. Psychol.* 58:593–614.

Mano H (1994) Risk-taking, framing effects, and affect. *Organ. Behav. Hum. Decis. Process.* 57(1):38–58.

Marteau TM, Bekker H (1992) The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). *Br. J. Clin. Psychol.* 31(3):301–306.

Meuter ML, Ostrom AL, Bitner MJ, Roundtree R (2003) The influence of technology anxiety on consumer use and experiences with self-service technologies. *J. Bus. Res.* 56(11):899–906.

Meuter ML, Ostrom AL, Roundtree RI, Bitner MJ (2000) Self-service technologies: Understanding customer satisfaction with technology-based service encounters. *J. Mark.* 64(3):50–64.

Morgan RM, Hunt SD (1994) The commitment-trust theory of relationship marketing. *J. Mark.* 58(3):20–38.

Osuna EE (1985) The psychological cost of waiting. *J. Math. Psychol.* 29(1):82–105.

Özer Ö, Subramanian U, Wang Y (2018) Information sharing, advice provision, or delegation: What leads to higher trust and trustworthiness? *Manage. Sci.* 64(1):474–493.

Özer Ö, Zheng Y (2018) Trust and Trustworthiness. *Handb. Behav. Oper.* (John Wiley & Sons, Inc., Hoboken, NJ, USA), 489–523.

Pham MT (2007) Emotion and rationality: A critical review and interpretation of empirical evidence. *Rev. Gen. Psychol.* 11(2):155–178.

van Pinxteren MME, Wetzels RWH, Rüger J, Pluymaekers M, Wetzels M (2019) Trust in humanoid robots: implications for services marketing. *J. Serv. Mark.* 33(4):507–518.

Porter CE, Donthu N (2008) Cultivating trust and harvesting value in virtual communities. *Manage. Sci.* 54(1):113–128.

Raghunathan R, Pham MT (1999) All negative moods are not equal: Motivational influences of anxiety and sadness on decision making. *Organ. Behav. Hum. Decis. Process.* 79(1):56–77.

Rapoport A, Dale P (1966) Models for prisoner's dilemma. *J. Math. Psychol.* 3(2):269–286.

Rick S, Loewenstein GF (2008) The Role of Emotion in Economic Behavior. *Handb. Emot.* 138–158.

Roels G (2014) Optimal design of coproductive services: Interaction and work allocation. *Manuf. Serv. Oper. Manag.* 16(4):578–594.

Rosenbaum MS, Massiah CA (2007) When customers receive support from other customers: Exploring the influence of intercustomer social support on customer voluntary performance. *J. Serv. Res.* 9(3):257–270.

Sampson S, Froehle CM (2006) Foundations and implications of a proposed unified services theory. *Prod. Oper. Manag.* 15(2):329–343.

Simmons JP, Nelson LD, Simonsohn U (2012) A 21 Word Solution. *SSRN Electron. J.*:1–4.

Spake DF, Beatty SE, Brockman BK, Crutchfield TN (2003) Consumer comfort in service relationships. *J. Serv. Res.* 5(4):316–332.

Sweeny K, Falkenstein A (2015) Is waiting the hardest part? Comparing the emotional experiences of awaiting and receiving bad news. *Personal. Soc. Psychol. Bull.* 41(11):1551–1559.

Urda J, Loch CH (2013) Social preferences and emotions as regulators of behavior in processes. *J. Oper. Manag.* 31(1–2):6–23.

Xue M, Hitt LM, Chen P yu (2011) Determinants and outcomes of internet banking adoption. *Manage. Sci.* 57(2):291–307.

Xue M, Hitt LM, Harker PT (2007) Customer efficiency, channel usage, and firm performance in retail banking. *Manuf. Serv. Oper. Manag.* 9(4):535–558.

Yang B, Ching AT (2014) Dynamics of consumer adoption of financial innovation: The case of ATM cards. *Manage. Sci.* 60(4):903–922.

Zeidner M, Matthews G (2005) Evaluation Anxiety: Current Theory and Research. *Handb. competence Motiv.* (Guilford Publications, New York, NY, US), 141–163.

Zeithaml VA, Gilly MC (1987) Characteristics affecting the acceptance of retailing technologies: A comparison of elderly and nonelderly consumers. *J. Retail.* 63(1):49–68.

Zhang DJ, Allon G, Van Mieghem JA (2017) Does social interaction improve learning outcomes? Evidence from field experiments on massive open online courses. *Manuf. Serv. Oper. Manag.* 19(3):347–367.

Appendix 1: Ex-post study of effects of transparency on anxiety

Since we could not practically administer a manipulation check during our field experiment without substantively impacting customer experiences, we designed an ex-post experiment to replicate the emotional experience of being transparently evaluated on a consequential task, akin to the experience of being evaluated for a loan. Participants completed a three-part financial literacy quiz used in prior academic studies (Lusardi & Mitchell, 2017; van Rooij et al., 2011). Between modules, those in the treatment cell were reminded that their answers were being evaluated, while those in the control cell were simply asked to wait for the next set of questions to load. 224 participants (M_{age} = 35.85, 43.30% Female) were recruited on Amazon Mechanical Turk to complete the financial literacy test and answer questions about their experience. To ensure incentive compatibility, participants were paid $1.00 for their participation and a $0.50 cash bonus for scores of 75% or higher.

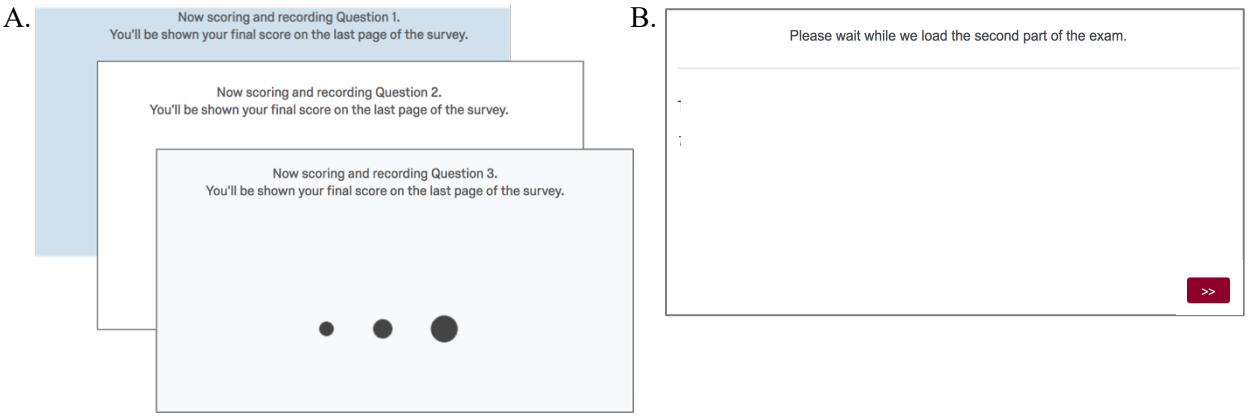


Figure A1. Screenshots of the participant experience. Panel A depicts "Scoring Process Transparency". Panel B shows the wait screen shown to our control group.

We primed participants to expect a high rate of failure on the test by reporting that "Studies have shown that many Americans are poorly educated about important financial topics", that "only half of Americans over the age of 50 can correctly answer two simple questions about compounding interest and inflation" and " less than one-third of those under 30 understand these topics" (van Rooij et al., 2011). **Figure A1** shows our anxiety manipulation. In our treatment condition, ("Scoring Process Transparency") we reminded participants that we were evaluating their test performance and recording their scores. In our control version, we simply asked participants to wait while the next module of the exam was loaded. We designed the flow so that the treatment and control groups experienced the same wait duration between modules. In both cases, test scores were revealed at the end of the survey.

We administered the six-item Short-form Spielberger State-Trait Anxiety Inventory ("STAI") (Marteau & Bekker, 1992) instrument to measure participant anxiety. We subtract the level of calm (ratings of feeling "content", "relaxed" or "calm") from the level of anxiety (ratings of feeling "worried", "tense" or "upset") to arrive at an aggregated *Reported Anxiety* measure. Since *Reported Anxiety* was our primary outcome of interest for this study, we measure anxiety levels once, at the end of the experiment but before revealing final test scores.

We include demographic controls (*age, income level, gender, education level*) that are commonly linked to financial decision-making and controlled for *test score* to avoid any confounding effects that may have arisen from participants' test performance expectations.

	(1) Reported Anxiety	(2) Reported Anxiety	(3) Reported Anxiety
Scoring Transparency	1.473***	1.456***	1.440***
	-0.487	-0.479	-0.487
Test Score		-0.240***	-0.203**
		-0.073	-0.087
Age			-0.015
			-0.024
Female Indicator			-0.485
			-0.505
Income Level			-0.009
			-0.116
Education Level			-0.098
			-0.271
Constant	-5.509***	-2.618***	-1.773
	-0.305	-0.936	-1.351
Observations	224	224	224
R-squared	0.04	0.078	0.084

Table A1: Scoring transparency induces anxiety (Ex-post Manipulation Test for Experiment 1). All models are estimated with OLS regression and robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

In **Table A1**, we model Reported Anxiety as a function of our treatment condition as well as a vector of controls, as described above. Column 1 demonstrates that our manipulation was effective in stimulating participant anxiety ($\beta = 1.47$, $p < 0.01$). Column 2 shows that the effect remains significant ($\beta = 1.46$, $p < 0.01$), after controlling for test score, which was also a significant predictor of anxiety ($\beta = -0.24$, $p < 0.01$) in that higher scoring participants were less anxious. This result is consistent with the conjecture that

customers with higher credit scores may have felt less anxiety in the loan decisioning process in Experiment 1. Finally, in the fully specified model in Column 3, we see that the size and significance of scoring process transparency remains ($\beta = 1.44$, $p < 0.01$). These results are consistent with the idea that making transparent a consequential evaluation process can increase the anxiety of the person being evaluated and are supportive of the idea that the messaging system used in Experiment 1 likely increased the levels of anxiety that customers in our field experiment felt while awaiting a decision on their loan application.

Appendix 2. Balance Checks Across Laboratory Experiments

Study 2A - Endogenous Anxiety Baseline							
	N_C	$Mean_C$	SD_C	N_T	$Mean_T$	SD_T	Means Comparison
Age	78	33.051	10.466	77	35.792	11.113	p=.12
Female Indicator	78	0.423	0.497	77	0.468	0.502	p=.58
Income Level	78	5.397	1.963	77	5.481	2.275	p=.81
Education Level	78	4.577	1.134	77	4.221	1.382	*p<.10
Pre-Treatment Calm	78	9.385	2.199	77	8.857	2.522	p=.17
Pre-Treatment Anxiety	78	3.731	1.551	77	4.143	1.931	p=.15
Study 2B - Endogenous Anxiety with Human Contact							
	N_C	$Mean_C$	SD_C	N_T	$Mean_T$	SD_T	Means Comparison
Age	107	22.953	3.758	108	23.972	4.932	*p<.10
Female Indicator	107	0.542	0.501	108	0.491	0.502	p=.45
Income Level	107	7.159	3.775	108	7.259	3.730	p=.85
Education Level	107	3.075	1.385	108	2.972	1.384	p=.59
Pre-Treatment Calm	107	8.308	2.139	108	8.944	2.130	**p<.05
Pre-Treatment Anxiety	107	4.243	1.338	108	4.213	1.388	p=.87
Study 3A - Exogenous Anxiety Baseline							
	N_C	$Mean_C$	SD_C	N_T	$Mean_T$	SD_T	Means Comparison
Age	127	36.213	10.318	119	36.269	11.162	p=.97
Female Indicator	127	0.402	0.492	119	0.361	0.482	p=.52
Income Level	127	6.457	1.918	119	6.294	1.902	p=.51
Education Level	127	4.850	1.040	119	4.462	1.281	***p<.01
Pre-Treatment Calm	127	9.299	2.013	119	9.168	2.293	p=.64
Pre-Treatment Anxiety	127	4.976	2.741	119	4.916	2.580	p=.86
Study 3B - Exogenous Anxiety with Human Contact							
	N_C	$Mean_C$	SD_C	N_T	$Mean_T$	SD_T	Means Comparison
Age	144	37.549	11.971	148	37.608	12.195	p=.97
Female Indicator	144	0.528	0.501	148	0.493	0.502	p=.56
Income Level	143	6.434	2.219	148	6.716	2.301	p=.29
Education Level	143	4.364	1.236	148	4.622	1.072	*p<.10
Pre-Treatment Calm	144	7.972	2.634	148	8.439	2.456	p=.12
Pre-Treatment Anxiety	144	4.972	2.212	148	4.649	2.300	p=.22

Table A2: After all exclusions, balance checks between our anxiety treatment versus control groups show imbalances using independent means comparison two-tailed t-tests. Accordingly, we report controlled estimations for all laboratory experiments.

Appendix 3A. Historical Stock Market Return Distribution – Experiments 2A and 2B

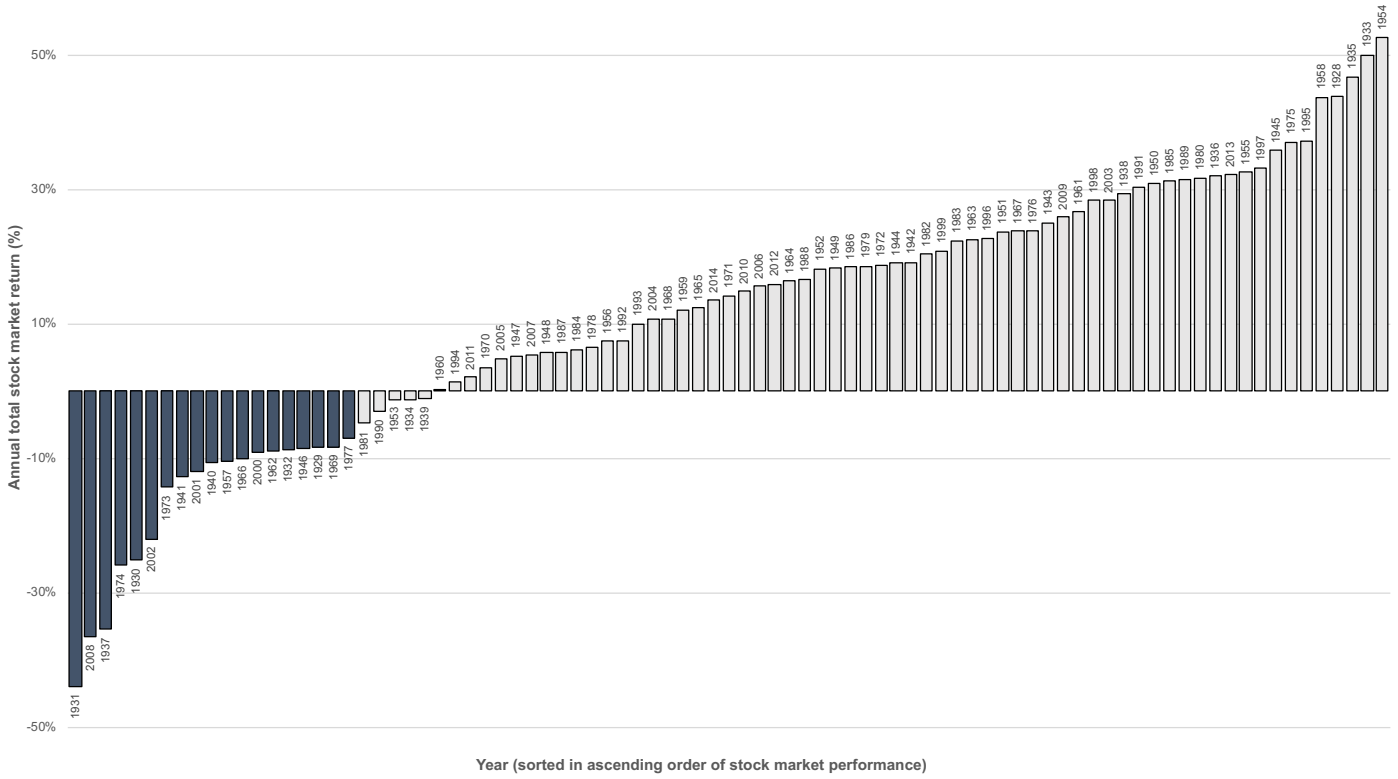


Figure A2: Annual returns of the Standard & Poor's 500 Index from 1928-2014 arranged in ascending order (Experiments 2A and 2B). Years with returns lower than -5% are shaded in black. Participants in the low-anxiety condition for our investment simulation studies experienced market performance for all asset classes (cash, stocks, and bonds) that corresponded with returns from these years, drawn uniformly from the full distribution of years. Participants in the high-anxiety condition also experienced market performance that corresponded with returns from these years, drawn uniformly from the full distribution of years with 50% probability, and drawn uniformly from years with returns lower than -5% with 50% probability. Hence, participants in the high-anxiety condition experienced more severely negative stock returns at a higher frequency than participants in the low-anxiety condition.

Appendix 3B: Fixed Investment Return Path – Experiments 3A and 3B

To minimize the potential for the investing task to stimulate anxiety beyond our exogenous manipulation, we have all participants in Experiments 3A and 3B face an identical, muted set of investment returns as specified below.

	Stocks	Bonds	Bills
Round 1	0.012	-0.02	0.002
Round 2	0.009	0.008	0.000
Round 3	-0.011	0.004	0.001
Round 4	0.003	0.004	0.001
Round 5	0.013	-0.003	0.001
Round 6	0.021	-0.008	0.001
Round 7	-0.012	0.007	0.000
Round 8	-0.012	0.007	0.001
Round 9	-0.004	0.013	0.001
Round 10	0.008	-0.016	0.001
Round 11	-0.007	0.009	0.000
Round 12	0.015	-0.012	0.002

Appendix 4: Instructions for the expert role in Experiments 2B and 3B

You may cut and paste from the information provided below as necessary to answer participant questions.

Click on the tabs on the header bar of the application to move through the tool.

Your Portfolio Tab

Here you are given information about your current balance, how the balance is divided among the investment choices and how the funds – as well as your overall portfolio – performed in the prior periods.

We provide investment commentary explaining what happened in the economy to affect the investment performance of each fund in the immediately preceding round.

Research Tab

You can learn about the characteristics of each investment choice by clicking on the Research tab, but are not required to do so in any round.

With each round, the historical performance and performance characteristics of stocks, bonds, and cash are updated.

Definition of Terms

Average Annual Return – If you put $1 into the fund 20 years ago and held it since, your $1 invested would be worth some amount now. We use that growth to determine the average annual return. Even though the fund return for any individual year within the history may be positive or negative, over the entire time period, the gains outweigh the losses to result in an average annual return over time.

Standard Deviation – Standard deviation is a measure of how spread out the annual returns for a fund are from its long term average. A higher standard deviation means that the return history is more widely spread from the average, while a lower standard deviation means that the returns are more narrowly spread.

Best / Worst Returns – Looking across the prior 20 years, the highest and lowest annual return for the fund.

Percentage of up periods – Looking across the prior 20 years, this shows the percentage of years with a positive, non-zero return.

Take Action Tab

On the Take Action Tab, you enter your investment decisions. You may choose to allocate any percentage of their portfolio from 0 to 100% to each of the investment choices. You do not have to make an allocation to all investments. In other words, you could allocate 0% to one or two funds, but the allocation decisions across the three funds must total 100%.

Once you submit your choices for a given round, your results are locked in for that round. Each investment will generate a return, which may be positive, negative or zero in that round.

After each round, the tool will take you back to the *Your Portfolio* tab where you will see the results of your previous choices.

This begins a new round, where you have the opportunity to change your allocations if desired. If you do not wish to make any changes, you may simply click the “Submit Allocation” button. Note that any allocation changes will apply to future rounds only and do not affect previous performance.

Appendix 5: Replications of main structural pathways in Experiments 2B and 3B

A. Replication of main structural pathway under endogenous anxiety (Experiment 2B)

Before incorporating the mitigating effects of human contact on choice satisfaction in Experiment 2B, we replicate our results from Experiment 2A to show that the pathway linking the high-anxiety service environment to trust through impacts to customer emotion and choice satisfaction remains. Again, since trust is measured at the end of the simulation and anxiety and choice satisfaction are measured repeatedly, we collapse our data set and use mean values for the intervening variables for this estimation as we did in Experiment 2A. The path analysis presented in **Figure A3** provides converging evidence that market downturns induced customer anxiety ($\beta = 0.97$, $p < 0.01$), which, consistent with Hypothesis 1, diminished choice satisfaction throughout the task ($\beta = -0.15$, $p < 0.01$). Consistent with Hypothesis 2, choice satisfaction, in turn, enhanced firm trust ($\beta = 0.21$, $p < 0.01$). The bias-corrected confidence interval for our pathway of interest from our anxiety manipulation to trust through reported anxiety and choice satisfaction (95% CI: [-0.076, -0.005]) does not contain zero. Having replicated the structural pathway shown in Experiment 2A, we focus our presented analysis in Experiment 2B on how access to human contact affects this structural equation model.

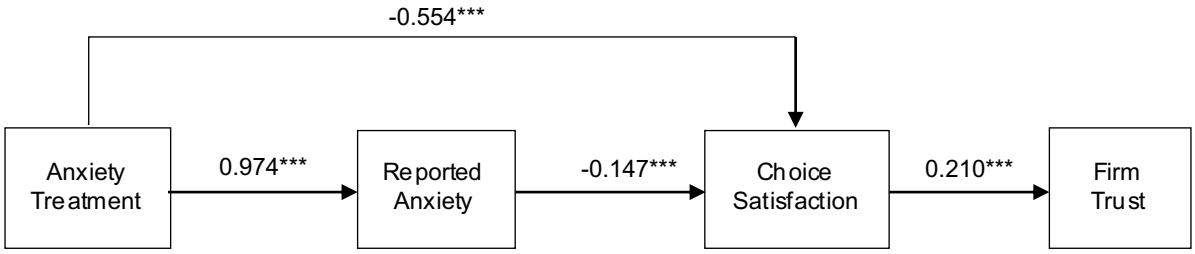


Figure A3: Links among anxiety, choice satisfaction, and firm trust (Experiment 2B). Models control for age, gender, income, education, pre-treatment anxiety, pre-treatment calm, and relative underperformance, and were estimated with bootstrapped standard errors with 1,000 repetitions. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

B. Replication of main structural pathway under exogenous anxiety (Experiment 3B)

Before examining the role of human contact in Experiment 3B, we replicate the structural model of Experiment 3A again observing a significant mediation pathway from our anxiety manipulation through to trust in the firm, completely mediated by reported anxiety and choice satisfaction. Again, since trust is measured at the end of the simulation and anxiety and choice satisfaction are measured repeatedly, we collapse our data set and use mean values for the intervening variables for this estimation. We can see that the only path by which watching an unrelated video impacts trust in the firm is through its direct impact on customer anxiety ($\beta = 1.43,\ p < 0.01$). Similarly, the only way that customer anxiety impacts firm trust is owing to its negative effect on how customers feel about their own decision-making ($\beta = -0.09,\ p < 0.01$), which has a positive relationship with firm trust ($\beta = 0.46,\ p < 0.01$). As shown in **Figure A4**, all other linkages between these variables are statistically insignificant when jointly estimated. The bias-corrected confidence interval for our pathway of interest from our anxiety manipulation to trust through reported anxiety and choice satisfaction (95% CI: [-0.119, -0.026]) does not contain zero.

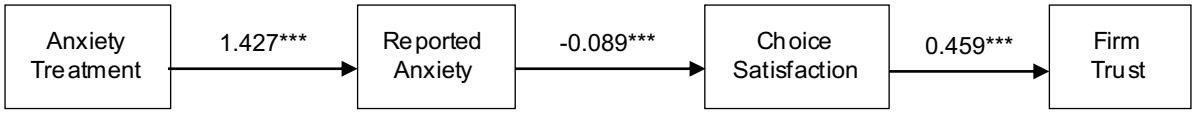


Figure A4: Structural links among anxiety, choice satisfaction, and firm trust (Experiment 3B). Models control for age, gender, income, education, pre-treatment anxiety, pre-treatment calm, and relative underperformance, and were estimated with bootstrapped standard errors with 1,000 repetitions. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

Appendix 6: Predictors of chat feature use (Experiment 2B)

As described in Section 4.2.5, a logistic regression modelling the choice to pursue human contact, if offered, as a function of the full panel of control variables used in Study 3A showed that the greatest and only statistically significant predictor of whether a participant would take advantage of the option to chat was how anxious he or she felt before beginning the investment simulation ($\beta = 0.74$, $p < 0.01$). This result, which is shown in **Table A3**, dovetails with the earlier finding that access to human contact is beneficial to customers who are experiencing low levels of anxiety associated with the service task itself – hinting at the potential for a broad array of firms to improve customer experiences through the integration of human access in their self-service offerings.

	Attempted Chat
Pre-Treatment Anxiety	0.743***
	(0.281)
Pre-Treatment Calm	0.127
	(0.151)
Age	-0.127
	(0.140)
Income Level	-0.128
	(0.106)
Education Level	0.096
	(0.468)
Female Indicator	-1.042
	(0.780)
Relative Underperformance	-3.165
	(3.570)
Constant	-3.162
	(3.272)
Observations	144
Pseudo R-squared	0.193

Table A3: The likelihood that a participant would take advantage of the chat feature if offered is best predicted by the extent to which he or she reported pre-existing anxiety (Experiment 3A). All models are estimated with logistic regression, and robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

Appendix 7: Experiment Log for Unreported Studies

Anxiety Human Contact Experiments Log								
Date of Experiment	**N**	**Average Pre-Treatment Anxiety Sub-score (min 3; max 12)**	**Experimental Design Tested**	**Number of investment rounds**	**Anxiety Manipulation Type**	**Anxiety Manipulation Failed?**	**Included Human Contact?**	**Human Contact Effect?**
Jan-20	89	3.99	Participant Pool: MTurk; Vertical Limit Video ; Flat Stock Returns (-.012, +.021); Fixed Path	12	Exogenous, Unrelated	N	N	N/A
Jun-20	393	4.94	Participant Pool: MTurk; Vertical Limit Video ; Flat Stock Returns (-0.012, +0.021); Fixed Path	12	Exogenous, Unrelated	N	Y – Expert Only	N
Aug-20	395	4.94	Participant Pool: Prolific ; Stock market news video vs NatGeo Warming Oceans anxiety manipulation; Flat Stock Returns (-0.012, +0.021); Fixed Path	12	Exogenous, Related	Y	Y - Expert only	N
Feb-21	173	4.90	Participant Pool: MTurk ; Stock market news video vs Breathing meditation manipulation	12	Exogenous, Related	N	N	N/A
Feb-21	467	4.80	Participant Pool: MTurk ; Stock market news video vs Breathing meditation manipulation; Flat Stock Returns (-0.012, +0.021); Fixed Path	12	Exogenous, Related	N	Y - Expert only	Marginally negative main effect on trust $p<0.10$

Jun-21	365	6.38	Participant Pool: MTurk ; Instructional Video manipulations (Treatment: "expect high volatility"); Flat Stock Returns (-0.012, +0.021); Fixed Path	12	Exogenous, Related	Y	Y - Expert only	N
Aug-21	429	5.97	Participant Pool: MTurk ; Practice Round manipulations Treatment: 5 high volatility practice rounds vs 5 low volatility practice rounds); Volatile stock returns (-0.83, +0.37); Fixed Path	12	Exogenous, Related	N	Y - Expert only	N
Oct-21	99	7.07	Participant Pool: MTurk ; High vs Low Stakes Bonus payment manipulations (Top 25% earns $0.25 vs $3.00); Volatile stock returns (-0.438, +0.370) Fixed Path	12	Exogenous, Related	Y	N	N/A
Dec-21	91	6.11	Participant Pool: MTurk ; Reminder of Bonus payment manipulation; Moderate returns (-0.070, +0.159) Fixed Path	12	Exogenous, Related	Y	N	N/A
Feb-22	382	6.19	Participant Pool: MTurk ; Stock Market manipulation; Full of stock array (-0.438, +0.526), Random Draw	12	Endogenous	Y	Y	N

Table A4: Summary of Unreported Experiments. Throughout this investigation and as general anxiety in the United States increased during the Covid-19 pandemic, we tested a variety of anxiety manipulations aimed to create enough emotional difference between groups to effectively test our hypotheses. We also tested manipulations that had no bearing on participant performance but were topically related to the investing task. These anxiety manipulations are labeled as “Exogenous, Related” below. **Figure A5** maps the Average Pre-Treatment Anxiety Levels corresponding to each experiment depicting the increase in general anxiety levels in the United States corresponding to our research period.

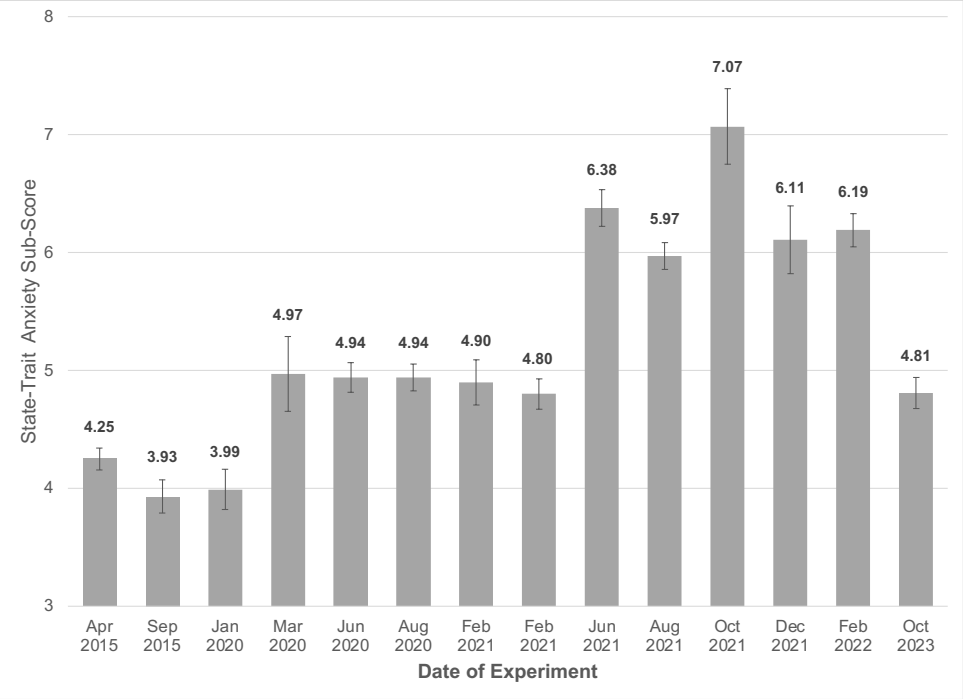


Figure A5: Participant ratings of Anxiety – the State-Trait Anxiety Index (STAI) sub-score – have increased throughout the research period from 3.98 in January 2020, peaking at 7.1 in October 2021. Owing to the construction of the STAI instrument, the minimum possible anxiety score is 3, and the maximum possible anxiety score is 12. The COVID-19 pandemic reached the United States in March 2020, and the Center for Disease Control ended the Public Health Emergency Declaration in May 2023.

Appendix 8: Alternative Specifications for Reported Experiments

Appendix 8A: OLS estimations for experiment 2A

Reported Anxiety, Choice Satisfaction and Trust were modeled using OLS regression with robust standard errors as a build up to a structural path analysis. As shown in **Table A5**, Column 1, participants in the high-anxiety condition reported higher levels of anxiety, demonstrating that our manipulation was effective (β = 1.14, $p < 0.05$). In Column 2, we see that those in the high-anxiety condition exhibited diminished choice satisfaction (β = -0.38, $p < 0.05$), which offers support for Hypothesis 1, and in Column 3, we can see that those faced with higher likelihoods of a market downturn were also highly likely to report decreased levels of trust in the firm (β = -0.49, $p < 0.01$).

	(1) Reported Anxiety	(2) Choice Satisfaction	(3) Firm Trust
Anxiety Treatment	1.138**	-0.376**	-0.490***
	(0.525)	(0.187)	(0.135)
Age	-0.039**	0.013*	0.004
	(0.019)	(0.008)	(0.007)
Income Level	0.042	-0.025	0.047
	(0.124)	(0.046)	(0.033)
Education Level	0.332	-0.066	-0.171***
	(0.216)	(0.072)	(0.048)
Female Indicator	0.382	-0.234	-0.027
	(0.510)	(0.193)	(0.133)
Pre-Treatment Anxiety	0.621***	0.129*	0.080*
	(0.103)	(0.066)	(0.047)
Pre-Treatment Calm	-0.840***	0.207***	0.039
	(0.116)	(0.044)	(0.034)
Relative Underperformance	-0.962	-0.703	-4.943***
	(6.406)	(2.163)	(1.695)
Constant	1.004	2.771***	11.150***
	(1.777)	(0.748)	(0.577)
Observations	155	155	155
R-squared	0.495	0.198	0.193
Mean VIF	1.18	1.18	1.18

Table A5: Feelings of anxiety diminish choice satisfaction and firm trust (Experiment 2A). All models are estimated with OLS regression, and robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

Since our estimations control for relative underperformance from an investment perspective, these results suggest that the diminished choice satisfaction of participants in the anxiety condition may have arisen from their heightened anxiety, rather than from differences in their objective performance, which is consistent with prior research on the psychology of consumer choice (Iyengar et al., 2006).

Since our dependent variable, firm trust, is measured using a single-item Likert Scale, we repeat the estimation in Table A5, Column 3 using an ordinal probit model as a robustness check. The results shown below in **Table A6** are consistent.

	(1) Firm Trust
Anxiety Treatment	-0.650***
	(0.179)
Age	0.006
	(0.009)
Income Level	0.064
	(0.044)
Education Level	-0.230***
	(0.067)
Female Indicator	-0.053
	(0.174)
Pre-Treatment Anxiety	0.107*
	(0.063)
Pre-Treatment Calm	0.056
	(0.046)
Relative Underperformance	-6.580***
	(2.425)
Observations	155
Pseudo R-squared	0.082

Table A6: Ordinal Probit estimation aligns with OLS regression for determinants of firm trust (Experiment 2A). Robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

Appendix 8B: OLS and Probit analysis for human contact intervention with endogenous anxiety (Experiment 2B)

Consistent with the analysis for Experiment 2A, we first conduct OLS regressions to examine the main effects of our treatment assignments on our outcomes of interest. Moreover, we extend the analysis to examine the impact of human contact on these factors and on the structural model. **Table A7**, Column 1 serves as our manipulation check, showing that participants assigned to the high-anxiety condition reported higher levels of anxiety (β = 1.00, $p < 0.01$). This effect remains after controlling for the human contact conditions in Column 2 (β = 1.02, $p < 0.01$). Although directionally it appears that having access to human contact reduces anxiety, neither access to an expert nor access to other investors has a statistically significant effect on reported anxiety in this estimation.

Including interaction terms in Column 3, however, reveals a marginal negative effect of access to experts on reported anxiety levels for participants in both conditions (β = -0.87, $p < 0.10$), though interestingly, access to an expert didn't exhibit a differential impact on the anxiety of participants in the high-anxiety condition (β = 0.32, $p = NS$). Post-estimation means comparison tests reveal that the net increase in anxiety between participants in the high-anxiety treatment granted access to an expert, and participants in the low-anxiety treatment who are not granted human contact are statistically indistinguishable ($M_{L,No\ HC}$ = 1.95, $SD_{L,No\ HC}$ = 2.51 vs. $M_{H,Expert}$ = 2.02, $SD_{H,Expert}$ = 2.82 ; $t(69) = -0.10$ $p = NS$). This pattern of results suggests that one way access to human contact may be beneficial in self-service high-anxiety contexts is its capacity to mitigate the anxiety customers experience. We find that providing access to an expert, such as a service employee, has a marginally significant reductive effect on the level of anxiety participants report.

More interesting is the effect of access to human contact on choice satisfaction shown in **Table A8**. Columns 1 and 2 again show that our anxiety treatment - that is experiencing a market downturn - has a negative effect on choice satisfaction (β = -0.73, $p < 0.01$) that can be attributed at least partially to the anxiety that people feel, evidenced by the attenuation in the main effect of the anxiety treatment exhibited between Columns 1 and 2. This result is consistent with Hypothesis 3.

Once we account for access to human contact in Columns 3 and 4, we begin to see a trend towards the recuperation of these declines in choice satisfaction. There is a main effect of access to experts that attenuates this decline in choice satisfaction (Column 3) and is mediated by reducing the anxiety customers experience (Column 4). Interestingly, Columns 5 and 6 show that access to human contact mitigates the loss of choice satisfaction primarily during high-anxiety conditions (Expert×Anxiety: β = 0.72, $p < 0.01$; Peer×Anxiety: $\beta = 0.81$, $p < 0.01$). The main effect of access to human contact during relatively low-anxiety conditions points toward a reduction in choice satisfaction with access to a peer having the strongest

negative effect (β = *-0.37*, $p < 0.05$), consistent with prior research showing that the presence of other people during SST use may be a detriment to service quality perceptions (Li et al., 2013).

In **Table A9** we can see that the direct effect of our anxiety treatment on Trust shown in Column 1 (β = *-0.22*, $p < 0.05$), diminishes and becomes statistically insignificant as we control for reported anxiety and choice satisfaction in Columns 2 and 3, and when we account for human contact in Columns 4-7. **Table A10 and 11** confirms our results with an ordinal probit specification since our dependent variables, *choice satisfaction and firm trust*, in this model was measured with a single-item question rated on a Likert scale.

	(1)	(2)	(3)
	Reported Anxiety	Reported Anxiety	Reported Anxiety
Anxiety Treatment	1.003***	1.023***	0.421
	(0.368)	(0.367)	(0.603)
Access to Expert		-0.696	-0.866*
		(0.422)	(0.480)
Access to Peer		-0.088	-0.833
		(0.467)	(0.534)
Expert x Anxiety Treatment			0.315
			(0.821)
Peer x Anxiety Treatment			1.495
			(0.914)
Relative Underperformance	1.364***	1.353**	1.333**
	(0.522)	(0.523)	(0.521)
Pre-Treatment Anxiety	0.591***	0.594***	0.567***
	(0.150)	(0.155)	(0.161)
Pre-Treatment Calm	-0.708***	-0.702***	-0.718***
	(0.092)	(0.093)	(0.094)
Age	-0.103*	-0.123**	-0.124**
	(0.055)	(0.057)	(0.057)
Income Level	-0.120**	-0.111**	-0.110**
	(0.050)	(0.050)	(0.050)
Education Level	0.141	0.170	0.168
	(0.182)	(0.182)	(0.182)
Female Indicator	0.217	0.202	0.212
	(0.366)	(0.363)	(0.361)
Block Number 2	0.030	0.030	0.030
	(0.098)	(0.098)	(0.098)
Block Number 3	0.183	0.183	0.183
	(0.177)	(0.178)	(0.178)
Block Number 4	0.348	0.348	0.348
	(0.214)	(0.214)	(0.214)
Block Number 5	0.469**	0.469**	0.469**
	(0.224)	(0.224)	(0.224)
Block Number 6	0.518**	0.518**	0.519**
	(0.238)	(0.238)	(0.238)
Constant	3.050*	3.557*	4.140**
	(1.738)	(1.806)	(1.835)
Observations	5,590	5,590	5,590
Participants	215	215	215
R-squared	0.313	0.320	0.327
Mean VIF	1.49	1.49	2.00

Table A7: Increasing access to human contact has a marginally negative effect on reported anxiety (Experiment 2B). All models are estimated with OLS regression, and robust standard errors, clustered at the participant level, are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

	(1) Choice Satisfaction	(2) Choice Satisfaction	(3) Choice Satisfaction	(4) Choice Satisfaction	(5) Choice Satisfaction	(6) Choice Satisfaction
Anxiety Treatment	-0.727***	-0.560***	-0.735***	-0.567***	-1.141***	-1.070***
	(0.139)	(0.129)	(0.139)	(0.130)	(0.246)	(0.236)
Reported Anxiety		-0.166***		-0.164***		-0.168***
		(0.020)		(0.020)		(0.020)
Access to Expert			0.307*	0.193	-0.033	-0.178
			(0.171)	(0.166)	(0.223)	(0.207)
Access to Peer			0.051	0.036	-0.234	-0.374**
			(0.167)	(0.153)	(0.197)	(0.189)
Expert x Anxiety Treatment					0.666*	0.719**
					(0.345)	(0.327)
Peer x Anxiety Treatment					0.558	0.809***
					(0.340)	(0.308)
Relative Underperformance	-1.366***	-1.139***	-1.361***	-1.139***	-1.359***	-1.135***
	(0.248)	(0.222)	(0.250)	(0.223)	(0.250)	(0.220)
Pre-Treatment Anxiety	-0.126**	-0.028	-0.127**	-0.030	-0.125**	-0.030
	(0.055)	(0.048)	(0.056)	(0.049)	(0.055)	(0.047)
Pre-Treatment Calm	0.084**	-0.033	0.081**	-0.033	0.075**	-0.046
	(0.036)	(0.035)	(0.036)	(0.035)	(0.035)	(0.035)
Age	-0.022	-0.039	-0.013	-0.033	-0.012	-0.033
	(0.026)	(0.026)	(0.026)	(0.025)	(0.025)	(0.024)
Income Level	0.015	-0.005	0.011	-0.007	0.007	-0.012
	(0.019)	(0.018)	(0.020)	(0.019)	(0.020)	(0.019)
Education Level	0.005	0.028	-0.008	0.020	-0.013	0.015
	(0.080)	(0.076)	(0.079)	(0.075)	(0.075)	(0.072)
Female Indicator	0.037	0.073	0.044	0.077	0.040	0.075
	(0.139)	(0.128)	(0.138)	(0.128)	(0.136)	(0.125)
Block Number 2	0.049	0.053	0.049	0.053	0.049	0.054
	(0.051)	(0.047)	(0.051)	(0.047)	(0.051)	(0.047)
Block Number 3	0.056	0.087	0.056	0.086	0.056	0.087
	(0.084)	(0.076)	(0.084)	(0.076)	(0.084)	(0.076)
Block Number 4	0.148	0.206**	0.148	0.205**	0.148	0.207**
	(0.093)	(0.083)	(0.093)	(0.083)	(0.093)	(0.083)
Block Number 5	0.242**	0.320***	0.242**	0.318***	0.242**	0.320***
	(0.102)	(0.089)	(0.102)	(0.089)	(0.102)	(0.088)
Block Number 6	0.254**	0.340***	0.254**	0.338***	0.254**	0.341***
	(0.111)	(0.097)	(0.111)	(0.097)	(0.112)	(0.097)
Constant	5.321***	5.828***	5.091***	5.673***	5.385***	6.080***
	(0.735)	(0.674)	(0.715)	(0.646)	(0.722)	(0.668)
Observations	5,590	5,590	5,590	5,590	5,590	5,590
Participants	215	215	215	215	215	215
R-squared	0.116	0.254	0.124	0.257	0.135	0.273
Mean VIF	1.49	1.52	1.49	1.52	2.00	2.00

Table A8: Access to an expert or to a peer improves choices satisfaction, particularly among individuals who are experiencing heightened anxiety (Experiment 2B). All models are estimated with OLS regression, and robust standard errors, clustered at the participant level, are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

	(1) Firm Trust	(2) Firm Trust	(3) Firm Trust	(4) Firm Trust	(5) Firm Trust	(6) Firm Trust	(7) Firm Trust
Choice Satisfaction			0.210***	0.214***		0.227***	0.217***
			(0.062)	(0.063)		(0.059)	(0.063)
Anxiety Treatment	-0.222**	-0.180*	-0.064	-0.057	-0.178*	-0.061	-0.038
	(0.099)	(0.097)	(0.098)	(0.099)	(0.097)	(0.099)	(0.172)
Reported Anxiety		-0.042**	-0.011	-0.013	-0.043**		-0.009
		(0.020)	(0.020)	(0.020)	(0.020)		(0.019)
Access to Expert				-0.120	-0.077	-0.115	-0.201
				(0.115)	(0.120)	(0.114)	(0.179)
Access to Peer				-0.069	-0.068	-0.069	0.042
				(0.107)	(0.113)	(0.107)	(0.154)
Expert x Anxiety Treatment							0.167
							(0.245)
Peer x Anxiety Treatment							-0.229
							(0.218)
Age	-0.007	-0.011	-0.002	-0.006	-0.014	-0.004	-0.005
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.017)	(0.016)
Income Level	0.007	0.002	0.001	0.002	0.002	0.003	0.001
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)	(0.013)
Education Level	-0.021	-0.016	-0.023	-0.016	-0.011	-0.018	-0.018
	(0.052)	(0.052)	(0.053)	(0.052)	(0.051)	(0.053)	(0.052)
Female Indicator	0.070	0.080	0.070	0.068	0.078	0.065	0.062
	(0.096)	(0.095)	(0.091)	(0.091)	(0.095)	(0.091)	(0.090)
Pre-Treatment Anxiety	-0.037	-0.012	-0.000	0.001	-0.012	-0.005	0.007
	(0.037)	(0.038)	(0.036)	(0.037)	(0.038)	(0.036)	(0.037)
Pre-Treatment Calm	0.037	0.006	0.010	0.009	0.006	0.017	0.014
	(0.027)	(0.030)	(0.027)	(0.027)	(0.030)	(0.026)	(0.027)
Relative Underperformance	-6.411***	-5.956***	-4.045*	-4.027*	-5.999***	-4.033*	-4.101*
	(2.208)	(2.134)	(2.108)	(2.156)	(2.167)	(2.168)	(2.128)
Constant	11.572***	11.663***	10.218***	10.316***	11.761***	10.205***	10.240***
	(0.503)	(0.503)	(0.527)	(0.532)	(0.496)	(0.508)	(0.558)
Observations	215	215	215	215	215	215	215
R-squared	0.091	0.115	0.189	0.193	0.117	0.191	0.206
Mean VIF	1.35	1.45	1.5	1.51	1.46	1.4	2.18

Table A9: OLS Regression results show no direct relationship between human assistance and trust in firm. The negative effect of our anxiety treatment on firm trust is fully mediated by choice satisfaction. Robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

	(1) Choice Satisfaction	(2) Choice Satisfaction	(3) Choice Satisfaction	(4) Choice Satisfaction	(5) Choice Satisfaction	(6) Choice Satisfaction
Anxiety Treatment	-0.552***	-0.463***	-0.561***	-0.469***	-0.889***	-0.915***
	(0.111)	(0.112)	(0.111)	(0.113)	(0.195)	(0.200)
Reported Anxiety		-0.142***		-0.140***		-0.146***
		(0.018)		(0.018)		(0.018)
Access to Expert			0.232*	0.156	-0.030	-0.163
			(0.136)	(0.142)	(0.191)	(0.192)
Access to Peer			0.041	0.030	-0.201	-0.344*
			(0.129)	(0.130)	(0.170)	(0.177)
Expert x Anxiety Treatment					0.511*	0.610**
					(0.276)	(0.284)
Peer x Anxiety Treatment					0.470*	0.730***
					(0.268)	(0.265)
Relative Underperformance	-1.059***	-0.971***	-1.060***	-0.972***	-1.063***	-0.976***
	(0.187)	(0.187)	(0.189)	(0.188)	(0.189)	(0.187)
Pre-Treatment Anxiety	-0.099**	-0.025	-0.100**	-0.026	-0.100**	-0.027
	(0.042)	(0.040)	(0.043)	(0.041)	(0.042)	(0.040)
Pre-Treatment Calm	0.079***	-0.014	0.077***	-0.014	0.072**	-0.026
	(0.029)	(0.029)	(0.028)	(0.029)	(0.028)	(0.029)
Age	-0.019	-0.035*	-0.012	-0.030	-0.012	-0.030
	(0.020)	(0.021)	(0.020)	(0.021)	(0.019)	(0.020)
Income Level	0.014	-0.001	0.012	-0.003	0.009	-0.007
	(0.015)	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)
Education Level	0.007	0.026	-0.003	0.019	-0.007	0.015
	(0.063)	(0.065)	(0.062)	(0.064)	(0.060)	(0.062)
Female Indicator	0.011	0.046	0.016	0.049	0.014	0.050
	(0.109)	(0.110)	(0.109)	(0.110)	(0.108)	(0.109)
Block Number 2	0.031	0.038	0.031	0.038	0.031	0.038
	(0.038)	(0.039)	(0.038)	(0.039)	(0.039)	(0.039)
Block Number 3	0.025	0.054	0.025	0.054	0.025	0.055
	(0.063)	(0.062)	(0.063)	(0.062)	(0.064)	(0.063)
Block Number 4	0.101	0.162**	0.101	0.162**	0.102	0.165**
	(0.070)	(0.068)	(0.071)	(0.069)	(0.071)	(0.069)
Block Number 5	0.186**	0.271***	0.187**	0.271***	0.188**	0.276***
	(0.079)	(0.076)	(0.080)	(0.076)	(0.080)	(0.076)
Block Number 6	0.199**	0.291***	0.200**	0.290***	0.201**	0.296***
	(0.088)	(0.084)	(0.089)	(0.084)	(0.089)	(0.085)
Observations	5590	5590	5590	5590	5590	5590

Table A10: Ordinal Probit estimation results align with OLS regression for determinants of Choice Satisfaction (Experiment 2B). Clustered standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

	(1) Firm Trust	(2) Firm Trust	(3) Firm Trust	(4) Firm Trust	(5) Firm Trust	(6) Firm Trust	(7) Firm Trust
Choice Satisfaction			0.362***	0.372***		0.388***	0.381***
			(0.113)	(0.113)		(0.107)	(0.114)
Anxiety Treatment	-0.360**	-0.298*	-0.114	-0.101	-0.293*	-0.108	-0.068
	(0.164)	(0.165)	(0.169)	(0.170)	(0.164)	(0.171)	(0.298)
Reported Anxiety		-0.066**	-0.015	-0.017	-0.068**		-0.011
		(0.032)	(0.034)	(0.033)	(0.032)		(0.033)
Access to Experts				-0.221	-0.137	-0.215	-0.372
				(0.196)	(0.195)	(0.196)	(0.312)
Access to Peer				-0.118	-0.106	-0.118	0.090
				(0.185)	(0.185)	(0.186)	(0.275)
Expert x Anxiety Treatment							0.306
							(0.417)
Peer x Anxiety Treatment							-0.415
							(0.377)
Age	-0.011	-0.017	-0.001	-0.008	-0.022	-0.005	-0.006
	(0.026)	(0.026)	(0.028)	(0.028)	(0.026)	(0.029)	(0.028)
Income Level	0.015	0.007	0.008	0.009	0.008	0.011	0.007
	(0.020)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.022)
Education Level	-0.036	-0.028	-0.047	-0.035	-0.019	-0.037	-0.037
	(0.084)	(0.085)	(0.091)	(0.089)	(0.084)	(0.091)	(0.089)
Female Indicator	0.100	0.119	0.109	0.104	0.115	0.099	0.096
	(0.154)	(0.155)	(0.156)	(0.155)	(0.154)	(0.155)	(0.155)
Pre-Treatment Anxiety	-0.064	-0.025	-0.006	-0.005	-0.025	-0.014	0.006
	(0.059)	(0.061)	(0.061)	(0.062)	(0.061)	(0.061)	(0.063)
Pre-Treatment Calm	0.066	0.020	0.027	0.026	0.019	0.037	0.035
	(0.044)	(0.048)	(0.045)	(0.045)	(0.047)	(0.044)	(0.046)
Relative Underperformance	-10.071***	-9.462***	-6.664*	-6.661*	-9.547***	-6.680*	-6.901*
	(3.421)	(3.406)	(3.591)	(3.655)	(3.444)	(3.673)	(3.600)
/cut1	-2.912***	-3.095***	-0.740	-0.925	-3.270***	-0.771	-0.794
	(0.807)	(0.829)	(0.905)	(0.913)	(0.816)	(0.881)	(0.946)
/cut2	-1.737**	-1.889**	0.535	0.354	-2.063**	0.504	0.498
	(0.798)	(0.815)	(0.899)	(0.910)	(0.805)	(0.874)	(0.954)
/cut3	0.084	-0.055	2.459***	2.284**	-0.226	2.436***	2.451**
	(0.787)	(0.800)	(0.904)	(0.914)	(0.789)	(0.880)	(0.959)
Participants	215	215	215	215	215	215	215

Table A11: Ordinal Probit estimation results align with OLS regression for determinants of Firm Trust (Experiment 2B). Robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

Appendix 8C: OLS estimations for Exogenous Anxiety with and without Human Contact (Experiments 3A and 3B)[4]

Consistent with the prior analysis, we conduct OLS regressions to examine the main effects of our anxiety treatment on each of our outcomes of interest. **Table A12**, Column 1 serves as our manipulation check for Experiment 3A, showing that participants assigned to the high-anxiety condition reported higher levels of anxiety ($\beta = 0.71$, $p < 0.05$). As an exogenous, unrelated anxiety manipulation, the treatment does not directly impact choice satisfaction or trust in the firm related to the investing task as shown in Columns 2 and 3.

	(1) Reported Anxiety	(2) Choice Satisfaction	(3) Firm Trust
Anxiety Treatment	0.705**	-0.023	0.006
	(0.358)	(0.126)	(0.172)
Age	0.016	-0.004	-0.016*
	(0.017)	(0.006)	(0.009)
Income Level	-0.075	-0.025	0.105**
	(0.091)	(0.037)	(0.049)
Education Level	0.108	0.205***	0.074
	(0.210)	(0.070)	(0.092)
Female Indicator	-0.573	-0.094	0.129
	(0.352)	(0.141)	(0.184)
Pre-Treatment Anxiety	0.686***	0.107***	0.161***
	(0.071)	(0.023)	(0.033)
Pre-Treatment Calm	-0.744***	0.158***	0.171***
	(0.080)	(0.034)	(0.042)
Relative Underperformance	206.476	-108.527**	-111.958*
	(126.708)	(54.138)	(64.983)
Constant	-2.234	3.485***	17.945***
	(1.636)	(0.711)	(0.760)
Observations	246	246	243
R-squared	0.526	0.242	0.220
Mean VIF	1.14	1.14	1.14

Table A12: An exogenous, unrelated anxiety treatment increases reported anxiety levels but does not directly influence choice satisfaction or firm trust (Experiment 3A). All models are estimated with OLS regression, and robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

Extending the analysis to examine the impact of human contact on the linkages between anxiety, choice satisfaction and firm trust, we begin with confirmation that our anxiety manipulation remains effective in **Table A13**. Column 1 serves as our manipulation check, demonstrating that those assigned to our anxiety treatment report higher levels of anxiety ($\beta = 1.40$, $p < 0.01$). In Column 2 we see that access to human contact has no impact on reported anxiety independently.

[4] Probit estimations are not performed for Experiments 3A and 3B as the dependent variables are average scores of multi-item scale measures and not discrete.

Including interaction terms in Column 3, however, reveals a positive effect of access to experts on reported anxiety levels for participants in both conditions (β = 0.90, $p < 0.05$, and differential impacts on the anxiety of participants in the high-anxiety condition in both conditions (Expert×Anxiety: β = -1.86, $p < 0.01$; Peer×Anxiety: β = -1.37, $p < 0.10$). Post-estimation means comparison tests reveal that the difference in the net increase in anxiety between participants assigned to watch an anxiety-inducing video and those assigned to watch a neutral video, decreases with access to human contact **(Figure A6)**, even as the difference in their means remains statistically significant. This pattern of results suggests that one way access to human contact may be beneficial in self-service contexts is its capacity to mitigate anxieties customers bring into the service encounter but service firms should consider the potential for inadvertent signaling that may serve to stimulate anxiety (Brough et al., 2022).

Table A14 dovetails with our structural model and confirms the negative relationship between reported anxiety and choice satisfaction. Access to human contact has no bearing on choice satisfaction when the source of anxiety is exogenous and unrelated to the decision task. In **Table A15**, we see that those assigned to the anxiety manipulation (Column 1), those reporting elevated anxieties (Column 5) and those assigned to access expert help (Column 7) report reductions of trust in the firm. While the pathway demonstrating that the relationship between anxiety and trust in the firm is mediated by choice satisfaction remains supported, when the source of anxiety is exogenous and unrelated to the service task, we do not see the same mitigating effect of access to human contact as when anxiety stems from the service task itself.

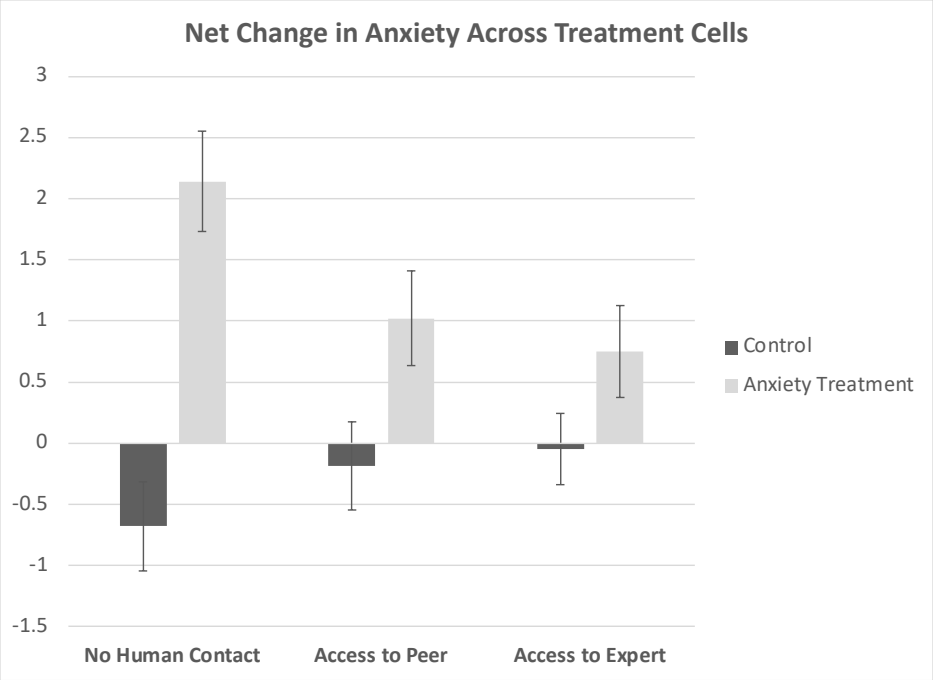


Figure A6. Across treatment cells, those with access to human contact demonstrate smaller changes in net anxiety during the investment task. Access to human contact appears to have a stabilizing effect on participant emotion.

	(1) Reported Anxiety Level	(2) Reported Anxiety Level	(3) Reported Anxiety Level
Anxiety Treatment	1.403***	1.407***	2.483***
	(0.282)	(0.280)	(0.519)
Access to Experts		-0.099	0.895**
		(0.358)	(0.426)
Access to Peer		0.002	0.710
		(0.369)	(0.455)
Expert X Anxiety Treatment			-1.864***
			(0.672)
Peer X Anxiety Treatment			-1.370*
			(0.704)
Age	0.008	0.008	0.007
	(0.011)	(0.011)	(0.011)
Income Level	0.026	0.026	0.018
	(0.068)	(0.068)	(0.069)
Education Level	0.125	0.123	0.160
	(0.134)	(0.134)	(0.130)
Female Indicator	0.182	0.170	0.165
	(0.278)	(0.288)	(0.285)
Pre-Treatment Anxiety	0.577***	0.579***	0.600***
	(0.080)	(0.080)	(0.078)
Pre-Treatment Calm	-0.989***	-0.989***	-0.977***
	(0.067)	(0.068)	(0.067)
Block Number 2	-0.076	-0.076	-0.075
	(0.080)	(0.080)	(0.080)
Block Number 3	-0.113	-0.113	-0.116
	(0.128)	(0.128)	(0.128)
Block Number 4	-0.088	-0.088	-0.091
	(0.146)	(0.146)	(0.146)
Block Number 5	-0.128	-0.128	-0.132
	(0.160)	(0.160)	(0.160)
Relative Underperformance	20.595***	20.607***	21.242***
	(5.920)	(5.917)	(5.951)
Constant	0.534	0.574	-0.297
	(1.124)	(1.165)	(1.156)
Observations	3,760	3,760	3,760
Participants	290	290	290
R-squared	0.624	0.624	0.632
Mean VIF	1.38	1.39	1.95

Table A13: Treated participants report higher levels of anxiety. Increasing access to human contact has a significantly negative effect on reported anxiety among those in our treatment group (Experiment 3B). Access to expertise has a significantly positive effect on anxiety among all participants. Access to expert help may have signaled task difficulty, but we leave this for future inquiry. All models are estimated with OLS regression, and robust standard errors, clustered at the participant level, are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Choice Satisfaction	Choice Satisfaction	Choice Satisfaction	Choice Satisfaction	Choice Satisfaction	Choice Satisfaction
Anxiety Treatment	-0.151	-0.012	-0.141	-0.287	-0.001	-0.049
	(0.116)	(0.116)	(0.117)	(0.207)	(0.115)	(0.202)
Reported Anxiety Level		-0.092***			-0.092***	-0.092***
		(0.020)			(0.020)	(0.020)
Access to Expert			0.072	-0.057	0.061	0.029
			(0.146)	(0.214)	(0.142)	(0.203)
Access to Peer			0.174	0.074	0.180	0.140
			(0.142)	(0.200)	(0.135)	(0.191)
Expert X Anxiety Treatment				0.243		0.061
				(0.291)		(0.287)
Peer X Anxiety Treatment				0.197		0.079
				(0.283)		(0.272)
Age	0.000	0.001	0.000	0.000	0.001	0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Income Level	0.089***	0.093***	0.088***	0.089***	0.093***	0.093***
	(0.029)	(0.028)	(0.029)	(0.029)	(0.028)	(0.028)
Education Level	0.018	0.032	0.015	0.010	0.029	0.027
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)
Female Indicator	-0.415***	-0.407***	-0.427***	-0.427***	-0.421***	-0.421***
	(0.114)	(0.111)	(0.115)	(0.115)	(0.112)	(0.112)
Pre-Treatment Anxiety	-0.004	0.050*	-0.007	-0.010	0.047	0.046
	(0.029)	(0.030)	(0.029)	(0.029)	(0.031)	(0.031)
Pre-Treatment Calm	0.102***	0.011	0.103***	0.102***	0.012	0.013
	(0.033)	(0.038)	(0.033)	(0.032)	(0.038)	(0.038)
Block Number 2	-0.045	-0.053*	-0.045	-0.045	-0.053*	-0.053*
	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Block Number 3	-0.351***	-0.357***	-0.351***	-0.350***	-0.358***	-0.357***
	(0.050)	(0.049)	(0.050)	(0.050)	(0.049)	(0.049)
Block Number 4	-0.537***	-0.536***	-0.537***	-0.537***	-0.536***	-0.536***
	(0.063)	(0.062)	(0.063)	(0.063)	(0.062)	(0.062)
Relative Underperformance	-7.652***	-6.598***	-7.617***	-7.747***	-6.560***	-6.600***
	(2.205)	(2.153)	(2.209)	(2.190)	(2.155)	(2.127)
Constant	3.762***	3.783***	3.711***	3.830***	3.736***	3.773***
	(0.439)	(0.423)	(0.433)	(0.458)	(0.416)	(0.437)
Observations	2,893	2,893	2,893	2,893	2,893	2,893
Participants	290	290	290	290	290	290
R-squared	0.161	0.202	0.164	0.166	0.206	0.206
Mean VIF	1.34	1.55	1.35	1.96	1.53	2.10

Table A14: Elevated anxiety is negatively linked to choice satisfaction. Access to human contact has a no effect on choice satisfaction among those in our treatment group (Experiment 3B). All models are estimated with OLS regression, and robust standard errors, clustered at the participant level, are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Firm Trust	Firm Trust	Firm Trust	Firm Trust	Firm Trust	Firm Trust	Firm Trust
Choice Satisfaction			0.459***	0.459***		0.484***	0.457***
			(0.067)	(0.067)		(0.067)	(0.067)
Anxiety Treatment	-0.242*	-0.119	-0.103	-0.097	-0.108	-0.160	-0.259
	(0.144)	(0.149)	(0.142)	(0.143)	(0.150)	(0.133)	(0.257)
Reported Anxiety		-0.087***	-0.046	-0.046	-0.087***		-0.041
		(0.029)	(0.028)	(0.029)	(0.029)		(0.030)
Access to Expert				-0.174	-0.139	-0.171	-0.423*
				(0.170)	(0.180)	(0.171)	(0.247)
Access to Peer				-0.022	0.064	-0.026	-0.031
				(0.158)	(0.167)	(0.159)	(0.209)
Expert X Anxiety Treatment							0.467
							(0.352)
Peer X Anxiety Treatment							-0.009
							(0.328)
Age	-0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002
	(0.006)	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
Income Level	0.039	0.043	0.004	0.005	0.043	0.001	0.010
	(0.035)	(0.034)	(0.031)	(0.031)	(0.034)	(0.031)	(0.032)
Education Level	0.007	0.021	0.014	0.012	0.017	0.004	0.001
	(0.077)	(0.075)	(0.071)	(0.070)	(0.074)	(0.071)	(0.072)
Female Indicator	0.097	0.095	0.233*	0.215	0.071	0.224	0.220
	(0.149)	(0.147)	(0.141)	(0.142)	(0.148)	(0.143)	(0.142)
Pre-Treatment Anxiety	0.066	0.114**	0.088**	0.092**	0.116***	0.066	0.086**
	(0.044)	(0.044)	(0.043)	(0.043)	(0.045)	(0.041)	(0.043)
Pre-Treatment Calm	0.108***	0.021	0.011	0.009	0.020	0.053	0.010
	(0.040)	(0.048)	(0.044)	(0.043)	(0.048)	(0.034)	(0.044)
Relative Underperformance	-131.308**	-105.359*	-42.942	-42.111	-105.160*	-51.931	-48.433
	(61.465)	(61.932)	(54.860)	(54.630)	(62.127)	(53.315)	(54.665)
Constant	4.496***	4.311***	2.086***	2.153***	4.359***	2.125***	2.344***
	(0.783)	(0.770)	(0.766)	(0.768)	(0.777)	(0.768)	(0.812)
Participants	290	290	290	290	290	290	290
R-squared	0.061	0.088	0.208	0.212	0.092	0.204	0.220
Mean VIF	1.34	1.74	1.73	1.68	1.68	1.37	2.32

Table A15: OLS Regression results confirm that choice satisfaction fully mediates the relationship between anxiety and firm trust (Experiment 3B). A marginally significant negative direct relationship is shown between expert assistance and trust in firm. No moderating effect of human contact on trust among anxious participants is shown. Robust standard errors are shown in parentheses. *, **, and ***, signify significance at the 10%, 5%, and 1% levels respectively.