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## To Disclose or To Falsify: The Effects of Cognitive Trust and Affective Trust on Customer Cooperation in Contact Tracing

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## **To Disclose or To Falsify: The Effects of Cognitive Trust and Affective Trust on Customer Cooperation in Contact Tracing**

### **Highlights**

- Contact tracing helps the hospitality industry to recover in the COVID-19 era.
- Cognitive and affective trust have distinct effects on contact tracing cooperation.
- Businesses should prioritize developing cognitive trust over affective trust.

## **To Disclose or To Falsify: The Effects of Cognitive Trust and Affective Trust on Customer Cooperation in Contact Tracing**

### **Abstract**

Contact tracing involves collecting people's information to track the spread of COVID-19 and to warn people who have been in the proximity of infected individuals. This measure is important to public health and safety during the pandemic. However, customers' concerns about the violation of their privacy might inhibit their cooperation in the contact tracing process, which poses a risk to public safety. This research investigates how to facilitate customers' cooperative behavior in contact tracing based on cognitive trust and affective trust. The findings show that cognitive trust increases people's willingness to disclose information and reduces their willingness to falsify it, whereas affective trust increases the willingness for both disclosure and falsification. This research contributes to the literature on customer data privacy by illuminating how cognitive and affective trust distinctly influence cooperative behavior, which has important implications for hospitality businesses.

### **Keywords**

Contact tracing, willingness to disclose, hospitality, trust, data privacy, COVID-19

## **To Disclose or To Falsify: The Effects of Cognitive Trust and Affective Trust on Customer Cooperation in Contact Tracing**

### **1. Introduction**

Contact tracing is a measure for mitigating the transmission of infectious diseases, which is important to public health and safety during the COVID-19 pandemic (World Health Organization, 2020). It requires businesses to collect customers' personal information (e.g., name, phone number, location, and travel history) in order to track the spread of the virus and to warn people who have been in the proximity of infected individuals (Servick 2020). An increasing number of countries have implemented contact tracing in hospitality venues, such as restaurants, cafes, pubs, and clubs. For example, New Zealand's largest online restaurant-booking website, Restaurant Hub, provides contact tracing instructions and QR codes for its registered venues (Restaurant Hub 2020). Australia and the UK also require hospitality venues to collect customers' contact details to support contact tracing (Government of NSW 2020; The UK Government 2020).

Contact tracing requires adequate customer cooperation to be effective (The New Daily 2020). However, many customers of hospitality businesses have been reported to be reluctant to cooperate because of privacy concerns, posing a serious threat to public safety (The Conversation 2020; Yahoo 2020). Therefore, the present research draws on customer data privacy literature to investigate the main reasons behind customer reluctance to cooperate in contact tracing during the COVID-19 pandemic.

Drawing on the social exchange theory, extant literature on customer data privacy suggests that customers relinquish their personal information in exchange for products or services (Krishen et al. 2017; Lwin et al. 2007; Martin and Murphy 2017; Schumann et al. 2014; White 2004). Due to increasingly personalized advertisements and widely reported data scandals (e.g., the Facebook–Cambridge Analytica scandal), customers have become wary of

the potential risk of disclosing their personal information (e.g., data access, breach, and misuse) and feel vulnerable in such exchanges (Kim et al. 2018; Krafft et al. 2017; Martin et al. 2017). Their perceived vulnerability triggers uncooperative behavioral intentions toward information requesters, including withholding and falsifying information (Martin et al. 2017).

Recent research on customer data privacy calls for examining interpersonal trust as a mechanism for promoting customers' cooperative behavior (Bleier and Eisenbeiss 2015; Jagadish 2020; Martin and Murphy 2017; Steinhoff et al. 2019; Waldman 2018). Trust is a sensitive indicator of people's willingness to accept vulnerability with positive expectations and beliefs about the other party in social exchanges (Kim et al. 2004). Concerning data privacy, customers are willing to accept being vulnerable in disclosing information with a business that they trust because they have positive expectations of it (Lwin et al. 2007; Waldman 2018).

Despite the substantial role of trust in influencing customers' cooperative behavior, research on customer data privacy has not yet considered the effects of different forms of trust. Grounded in social exchange theory, the trust literature has identified two forms of trust: cognitive trust and affective trust (e.g., McAllister 1995). Cognitive trust refers to the rational evaluation of whether the other party to an exchange is trustworthy based on the knowledge and information regarding its ability, professionalism, and reliability (McAllister 1995; Schaubroeck et al. 2011; Su and Mattila 2020; Yang and Mossholder 2010). Affective trust refers to the emotional bonds or connections with the party to the exchange that are grounded in the care and concern that it demonstrates (McAllister 1995; Schaubroeck et al. 2011; Su and Mattila 2020; Yang and Mossholder 2010).

Past research has shown that these two forms of trust are driven by different antecedents and lead to different behavioral outcomes in leadership and organizational behavior (Nienaber et al. 2015; Schaubroeck et al. 2011). However, it is unclear how these

two forms of trust evolve and distinctively influence customers' cooperative behavior related to data privacy. To address this research gap and link to the COVID-19 pandemic, this research investigates the following questions: (1) How do cognitive trust and affective trust influence different cooperative behaviors toward contact tracing? (2) What are the antecedents for different forms of trust in contact tracing?

This research makes several theoretical contributions. First, it is among the first to apply cognitive and affective trust as psychological mechanisms to explicate different cooperative behaviors, namely, disclosure and falsification, related to data privacy, especially in the context of contract tracing. Our findings add theoretical nuance to the literature on customer data privacy (e.g., Janakiraman et al. 2018; Kashmiri et al. 2017; Martin et al. 2017) by showing that these two forms of trust have divergent effects. Second, this research identifies contact tracing-related perceptual factors and illuminates how they contribute to different forms of trust, thus adding to research on the antecedents of trust (Acquisti et al. 2015; Acquisti et al. 2012). Taken together, our findings have important implications for the hospitality industry and governments in facilitating customer cooperation in contact tracing.

The remainder of this paper is organized as follows: We review the relevant literature to develop our hypotheses regarding how cognitive trust and affective trust drive cooperative behaviors in contact tracing. We then conduct an exploratory qualitative study to identify the relevant perceptual antecedents and revert to the literature to conceptualize how they influence the two forms of trust. After establishing our conceptual model, we employ a survey study to test all hypotheses. Finally, we discuss the theoretical contributions and practical implications of our findings.

## **2. Conceptual Development**

Despite the benefit of contact tracing to public health and safety in the COVID-19 pandemic, it has been reported that many customers are reluctant to cooperate when they are asked to provide their personal information (The Conversation 2020; Yahoo 2020). Thus, it is important for us to understand the major obstacles to customer cooperative behaviors in contact tracing. To do so, we conducted a short survey of 240 participants from the US on Amazon Mechanical Turk (see Appendix A for more details). 74% of the participants reported that they had been asked to provide contact information at hospitality venues. However, only 24% of them reported having provided correct and complete information each time. Furthermore, amongst a range of plausible reasons, the most chosen reason for their reluctance to cooperate was their concern about privacy (for 68% of the participants). These findings allow us to draw on customer data privacy literature to investigate cooperative behavior in contact tracing.

### ***2.1 Contact tracing as social exchange***

By drawing on social exchange theory (Blau 1964), the literature on customer data privacy conceptualizes the provision of personal information as a form of social exchange in which customers relinquish their personal information in order to gain access to services or to obtain more relevant and better services from businesses (e.g., Martin and Murphy 2017; Schumann et al. 2014; White 2004). Whether to provide personal information or not depends on the customer's evaluation of the expected benefit and cost of doing so. In this evaluation, the cost is largely associated with the perceived privacy vulnerability (Schumann et al. 2014). Privacy is defined as the customer's control over the dissemination and use of their information (Jaap et al. 2021; Martin and Murphy 2017). As customers have less control over



their information after relinquishing it to a business, they become vulnerable to its potential misuse (Martin et al. 2017).

By applying this notion to the context of our research, contact tracing can be viewed as the exchange between customers and hospitality businesses where customers may feel that control has been taken over their information in exchange for services, leading consumers to feel vulnerable to privacy-related risks. Such vulnerability creates barriers for customers to cooperate in contact tracing.

## ***2.2 Trust as the core mechanism of cooperation in contact tracing***

Trust refers to an individual's intention to accept vulnerability based upon positive expectations of the exchange party's intentions or behavior (Kim et al. 2004). Trust acts as a core mechanism to facilitate people's cooperation with the exchange party (Aguirre et al. 2015; Luo 2002; Schaubroeck et al. 2011). When customers trust a business, they tend to accept their vulnerability because they believe that the business will handle their information appropriately (Martin et al. 2017). Hence, in terms of data privacy, trust generally increases customers' cooperation with the business by disclosing information to it (Lwin et al. 2007; Martin et al. 2017; Wirtz and Lwin 2009). Our literature review (Table 1) shows that prior research on trust and cooperative behavior related to data privacy has not considered different forms of trust and their effects on different cooperative behaviors such as willingness to disclose and falsify. The present research aims at addressing these research gaps.

**Table 1.** Empirical studies on trust and customer cooperative behavior related to data privacy

Article	Context	Cooperative behavior (outcome variable)	Conceptualization of trust (explanatory variable)	Key findings	Examine both disclosure and falsification behaviors	Examine the effects of both affective and cognitive trust
Our research	Contact tracing (the hospitality and service industry)	Willingness to disclose, willingness to falsify	Cognitive trust and affective trust	Cognitive trust and affective trust have distinct effects on willingness to disclose and willingness to falsify.	Yes	Yes
<i>Hospitality and tourism</i>						
Ioannou et al. (2020)	Travel (online)	Willingness to share information	Travelers' trust. Trust is defined as "willingness to be vulnerable to the actions of another." (p. 4)	Trust can reduce risk beliefs and encourages people to share their information.	No	No
Morosan and DeFranco (2015)	Mobile apps (hotel)	Willingness to disclose	Trust in organization and trust in system/app. Trust is viewed as "a social relationship where principals invest resources in agents in exchange for an uncertain future benefit." (p. 123)	Consumer trust in hotel apps has a positive effect on willingness to disclose information.	No	No
<i>Marketing</i>						
Aiken and Boush (2006)	Websites	Willingness to provide personal information	Signals of trust: a third-party certification, an objective-source rating, and an implication of investment in advertising. Perceived trustworthiness: cognitive, affective, and behavioral	Trust signals can influence consumers' perceived security and privacy, perceived firm trustworthiness, and willingness to provide personal information.	No	Yes
Bansal et al. (2016)	Online service context (financial websites)	Intention to disclose information	Trust in the website. Trust is defined as "the willingness to depend on another person or institution based on the belief in the integrity, ability, and benevolence of the other party." (p.1)	Trust has an important impact on disclosure intention. This impact is influenced by customer personality and the sensitivity of the context.	No	No
Bart et al. (2005)	Websites	Behavioral intent (e.g., providing personal information, purchase intention, word of mouth)	Online trust. Trust is defined as "a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviors of Another." (p.134)	Online trust mediates the relationships between the characteristics of websites and consumers and consumer behavioral intent.	No	No
Cho (2006)	business-to-consumer (B2C) Internet exchange relationships	Self-disclosure and willingness to commit	Trust and distrust. Trust and distrust are considered as distinct entities.	Trust and distrust have different effects on customer behavioral intentions such as self-disclosure.	No	No

Grosso et al. (2020)	Retailing (online and offline)	Willingness to disclose	Micro- and micro-level trust: trust in a retail personnel, trust in a retailer, trust in a country	The interaction between three types of trust, privacy concerns, and information type influence consumers' willingness to disclose.	No	No
Martin et al. (2017)	Retail, financial services, and technology	Falsifying information, negative word of mouth, switching behavior	Cognitive trust and feelings of violation. Cognitive trust is defined as "customer's willingness to rely on a firm in which (s)he has confidence." (p. 39)	Cognitive trust and feelings of violation mediate the relationships between data vulnerabilities and behavioral outcomes such as falsification.	No	No
Mothersbaugh et al. (2012)	Online service context (online TV program guide)	Willingness to disclose	Firm trust. It was measured based on whether a firm could be trusted, counted on, and relied on.	Firm trust is a key mechanism that mediates antecedents and disclosure intention. Specifically, firm trust can reduce perceived risk of disclosure.	No	No
White (2004)	Relationship marketing	Willingness to disclose	Relational depth (trust is considered as the underlying theoretical mechanism without being explicitly tested).	Deep relationship perceptions are associated with strong satisfaction and trust. Such perceptions can reduce risks in disclosing certain kinds of information but increase risks in disclosing embarrassing information.	No	No
Wirtz and Lwin (2009)	Online retailing	Relational behavior (provision and updating of customer information)	Trust in the website. Trust means that "customers have faith in the organization's reliability and integrity and feel secure about sharing their personal information with the organization." (p. 192)	Trust facilitates consumers' relational behavior such as providing and updating their information on the website.	No	No
<b><i>Information management</i></b>						
Anderson and Agarwal (2011)	Healthcare (digital)	Willingness to provide access to personal information, willingness to disclose	Trust in electronic medium. Trust is defined as "a multi-dimensional construct comprising of competence, reliability, and safety trusting beliefs; i.e., the individual's belief that electronic storage provides a reliable and safe environment in which to store health information, and her belief that the electronic storage format provides the necessary components to facilitate electronic storage of health information." (p. 474)	Trust, intended purpose, and type of information have interaction effects on willingness to disclose and willingness to provide access.	No	No
Chai et al. (2011)	Blog	Knowledge sharing behaviors	Bloggers' Trust. Trust is defined as "a user's beliefs about the reliability, credibility, and accuracy of information gathered through the Web." (p.318)	Bloggers' trust, strength of social ties, and reciprocity all influence their knowledge sharing behavior positively.	No	No
Dinev and Hart (2006)	Online transactions	Willingness to provide personal information	Internet trust. Trust is defined as "beliefs reflecting confidence that personal information Internet websites will be handled competently." (p. 64)	Internet trust has a positive effect on willingness to provide personal information to transact on the Internet.	No	No

Kehr et al. (2015)	Mobile application (driving behavior app)	Intention to disclose	Institutional trust. It is defined as “an individual's confidence that the data-requesting medium will not misuse his or her data.” (p. 611)	Institutional trust influences consumers' intention to disclose private information.	No	No
Malhotra et al. (2004)	E-commerce	Behavioral intention (intention to reveal personal information)	Trusting belief. It is defined as “the degree to which people believe a firm is dependable in protecting consumers' personal information.” (p. 341)	Trusting beliefs negatively influence risk beliefs and positively influence intentions to reveal personal information.	No	No
Miltgen and Smith (2019)	Commercial websites	Withholding, falsification	Trust. It refers to “an individual's trust in an entity that is requesting data.” (p. 706)	Trust reduces customers' intentions to withhold and falsify their information.	No	No
Zimmer et al. (2010)	Websites	Intention to disclose	Trust in website. It refers to the “belief that the website is benevolent, competent, or honest in handling personal information.” (p. 117)	Trust can encourage people to disclose information because it reduces risk perceptions associated with disclosure.	No	No
<b>Contact tracing</b>						
Guillon and Kergall (2020)	Digital contact tracing	Willingness to use a contact-tracing application (disclosing information to the application)	Trust in the government. It is defined as trust in the government to handle the health crisis.	Trust is significantly related to people's willingness to use a contact-tracing application.	No	No
Hu et al. (2020)	COVID-19 safety measures (e.g., contact tracing)	Compliance with safety measures.	NA	Hospitality employees' compliance with safety measures is driven by management practices and organizational crisis strategies.	No	No
Trang et al. (2020)	Digital contact tracing	Intention to install contact tracing app (disclosing information to the app)	NA	The benefit appeals, privacy designs, and convenience influence peoples' intention to install contact tracing apps.	No	No

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Trust consists of two conceptually different forms—cognition-based and affect-based trust (Hon and Lu 2010; Massey et al. 2019; McAllister 1995; Tomlinson et al. 2020).

Cognitive trust develops through knowledge and information that enables individuals to evaluate the other party's competence and reliability, while affective trust is generated from positive feelings based on care and concern demonstrated by the other party (McAllister 1995; Schaubroeck et al. 2011; Yang and Mossholder 2010). We propose that these two forms of trust may influence customer cooperative behaviors differently due to their distinct characteristics. Specifically, we focus on disclosure and falsification as two specific behaviors.

Customers' willingness to disclose represents their intention to cooperate publicly, and thus is an important behavioral outcome in the exchange of information between customers and businesses (Martin and Murphy 2017). When customers disclose information, they can inconspicuously provide truthful information or offer false or incomplete information, which is called "falsification" (Lwin et al. 2007; Norberg and Horne 2014). Falsification can complicate contact tracing efforts and put public health at risk (Queensland Government 2020). Therefore, we conceptualize willingness to disclose and willingness to falsify as separate behaviors toward contact tracing and investigate how they are influenced by cognitive trust and affective trust.

*Cognitive trust.* Cognitive trust is individuals' evaluation of the exchange party regarding whether it is competent, professional, and capable of handling the exchange (Johnson and Grayson 2005; McAllister 1995). In the context of contact tracing, customers who have cognitive trust in a business hold positive expectations that the business will implement an appropriate process in collecting, storing, and using their data (Martin et al. 2017). Such positive expectations of competence in data management increase customers' willingness to accept their vulnerability in this exchange. Therefore, high cognitive trust in a

business motivates customers to cooperate by disclosing truthful information that can support its purpose of contact tracing. In contrast, low cognitive trust in a business makes customers feel vulnerable to privacy-related risks such that they tend to exhibit behavioral reactance, such as withholding and falsification. Therefore, we propose the following:

**H1:** Customers' cognitive trust in the business is positively related to their willingness to *disclose* (**H1a**) and negatively related to their willingness to *falsify* (**H1b**) in contact tracing conducted by this business.

*Affective trust.* Affective trust captures individuals' positive feelings and emotions of the exchange party which are grounded in its demonstrated concern and care (Johnson and Grayson 2005; McAllister 1995). If individuals feel that the exchange party has concern and care for them, they tend to disclose broader and deeper information (Borg and Freytag 2012; Park et al. 2011). This is because individuals reciprocate by providing their information to the exchange party in order to maintain a positive relationship (Moon 2000; Park et al. 2011; White 2004). In light of this notion, high affective trust associated with a business should increase customers' willingness to disclose in contact tracing.

However, as positive feelings and emotions toward the business deepen, the associated motive to maintain this relationship can also become a pressure that leads to the invasion of people's privacy (O'Malley et al. 1997; Song et al. 2016; Steinhoff et al. 2019). That is, individuals may feel obligated to comply with the request for disclosure from the exchange party without knowing if their privacy will be competently protected. To resolve this relationship maintenance–privacy risk dilemma, they can take a symbolic cooperative action—falsification—to maintain the relationship with the business without putting their privacy at risk. Therefore, affective trust can increase customers' willingness to disclose but also increase their willingness to falsify. Formally, we propose:

**H2:** Customers' affective trust in the business is positively related to their willingness to *disclose* (**H2a**) and their willingness to *falsify* (**H2b**) in contact tracing conducted by this business.

### ***2.3 Perceptual antecedents of trust in the context of contact tracing***

Past studies on customer data privacy show that customers' trust and cooperative behaviors toward businesses are driven by various perceptual antecedents (Acquisti et al. 2015; Acquisti et al. 2012; Bansal et al. 2016; Su and Mattila 2020; Yang et al. 2019). As hospitality businesses have only started adopting contact tracing since the COVID-19 pandemic, the perceptual antecedents of cognitive trust and affective trust in this context are unclear. Therefore, we conducted a pilot qualitative study to identify the most relevant perceptual antecedents. We followed protocols from Kvale (1996) to design semi-structured interviews and used convenience sampling to recruit 24 participants (including a pilot test with five participants) with experience and knowledge of contact tracing from Anglosphere countries, including Australia, New Zealand, the UK, the US, and Canada (see Appendix B for the participants' profile). Our interview questions primarily focused on exploring participants' experiences with contact tracing in hospitality venues (e.g., restaurants, cafes, and bars), the main reasons and drivers for their cooperative (or uncooperative) behavior, and their perceptions of the practices of hospitality businesses and governments (see Appendix C for interview questions).

We conducted thematic analysis (Braun and Clarke 2006) and identified four key perceptual factors influencing cooperative behaviors in contact tracing: 1) perceived ethics of data collection, 2) perceived data protection policy, 3) perceived governmental regulation, and 4) perceived prevalence of participation, as shown in Table 2 (see Appendix D for detailed data analysis). We explain each of these perceptual antecedents in the following section. For each

perceptual antecedent, we first illustrate its meanings and characteristics based on our qualitative findings, and then draw on the relevant literature to explain and predict how this antecedent influences the two forms of trust.

**Table 2.** Summary of first-order codes, and second- and third-order themes (pilot study)

First-order code	Second-order theme	Third-order theme
Data are collected to help stop the spread of COVID-19	Perceived societal benefits Perceived ethical consideration Perceived social responsibility	Perceived ethics of data collection
Data are collected to help hospitality businesses stay open and provide services for people		
Hospitality businesses collect information because they want to protect customers		
Hospitality businesses lack ethics because they collect customers' data for targeted marketing		
Collecting data for contact tracing is the businesses' civic duty		
Every member of society has the obligation to support contact tracing		
Only customers own their data, and they decide what information to share and with whom they share their information	Perceived data ownership	Perceived data protection policy
Customers are unaware of the ownership of their data		
Customers give up the ownership of their data to businesses when they share information	Perceived data protection in the collection process	
Customers are concerned about hospitality staff's unprofessional conduct		
Hospitality businesses do not have adequate explanations for how they keep customer information confidential	Perceived data control	
Hospitality businesses do not provide information about customer data storage		
The collected customer data should be used only by authorities, and only for contact tracing		
The business controls the collected information and should be responsible for its safety		
The uniform pattern of the QR codes and contact tracing app for businesses make me confident in the government	Confidence in regulators	Perceived governmental regulation
The government has made strong efforts to control the pandemic		
The government wants to protect customers; so customers follow its regulations	Perceived sufficiency of regulations	
Laws and regulations (including penalties) should supervise the use of customers' data		
Government websites keep the public informed about data policy and regulation	Perceived regulation enforcement and policy support	
The government encourages everyone to participate in contact tracing		
The tool of QR codes for businesses shows technological support from the authorities		
The government should have provided stricter guidelines on how to collect store, and use data		
Customers follow hospitality contact tracing because they see everyone uses/accepts it frequently	Perceived prevalence	Perceived prevalence/social norms for information disclosure
Contact tracing information frequently appears in the news and other media channels		
Employers encourage people to participate in contact tracing	Social norm	
Contact tracing instructions are available at malls, parks, hotels, subways, etc.		
The use of QR codes for contact tracing is a new normal		
All my family members, friends, and colleagues are okay with providing their information		

*Perceived ethics of data collection.* Our qualitative findings reveal that participants were willing to disclose their personal information if they perceived the following ethical characteristics of hospitality businesses: ethical considerations (e.g., the data were collected to protect other customers rather than to target customers for commercial purposes), societal



benefits (e.g., data collection helps stop the spread of COVID-19, and helps businesses stay open and provide services for people), and social responsibility (e.g., businesses exercise responsibility in protecting their customers and honor their obligation to support contact tracing). For example, one participant (ID 01) emphasized that restaurants do not collect data for self-interest by stating: “They [restaurants] have collected information because they’re looking after their customers. The information that they’ve collected is basically for the use of public health and for the benefit of customers ... it’s to protect them ... I very much doubt that they [restaurants] would be misusing it.”

Many studies have shown that ethics are vital to the development of customer trust (Martínez and Del Bosque 2013; Stanaland et al. 2011; Sung and Kim 2010). Customers have positive expectations of an ethical business that exercises social responsibility and cares about public well-being (Fan 2005; Singh et al. 2012). This expectation can be generalized to the customers’ belief that ethical businesses are also concerned with, and care about, their customers in implementing contact tracing. Therefore, customers feel less vulnerable and have higher trust in ethical businesses.

As businesses’ ethics reflect their motives and characteristics, such as altruism, benevolence, and sincerity, that generate positive feelings among customers and help form emotional bonds with them (Fan 2005; Sung and Kim 2010), such ethics contribute to affective trust. However, ethics do not convey any information about the competence and professionalism of the business in managing customers’ data. Therefore, we propose the following hypothesis:

**H3:** Customers’ perceived ethics of data collection conducted by the business is positively related to their affective trust in this business.

*Perceived data protection policy.* Our interview participants believed that their data should be handled safely by businesses to avoid data breaches and scandals. They stressed the

importance of a business's control of data (e.g., ability to control the flow of data, and management of data storage and data safety), protection of data (e.g., confidentiality of customer information and employees' professionalism in data management), and ownership of data (e.g., who owns customer data, and customers' own access to their data). These three themes can be merged and interpreted as perceived data protection policy. For example, one participant (ID 02) mentioned that data protection policy is an important driver for information disclosure: "Usually, when you enter your information on the Internet, they [websites] recommend that you read the privacy policy, which indicates how they're going to protect your information. But at restaurants, they do not indicate anything like this. I don't actually know how they're going to protect my information. I feel kind of insecure, and I don't really want to give up my information."

Data protection policy describes the way in which businesses exercise ownership of and power over customer data, and how they protect their use of customer data (Lwin et al. 2007; Martin and Murphy 2017; Xu et al. 2012). Customers nowadays have become increasingly wary of the data protection policies of businesses (Kim et al. 2018; Wright and Xie 2019). If customers perceive that a business implements adequate data protection, they believe that it has the competence and professionalism to manage their data properly, and are thus more willing to accept vulnerability (Lwin et al. 2007; Steinhoff et al. 2019). Therefore, businesses that integrate strong data protection policies into effective marketing communication can build the positive belief of competence, professionalism, and reliability among customers (Martin and Murphy 2017; Trim and Lee 2019), which in turn contributes to cognitive trust. However, data protection policy is limited in building emotional bonds through care and concern toward customers. Therefore, we hypothesize:

**H4:** Customers' perceived data protection policy of the business is positively related to their cognitive trust in this business.

*Perceived governmental regulation.* Our interview participants attached importance to how governments regulate their businesses' contact tracing practices. They emphasized the following characteristics of governmental regulation: confidence in regulators (e.g., positive beliefs about the government's efforts to control the pandemic and protect their citizens), sufficiency of regulations (e.g., adequacy of data security laws and policy of contact tracing), and regulation enforcement and policy support (e.g., governments encouraging citizens to participate in contact tracing and providing advice to businesses on how to collect, store, and protect customer data). For example, one participant (ID 10) claimed that governments should guide restaurants to conduct contact tracing by providing the relevant policies. She explained: "There should be some level of government intervention, at least some regular check or some regular audit to make sure the hospitality venues are following the rules and guidelines properly."

Customers expect governments to act as an external force to supervise the data practices of businesses through regulations and policies (Acquisti et al. 2015; Kashmiri et al. 2017; Lwin et al. 2007; Poortinga and Pidgeon 2006; Xu et al. 2012). Well-developed governmental regulation deters business misconduct, such as the misuse of customer data, and provides detailed guidance and support for businesses to engage in appropriate data practices (Lwin et al. 2007; Xu et al. 2012). With more regulations, guidance, and support from governments, businesses can more knowledgeably, competently, and professionally collect and manage customer data, thus gaining cognitive trust from customers. However, complying with government regulations does not necessarily mean that the business cares for, and is concerned about, its customers, which limits its impact on affective trust. We thus propose the following hypothesis:

**H5:** Customers' perceived governmental regulation is positively related to their cognitive trust in the business.

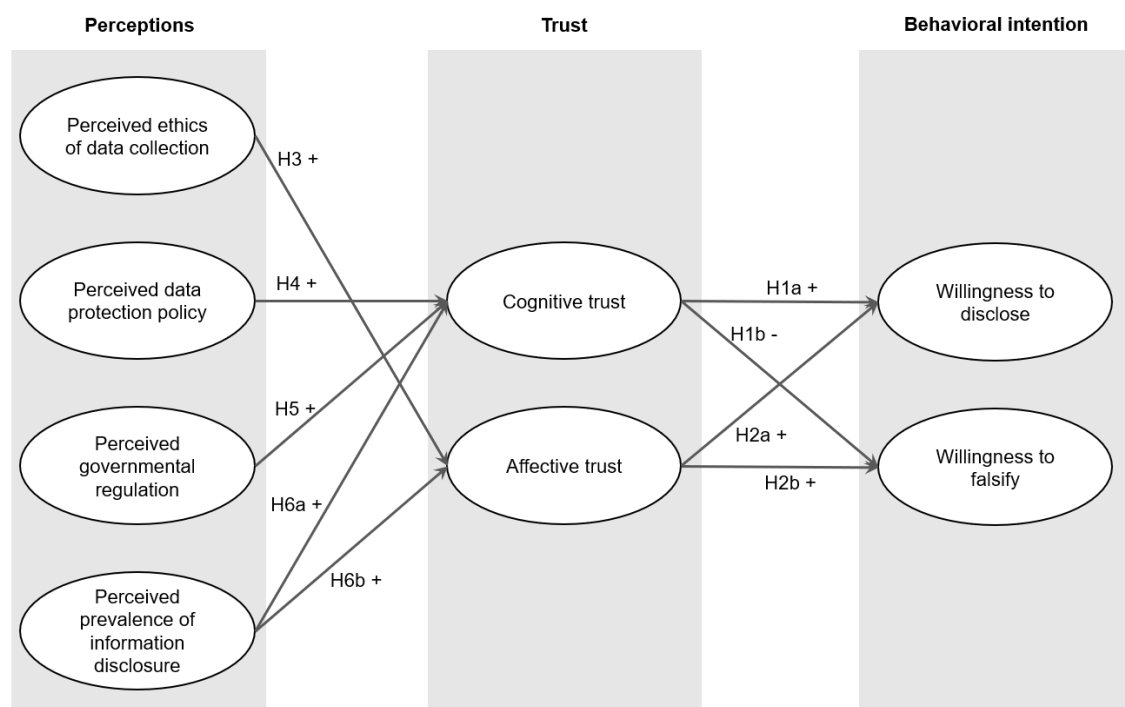
*Perceived prevalence of information disclosure.* Participants tended to observe how other people respond to contact tracing requests and used their immediate social circle as a reference to guide their own behavior. They paid attention to prevalence (e.g., the majority of the population, popular content in media channels, and employers' emphasis on contact tracing) and social norms (e.g., popular use of QR codes, and family, friends, and colleagues respecting contact tracing in hospitality venues). For example, one participant (ID 08) claimed that she would participate in contact tracing at restaurants without too much concern if she saw this behavior becoming a norm followed by many other people. She said: "When you see people write in their names, you just follow that [behavior] without even thinking about it."

Social and peer influence play an important role in how people perceive and respond to privacy (Acquisti et al. 2015; Acquisti et al. 2012). Customers' perceived prevalence of information disclosure captures the extent to which others are engaging in information disclosure (Dootson et al. 2017). According to the "bandwagon effect," customers tend to follow what the majority believes and does because other people's actions serve as social proof (Van Herpen et al. 2009). This social proof is premised on the belief that if other people believe in something or follow something, it must be good. Applying this logic to contact tracing, if customers observe many other people disclosing information to a business, they infer that these people must trust the business (or that this business is trustworthy). It may not be straightforward or easy for customers to observe on which form the trust is developed, thus they can attribute such trust to either cognitive trust or affective trust. Therefore:

**H6:** Customers' perceived prevalence of information disclosure is positively related to their cognitive trust (**H6a**) and affective trust (**H6b**).

## 2.4 The conceptual model

Based on our hypothesis development, we propose a perception–trust–behavior intention framework to capture the psychological process that drives the cooperative behaviors of customers in the context of contact tracing. The antecedents of trust include four perceptual factors, as identified in the qualitative pilot study. The two forms of trust, cognitive and affective, in turn, influence customers’ willingness to disclose and willingness to falsify. Figure 1 summarizes the conceptual model and the predicted relationships.



**Figure 1.** The conceptual model

## 3. Method

Our study used a survey to test the conceptual model and our hypotheses. We provided a brief to give participants the background information on contact tracing (see Appendix E). To ease participants into a concrete context of consumption, the survey instructed them to read that a restaurant chain “X” was adopting contact tracing and asked them questions related to this restaurant’s contact tracing. We purposefully kept the brief

short and generic in order to elicit participants' reactions based on their experiences and perceptions of contact tracing in the context of restaurants/eateries. We pre-tested the brief with 15 participants and sought feedback from them to ensure that it was easy to understand and had no ambiguity.

### ***3.1 Sample and procedure***

We collected data from US participants in June, 2020, when contact tracing in restaurants had already begun in other Anglosphere countries, such as the UK, Australia, and New Zealand, and was on the horizon for restaurants in the US (American Council on Science and Health 2020; Government of NSW 2020; Restaurant Hub 2020; The UK Government 2020). The US was an ideal location to test our conceptual model because (1) it had the highest number of confirmed infection cases in the world by June 2020, and (2) US customers might have been aware of contact tracing but not yet used to the practice, which suggests variations in their cooperative behavior.

Participants residing in the US were recruited from Amazon Mechanical Turk. Upon giving their consent, they were instructed to read the brief and then complete a questionnaire. In total, 420 participants took part in the survey. After removing cases with incomplete responses ( $n = 12$ ) and those that failed the attention check ( $n = 43$ ) (Huang et al. 2015), we obtained 365 valid responses (29.9% female, 82.5% aged from 18 to 45 years, 84.9% with university degrees, 44.1% with an annual income from \$45,000 to \$90,000). The demographic details are presented in Table 3.

**Table 3.** Demographic profile of the participants.

Characteristics		n	%
Age	18-30	142	38.9
	31-45	159	43.6
	46 and above	64	17.5
Gender	Male	255	69.9
	Female	109	29.9
	Other	1	0.3
Annual income (pretax)	Less than \$45,000	174	47.7
	\$45,000 to \$90,000	161	44.1
	More than \$90,000	30	8.2
Education	High school or lower	32	8.8
	Vocational school	23	6.3
	Four-year college	245	67.1
	Graduate school	65	17.8
Political affiliation	Democrat	169	46.3
	Republican	114	31.2
	Independent	72	19.7
	Other	10	2.7
Ethnicity	European American	177	48.5
	African American	38	10.4
	Latino American	50	13.7
	Asian American	56	15.3
	Other	44	12.1

### 3.2 Measurements

All measurements were adapted from existing scales into our research context. The measurement items were subjected to a series of pre-tests ( $n = 15$ ) to check for their relevance, readability, and comprehensiveness. In addition, to ensure the substantive validity of the measurements, a committee of five marketing researchers was asked to assess the items and assign them to the corresponding constructs according to how well they reflected their full contents. In response, minor revisions in terms of wordings were made to improve the quality of the questionnaire.

Specifically, we measured *perceived ethics of data collection* (ETH) based on items from Edinger-Schons et al. (2018). *Perceived data protection policy* (POL) was measured with items devised by Lwin et al. (2007). We adapted items from the literature (Lwin et al. 2007; Poortinga and Pidgeon 2006) to measure *perceived governmental regulation* (REG), and items from Dootson et al. (2017) to measure *perceived prevalence of information disclosure* (PRE). Regarding trust, we modified items from interpersonal trust research

(Johnson and Grayson 2005; McAllister 1995) to measure *cognitive trust* (COT), and *affective trust* (AFT). Finally, *willingness to disclose* (DCL) and *willingness to falsify* (FAL) were measured by items adapted from Morosan (2018) and Martin et al. (2017), respectively. All items were measured on seven-point Likert scales (see Appendix F for the full item list).

### **3.3 Analysis and results**

We carried out data analysis following a two-stage procedure of structural equation modeling (Anderson and Gerbing 1988) with SmartPLS 3 (Ringle et al. 2015). In the first stage, the psychometric properties (reliability and validity) of the measurement model were examined. In the second stage, the structural model was estimated, and the hypotheses were tested using a partial least-squares structural equation model (PLS-SEM). Parameters in the model were estimated by a bootstrapping method with 5,000 resamplings. The PLS-SEM approach was used because it is suitable for research that focuses on prediction and theory development (Reinartz et al. 2009), and it is appropriate for evaluating models with complex relationships (Chin 1998).

#### **3.3.1 Measurement model validation**

The reliability of the measurement of each construct was assessed by composite reliability (CR) and Cronbach's alpha ( $\alpha$ ) scores. As is shown in Table 4, all construct measures achieved high internal consistency, with the values of CR and  $\alpha$  exceeding the recommended threshold of 0.7 (Hair et al. 2016). Moreover, the average variance extracted (AVE) of each construct was greater than 0.5, and all factor loadings were higher than 0.7 and statistically significant ( $p < 0.001$ ). This established the convergent validity of the measurement of the constructs (Hair et al. 2016).



**Table 4.** Examination of reliability and convergent validity.

Construct/Item	Cronbach's Alpha	Composite reliability	Average variance extracted	Loadings	Maximum cross-loading on other constructs
Perceived ethics (ETH)	0.891	0.917	0.647		
ETH1				0.806 ***	0.572
ETH2				0.735 ***	0.478
ETH3				0.807 ***	0.568
ETH4				0.827 ***	0.627
ETH5				0.811 ***	0.623
ETH6				0.836 ***	0.611
Perceived data protection policy (POL)	0.892	0.925	0.755		
POL1				0.869 ***	0.611
POL2				0.864 ***	0.560
POL3				0.860 ***	0.594
POL4				0.881 ***	0.677
Perceived governmental regulation (REG)	0.922	0.951	0.866		
REG1				0.937 ***	0.654
REG2				0.918 ***	0.642
REG3				0.936 ***	0.642
Perceived prevalence of information disclosure (PRE)	0.865	0.917	0.788		
PRE1				0.910 ***	0.605
PRE2				0.866 ***	0.538
PRE3				0.886 ***	0.620
Cognitive trust (COT)	0.859	0.899	0.640		
COT1				0.832 ***	0.658
COT2				0.811 ***	0.602
COT3				0.816 ***	0.614
COT4				0.717 ***	0.520
COT5				0.819 ***	0.686
Affective trust (AFT)	0.861	0.900	0.642		
AFT1				0.845 ***	0.698
AFT2				0.821 ***	0.647
AFT3				0.816 ***	0.672
AFT4				0.784 ***	0.600
AFT5				0.735 ***	0.559
Willingness to disclose (DCL)	0.927	0.954	0.872		
DCL1				0.939 ***	0.611
DCL2				0.921 ***	0.630
DCL3				0.941 ***	0.614
Willingness to falsify (FAL)	0.910	0.943	0.846		
FAL1				0.916 ***	0.339
FAL2				0.935 ***	0.404
FAL3				0.909 ***	0.335

Note: \*\*\*  $p < .001$

ETH = Perceived ethics of data collection. POL = Perceived data protection policy. REG = Perceived governmental regulation. PRE = Perceived prevalence of information disclosure. COT = Cognitive trust. AFT = Affective trust. DCL = Willingness to disclose. FAL = Willingness to falsify.

As is shown in Table 5, in terms of discriminant validity, the measurement model passed the Fornell and Larcker criterion (i.e., the square root of the AVE of each construct was higher than its correlations with other constructs), and the heterotrait–monotrait ratio of

correlations (HTMT) criterion (i.e., HTMT values were lower than 0.9 and statistically different from one) (Hair et al., 2017). The loading of each indicator on its corresponding construct was also greater than its cross-loadings on the other constructs (see Table 4). These tests confirmed the discriminant validity of the measurement of the constructs in the model.

**Table 5.** Examination of discriminant validity

	1	2	3	4	5	6	7	8
1. Perceived ethics of data collection	<b>0.804</b>	0.782	0.614	0.461	0.806	0.756	0.643	0.106
2. Perceived data protection policy	0.704	<b>0.869</b>	0.755	0.547	0.726	0.700	0.718	0.080
3. Perceived governmental regulation	0.562	0.688	<b>0.930</b>	0.742	0.638	0.711	0.710	0.347
4. Perceived prevalence of information disclosure	0.408	0.483	0.664	<b>0.887</b>	0.542	0.590	0.689	0.440
5. Cognitive trust	0.712	0.641	0.573	0.474	<b>0.800</b>	0.896	0.720	0.082
6. Affective trust	0.670	0.626	0.651	0.521	0.774	<b>0.801</b>	0.697	0.171
7. Willingness to disclose	0.587	0.655	0.658	0.618	0.646	0.634	<b>0.934</b>	0.133
8. Willingness to falsify	-0.033	0.073	0.322	0.393	0.066	0.169	0.125	<b>0.920</b>

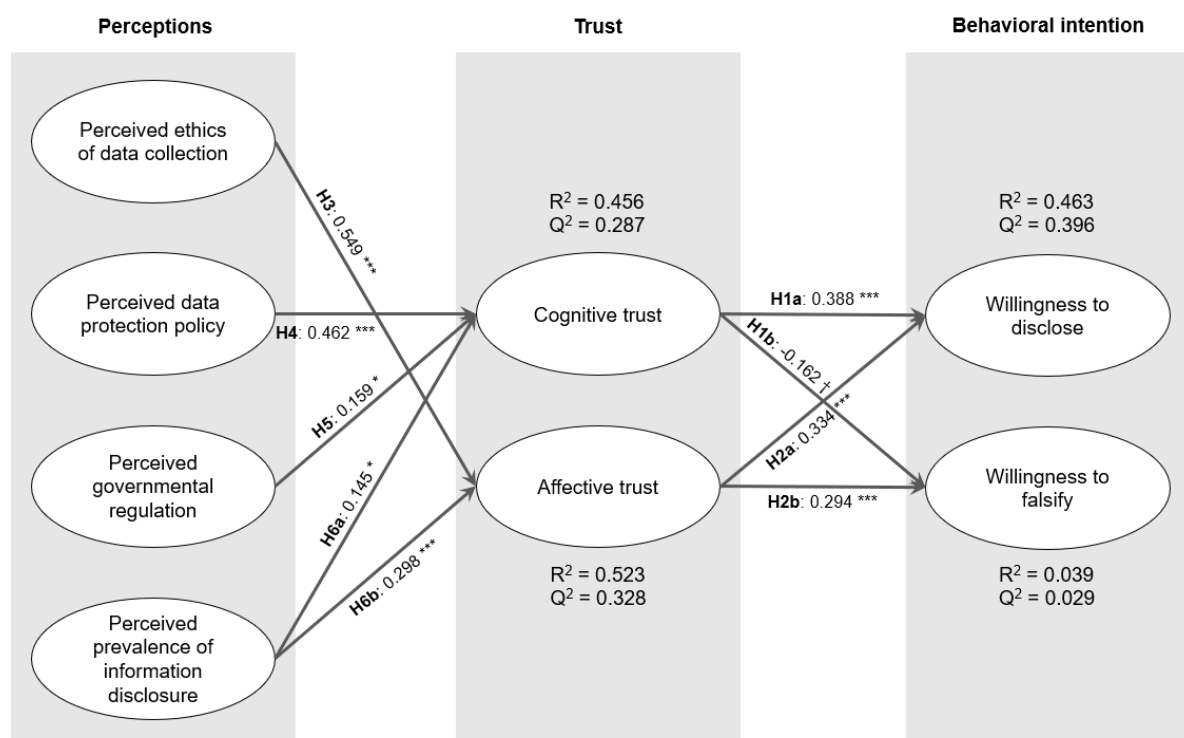
Note: Values on the diagonal are square root of AVEs. Values below the diagonal are correlations. Values above the diagonal are HTMT ratios.

Because our data were collected in a cross-sectional survey with single informants, we used both ex- and post-ante remedies to minimize the threat of the common method bias (CMB) (Podsakoff et al. (2003). By way of ex-ante remedies, we tried to control for the CMB by obtaining feedback through a series of pre-tests while ensuring respondent anonymity, reducing the apprehension of evaluation, including attention checks, and organizing the order of questions to prevent item-priming effects (Podsakoff et al. 2003). Of the ex-post remedies, first, Harman's single-factor test (Podsakoff and Organ 1986) showed that the most variance explained by one factor met the criterion of less than 50% (44.5%). Second, a full collinearity test (Kock and Lynn 2012) resulted in VIF values less than 3.33 (maximum VIF = 2.353), indicating no pathological collinearity (Kock 2015). Third, the highest correlation between the constructs was lower than 0.9 ( $r = 0.77$  between COT and AFT), indicating that there was no extremely high correlation (Pavlou et al. 2007). Fourth, the results of the common method

factor approach, as suggested by Liang et al. (2007), showed that the variance of each item was mostly explained by its theoretical construct (average variance = 74.4%), rather than by the common method factor (average variance = 1.3%). Moreover, while all item loadings on the corresponding theoretical constructs were statistically significant ( $p < 0.001$ ), several loadings on the method factor were insignificant ( $p > 0.05$ ) (see Appendix G). Taken together, we conclude that CMB was not a serious issue in this study.

### 3.3.2 Structural model analysis

Figure 2 shows the results of model estimation from the PLS-SEM in terms of path coefficients ( $\beta$ ) and significance ( $p$  value) as well as the model's explained variance ( $R^2$ ) and predictive relevance ( $Q^2$ ). More details of the PLS-SEM results are provided in Appendix H.



**Figure 2.** The results of the structural model.

Note:  $*** p < 0.001$ ,  $** p < 0.01$ ,  $* p < 0.05$ ,  $^\dagger p < 0.1$ .

We found that *cognitive trust* had a positive and significant effect on *willingness to disclose* ( $\beta = 0.388$ ,  $t = 5.962$ ,  $p < 0.001$ ,  $f^2 = 0.112$ ), and a negative and significant effect on

*willingness to falsify* ( $\beta = -0.162$ ,  $t = 1.865$ ,  $p = 0.062$ ,  $f^2 = 0.011$ ), thus supporting H1a and H1b. In comparison, *affective trust* had a positive and significant effect on both *willingness to disclose* ( $\beta = 0.334$ ,  $t = 5.307$ ,  $p < 0.001$ ,  $f^2 = 0.083$ ) and *willingness to falsify* ( $\beta = 0.294$ ,  $t = 3.500$ ,  $p < 0.001$ ,  $f^2 = 0.036$ ), supporting H2a and H2b.

Perceived *ethics of data collection* had a significant effect on *affective trust* ( $\beta = 0.549$ ,  $t = 10.914$ ,  $p < 0.001$ ,  $f^2 = 0.526$ ), thus supporting H3. *Perceived data protection policy* exerted a significant effect on *cognitive trust* ( $\beta = 0.462$ ,  $t = 7.026$ ,  $p < 0.001$ ,  $f^2 = 0.206$ ), supporting H4. The path from *perceived governmental regulation* to *cognitive trust* was significant ( $\beta = 0.159$ ,  $t = 2.270$ ,  $p = 0.023$ ,  $f^2 = 0.018$ ), supporting H5. In addition, perception of the *prevalence of information disclosure* had a significant effect on *cognitive trust* ( $\beta = 0.145$ ,  $t = 2.500$ ,  $p = 0.012$ ,  $f^2 = 0.022$ ) and *affective trust* ( $\beta = 0.298$ ,  $t = 6.180$ ,  $p < 0.001$ ,  $f^2 = 0.155$ ), thus supporting both H6a and H6b. Together, the constructs of perception explained 45.6% and 52.3% of the variance in *cognitive trust* and *affective trust*, respectively.

Overall, the structural model did not suffer from collinearity problems, as indicated by the low VIF values ( $< 3$ ) of all sets of exogenous constructs (see Appendix G). It also had a moderate explanatory power or predictive accuracy (Hair et al. 2016), as the  $R^2$  values were within the acceptable range ( $>10\%$ , with the exception for the  $R^2$  of *willingness to falsify*) (Falk and Miller 1992). All  $Q^2$  statistics obtained by a blindfolding procedure were greater than zero, indicating the predictive relevance of the endogenous constructs in the model (Hair et al. 2016).

We further analyzed the mediating roles of the two forms of trust on the relationships between perceptions and behavioral outcomes. Table 6 shows that *cognitive trust* significantly mediated the effect of perceived *data protection policy*, *governmental regulation*, and *prevalence of information disclosure* on customers' *willingness to disclose* ( $p < 0.05$ ), but did not significantly mediate the relationships between any perception and

willingness to falsify ( $p > 0.05$ ). By comparison, *affective trust* significantly mediated the influence of perceived *ethics* and the *prevalence of information disclosure* on *willingness to disclose* ( $p < 0.001$ ), and was a significant mediator of the effects of perceived *ethics* and the *prevalence of information disclosure* on *willingness to falsify* ( $p < 0.01$ ). These results provide further evidence of the distinct roles of cognitive trust and affective trust in our conceptual model.

**Table 6.** Estimates of indirect effects in the model.

	Coefficient	t	p value	Lower limit of 95% confidence interval	Upper limit of 95% confidence interval
<b>Indirect effects on DCL</b>					
ETH → AFT → DCL	0.183	4.918	0.000	0.115	0.261
POL → COT → DCL	0.179	4.413	0.000	0.105	0.262
REG → COT → DCL	0.061	2.046	0.041	0.007	0.124
PRE → COT → DCL	0.056	2.252	0.024	0.012	0.110
PRE → AFT → DCL	0.099	3.724	0.000	0.052	0.156
<b>Indirect effects on FAL</b>					
ETH → AFT → FAL	0.161	3.421	0.001	0.071	0.257
POL → COT → FAL	-0.075	1.692	0.091	-0.168	0.006
REG → COT → FAL	-0.026	1.486	0.137	-0.064	0.004
PRE → COT → FAL	-0.024	1.462	0.144	-0.060	0.002
PRE → AFT → FAL	0.088	2.848	0.004	0.034	0.154

Note: ETH = Perceived ethics of data collection. POL = Perceived data protection policy. REG = Perceived governmental regulation. PRE = Perceived prevalence of information disclosure. COT = Cognitive trust. AFT = Affective trust. DCL = Willingness to disclose. FAL = Willingness to falsify.

#### 4. Conclusions

Contact tracing is a safety practice for hospitality businesses to remain open in a safe environment during the COVID-19 pandemic. This research investigates customers' cooperative behavior toward contact tracing based on cognitive trust and affective trust, and it examines perceptual antecedents of the two forms of trust. The findings show that *cognitive trust* facilitates willingness to disclose and reduces willingness to falsify, leading to actual cooperative behavior in contact tracing. By contrast, *affective trust* increases both the willingness toward disclosure and falsification, suggesting that it may encourage symbolic cooperative behavior. Such symbolic cooperation complicates contact tracing by creating

barriers to quickly and precisely reach people who have been in proximal contact with infected individuals, and thus is detrimental to public safety.

Moreover, the findings demonstrate the relevant perceptual factors in contact tracing that influence cognitive trust and affective trust. Specifically, the antecedents of *cognitive trust* comprise perceived data protection policy, perceived governmental regulation, and perceived prevalence of information disclosure, while the antecedents of *affective trust* comprise perceived ethics of data collection and perceived prevalence of information disclosure. Theoretical and practical implications can be derived from our findings.

#### ***4.1 Theoretical implications***

The primary contribution of this research is the demonstration of how different forms of trust influence cooperative behavior toward contact tracing in distinct ways. Although the literature on customer data privacy demonstrates has shown that trust is a key mechanism that promotes cooperative behavior, it overlooks the effects of different forms of trust (e.g., Aguirre et al. 2015; Jagadish 2020; Martin and Murphy 2017; Waldman 2018). Our findings show that cognitive and affective trust differently influence two types of cooperative behaviors: the willingness toward disclosure and falsification. Cognitive trust encourages customers to disclose truthful information through positive evaluations of the competence, professionalism, and reliability of a business, which contribute to the confidence that private customer information will be handled appropriately. By comparison, affective trust can be a double-edged sword in facilitating customer cooperation in contact tracing. Customers tend to disclose information to a business with high affective trust because they have the motive to maintain a positive relationship with it. However, such a motive can pressure customers and trigger their intentions to provide false information, especially when they are unsure about how their data will be collected, managed, and used. Thus, our work here broadens and

deepens the understanding of the role of trust in driving cooperative behavior related to data privacy.

Moreover, we add to the research on customer data privacy by identifying the antecedents of the two forms of trust and examining their effects. While past studies have suggested various antecedents of trust and consequent behaviors (Acquisti et al. 2015; Bansal et al. 2016; Su and Mattila 2020; Yang et al. 2019), antecedents that specifically contribute to cognitive or affective trust are unclear. Our findings show that *perceived protection policy* reflects the competence, capability, and professionalism of the business in terms of ensuring the security of customer data, which is related to the attributes of *cognitive* trust. Similarly, *perceived governmental regulation* creates positive beliefs that the business has sufficient knowledge and skills to act competently and professionally in contact tracing, thus contributing to *cognitive* trust. Moreover, *perceived business ethics* conveys such business qualities as altruism, benevolence, and sincerity that create positive feelings and emotional connections, thus strengthening *affective* trust. Customers apply the *prevalence of information disclosure* as social proof to develop both *cognitive* and *affective* trust. The investigation of these perceptions deepens our understanding of the distinct characteristics of the two forms of trust, and it helps us establish a perception–trust–behavioral intention conceptual model to understand the psychological processes of customers in the context of contact tracing.

#### ***4.2 Practical implications***

Our research has direct practical implications for hospitality businesses and governments in terms of effectively encouraging customers to cooperate in contact tracing. Hospitality businesses should prioritize the development of cognitive trust over that of affective trust to improve the effectiveness of contact tracing. Despite the clear benefit of

affective trust in establishing and maintaining sustainable customer relationships, hospitality businesses should be cautious about the negative and costly effects of affective trust on customer cooperation that may even backfire. Therefore, for the sake of public health and safety in the COVID-19 pandemic, hospitality businesses should gain customer confidence in their capability of handling contact tracing competently and professionally before showing care and concern to develop relationships.

Hospitality businesses can gain cognitive trust by strengthening positive perceptions of data protection policy, the prevalence of information disclosure, and governmental regulation. First, businesses should offer fact-based information about their data protection policy to strengthen customers' cognitive trust in them. For example, they can provide the relevant information on leaflets, posters, social media, and webpages to inform customers. Second, hospitality industry associations or influential platforms can collaborate with hospitality businesses to make contact tracing prevalent at a large scale through technological support and promotional activities. For example, the Restaurant Association of New Zealand has taken the lead in providing support for restaurants and cafes to conduct standardized contact tracing (Restaurant Association of New Zealand 2020).

Finally, governments play an important role in helping hospitality businesses gain cognitive trust and facilitate contact tracing. Governments should enact sufficient regulatory mechanisms, such as administrative regulations, privacy standards, and supervision systems. Governments also need to strengthen the degree of regulatory enforcement on data practices in the hospitality industry. This regulatory enforcement is seen as an endorsement of the hospitality industry. For example, compared with Australia, where many electronic check-ins are outsourced to private companies with opaque privacy rules, the New Zealand government participates in designing and operating mobile applications for contact tracing for hospitality check-ins to balance the protection of personal privacy with protecting public health (ABC



News 2020). Such regulatory efforts send clear signals to customers that their privacy is respected. In this regard, hospitality businesses should lobby for, rather than resist, strong government regulation and intervention in contact tracing.

#### ***4.3 Limitations and future research directions***

This research has limitations that offer directions for future studies. First, we measured customers' behavioral intentions rather than their actual behaviors. Future research can collaborate with hospitality businesses to conduct field studies to better measure cooperative behavior. Second, our research was conducted in the Western context, where personal privacy and self-independence are highly valued. A fruitful area for future research will be to replicate our conceptual model in Eastern countries, such as South Korea and China, that have a strong culture of interdependence. How hospitality businesses and governments can facilitate cooperative behavior might need to be evaluated through a cultural lens. Finally, future research can extend the generalizability of our findings to other privacy-related contexts, such as customer registration, that require customers to disclose their information.

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## Appendix A. A short survey

Table a.1. Demographic profile of the participants

Characteristics	n	%	
Age	18-30	72	30.0
	31-45	110	45.8
	46 and above	58	24.2
Gender	Male	154	64.2
	Female	86	35.8

Table a.2. Summary of analyses results

7-liker scale questions (1 = never, 7 = every time)	N	Mean	Std. Deviation	Std. Error Mean
Q1: During the pandemic, how often have you provided your contact information for contact tracing purpose when being asked to do so?	238	4.15	2.162	.140
Q2: During the pandemic, how often have you provided 100% correct and complete contact information for contact tracing purpose when being asked to do so?	238	4.58	2.260	.146

Table a.3. Summary of reasons for not disclosing and falsifying

Answers	Percentage
Concern for privacy	67.5%
Contact tracing is not necessary	27.9%
COVID-19 is not severe	20.4%
I am at low risk for COVID-19	19.2%
contact tracing is not helpful	18.8%
Too lazy to do so	13.3%
Other	10.0%

**Appendix B. Participants profile (pilot study)**

ID	Residence	Age	Gender	Profession
01	NZ	52	Female	Medical doctor
02	NZ	35	Female	Academic and former HR manager
03	NZ	20	Female	Colleague student
04	NZ	28	Male	Artist
05	NZ	51	Male	Health board staff / doctor
06	NZ	49	Female	Social worker
07	NZ	27	Female	University student
08	NZ	30	Female	Marketing administrator
09	NZ	25	Female	University student
10	NZ	26	Female	University support staff
11	Australia	62	Female	IT specialist
12	Australia	36	Male	Government employee
13	Australia	31	Female	Assistant accountant
14	Australia	28	Male	Academic
15	Australia	22	Male	Taxi driver
16	Australia	20	Female	Supermarket employee
17	Australia	65	Male	Retired resident
18	NZ	38	Male	COVID-19 response manager
19	Canada	34	Male	IT consultant
20	UK	34	Male	Academic
21	UK	34	Male	Retail manager
22	UK	38	Male	Community manager
23	USA	33	Male	Former HR administrator
24	USA	30	Male	Digital promotion broker

Note: NZ = New Zealand, UK = United Kingdom, USA = United States of America.

**Appendix C. Brief interview questions (pilot study)**

1. Have you visited restaurants/cafes/bars during the COVID-19 pandemic? If yes, have you been requested to provide your personal information for contact tracing? Please share your experience.
2. Please tell us what personal information was requested from you and how your information was collected.
3. Did the restaurants/cafes/bars explain why they had collected your information?
4. Do you think you have a say in how your information was collected, stored, and used?
5. Did you provide incomplete information or 100% accurate information? Did you have any concerns?
6. Please tell us what personal information you were not willing to share and explain why.
7. What can restaurants/cafes/bars do to encourage you to share your information for contact tracing?
8. What are the hospitality industry and governments doing to protect people's privacy? What can they do to encourage customers to share their information for contact tracing?

## **Appendix D. Data analysis of qualitative interviews (pilot study)**

Thematic analysis was applied to analyze our qualitative data (Braun and Clarke 2006). We followed the process of making sense of and becoming familiar with the data, open coding, grouping codes with related meanings into themes, and an abstraction process to formulate the descriptions of the themes. We followed the guidelines from Sandberg (2005) to improve the validity (communicative) and reliability (interpretive awareness) of the findings. Communicative validity is an ongoing dialog throughout the research process where alternative knowledge claims are debated (Sandberg 2005). We achieved communicative validity by ensuring the consistency of the findings through analyst triangulation by two independent analysts who interpreted the data simultaneously (Sandberg 2005). This process generated initial categorical coding that was discussed rigorously by the authors until a consensus on the first-order codes had been achieved. The same process was repeated to generate the second- and third-order themes (see Table 1). Reliability as interpretive awareness acknowledges that researchers cannot escape from subjective interpretations and so must address this issue throughout the research process (Sandberg 2005). During the interviews, reliability was achieved by asking open-ended questions and then following-up with probes. We further strengthened reliability through theoretical saturation (Corbin and Strauss 1990). After the seventeenth interview, we achieved interpretive awareness as no new themes emerged from the data.



## Appendix E. Survey brief (main study)

The COVID-19 pandemic is one of the greatest challenges we face in decades. Government officials and health experts have been working together to contain the spread of the virus and help industries to recover from the crisis.

Many health experts suggest a **contact tracing approach**: tapping into **personal information (e.g., name, phone number, location, travel history, health status)** to track the spread of infection and warn people who have come into close proximity to a COVID-19 infected individual. Contact tracing has two purposes: 1) to figure out who a sick person caught an illness from, and 2) to find out who they've been in contact with while infectious. This **contact tracing approach** has been adopted by several countries, such as South Korea, Singapore, Australia, New Zealand, and some states in the U.S.

Restaurants, cafes, and bars have been hit hard by the pandemic. Their owners hope to reopen their businesses and allow customers to dine, and some of them have adopted **the contact tracing approach for safety management**. These restaurants require customers to provide contact details upon entry. For example, restaurants may require customers to provide information including names, contact information and visit times by filling a form, scanning a QR code or downloading a mobile App.

**A major restaurant chain X** in the U.S. (in order to avoid legal disputes, we use "X" to replace the real restaurant name) **has adopted the contact tracing approach for safety management**. This restaurant chain collects personal information including names and phone numbers from their customers.

Please answer the following questions based on your opinion about this restaurant chain X.

## Appendix F. Scales and items (main study)

Construct	Item	Reference
Perceived ethics of data collection (ETH): a perception of the extent to which the business takes responsibility to look after public safety and wellbeing		Edinger-Schons et al. (2018)
	ETH1 The purpose for this restaurant chain to gather personal information during the COVID-19 pandemic is to fulfill responsibility for the society.	
	ETH2 The purpose for this restaurant chain to gather personal information during the COVID -19 pandemic is to support customers to live a healthy life.	
	ETH3 The purpose for this restaurant chain to gather personal information during the COVID -19 pandemic is to express their genuine feeling of responsibility.	
	ETH4 Given the act of collecting personal information during the COVID -19 pandemic, I believe this restaurant chain is genuinely concerned about being socially responsible.	
	ETH5 Given the act of collecting personal information during the COVID -19 pandemic, I believe this restaurant chain is committed to public welfare out of unselfish motives.	
	ETH6 Given the act of collecting personal information during the COVID -19 pandemic, I believe this restaurant chain's commitment is based on the wish to do good.	
Perceived data protection policy (POL): a positive perception of the way the business exercises ownership, power, and protection over the use of customer data		Lwin et al. (2007)
	POL1 This restaurant chain prevents customer information from being used for purposes other than those initially stated during the COVID -19 pandemic.	
	POL2 This restaurant chain prevents customer information from being shared with unauthorized external parties.	
	POL3 This restaurant chain's databases containing customer information are protected from unauthorized access regardless of costs.	
	POL4 This restaurant chain keeps customer information secure.	
Perceived governmental regulation (REG): a perception regarding how well data practices and potential privacy risks are regulated and monitored by government authorities		Lwin et al. (2007); Poortinga and Pidgeon (2006)
	REG1 The existing laws in the U.S. are sufficient to protect restaurant customers' privacy when contact tracing is adopted during the COVID-19 pandemic.	
	REG2 There is stringent legal enforcement in the U.S to protect personal information of restaurant customers when contact tracing is adopted during the COVID-19 pandemic.	
	REG3 The U.S. government is doing enough to ensure that restaurant customers are protected against privacy violations when contact tracing is adopted during the COVID-19 pandemic.	
Perceived prevalence of information disclosure (PRE): a perception of the extent to which others are engaging in information disclosure		Dootson et al. (2017)
	PRE1 During the COVID-19 pandemic, what proportion of restaurant customers in the U.S. do you think participate in sharing their personal information with restaurants?	
	PRE2 During the COVID-19 pandemic, what proportion of restaurant customers in the U.S. do you think accept the advice to share their personal information with restaurants?	
	PRE3 During the COVID-19 pandemic, what proportion of restaurant customers in the U.S. think sharing their personal information with restaurants is necessary?	
Cognitive trust (COT): a rational evaluation of whether the other exchange party is trustworthy or not based on its ability, professionalism, and reliability		Johnson and Grayson (2005); McAllister (1995)
	COT1 I believe this restaurant chain does its business with professionalism and dedication during the COVID-19 pandemic.	
	COT2 Given the approach of this restaurant chain, I believe in its competence during the COVID-19 pandemic.	
	COT3 I can rely on this restaurant chain to serve me carefully during the COVID-19 pandemic.	
	COT4 I am confident about this restaurant chain's ability to professionally operate its business during the COVID-19 pandemic.	
	COT5 I can confidently depend on this restaurant chain if I visit it during the COVID-19 pandemic.	
Affective trust (AFT): emotional bonds or connections with the exchange party that are grounded in its care and concern		Johnson and Grayson (2005);
	AFT1 I would feel a sense of personal connection with this restaurant chain if I visit it during the COVID-19 pandemic.	

AFT2	I feel that this restaurant chain will respond to me caringly as a customer during the COVID-19 pandemic.	McAllister (1995)
AFT3	I feel that this restaurant chain will show a warm and caring attitude toward me during the COVID-19 pandemic.	
AFT4	I feel that this restaurant chain will be concerned about me during the COVID-19 pandemic.	
AFT5	I feel that this restaurant chain will care about maintaining a good relationship with me during the COVID-19 pandemic.	
Willingness to disclose (DCL): an intent to provide information to the business		
DCL1	How likely are you to disclose personal information to this restaurant chain during the COVID-19 pandemic?	Morosan (2018)
DCL2	How willing are you to disclose personal information to this restaurant chain during the COVID-19 pandemic?	
DCL3	How probable are you to disclose personal information to this restaurant chain during the COVID-19 pandemic?	
Willingness to falsify (FAL): an intent to provide false or incomplete information to the business		Martin et al. (2017)
FAL1	If this restaurant chain asks for my personal information when I visit it, I will give them false information.	
FAL2	If this restaurant chain asks for my personal information when I visit it, I will purposely try to trick them when providing my information.	
FAL3	If this restaurant chain asks for my personal information when I visit it, I think it is fine to give misleading answers on personal questions.	

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**Appendix G. Common method bias analysis using the common method factor approach (main study)**

Item	Loading on theoretical construct ( $R_1$ )		$R_1^2$	Loading on common method construct ( $R_2$ )		$R_2^2$
ETH1	0.950	***	0.902	-0.162	**	0.026
ETH2	0.850	***	0.722	-0.131	*	0.017
ETH3	0.831	***	0.691	-0.019	ns	0.000
ETH4	0.772	***	0.595	0.059	ns	0.004
ETH5	0.660	***	0.435	0.173	**	0.030
ETH6	0.776	***	0.602	0.065	ns	0.004
POL1	0.888	***	0.789	-0.021	ns	0.000
POL2	0.977	***	0.955	-0.126	*	0.016
POL3	0.900	***	0.810	-0.047	ns	0.002
POL4	0.713	***	0.509	0.190	**	0.036
REG1	0.915	***	0.837	0.024	ns	0.001
REG2	0.882	***	0.778	0.041	ns	0.002
REG3	0.994	***	0.988	-0.065	*	0.004
PRE1	0.925	***	0.856	-0.019	ns	0.000
PRE2	0.915	***	0.838	-0.061	*	0.004
PRE3	0.823	***	0.677	0.079	*	0.006
COT1	0.715	***	0.511	0.128	*	0.016
COT2	0.883	***	0.780	-0.079	ns	0.006
COT3	0.817	***	0.667	-0.003	ns	0.000
COT4	0.872	***	0.761	-0.168	**	0.028
COT5	0.733	***	0.537	0.096	ns	0.009
AFT1	0.549	***	0.301	0.322	***	0.104
AFT2	0.894	***	0.799	-0.081	ns	0.007
AFT3	0.804	***	0.647	0.017	ns	0.000
AFT4	0.791	***	0.626	-0.010	ns	0.000
AFT5	1.009	***	1.018	-0.295	***	0.087
DCL1	0.975	***	0.951	-0.041	ns	0.002
DCL2	0.873	***	0.762	0.056	ns	0.003
DCL3	0.953	***	0.909	-0.014	ns	0.000
FAL1	0.920	***	0.846	-0.028	ns	0.001
FAL2	0.913	***	0.833	0.066	***	0.004
FAL3	0.928	***	0.862	-0.040	*	0.002
<b>Average</b>			<b>0.744</b>			<b>0.013</b>

Note: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , ns  $p \geq 0.05$ .

**Appendix H. Detailed PLS-SEM results (main study)**

<b>Hypothesis</b>	<b>Direct paths</b>	<b><math>\beta</math></b>	<b>t</b>	<b>p value</b>	<b>f<sup>2</sup></b>	<b>VIF</b>	<b>Result</b>
H1a	COT → DCL	0.388	5.962	0.000	0.112	2.495	Supported
H1b	COT → FAL	-0.162	1.865	0.062	0.011	2.495	Weakly supported
H2a	AFT → DCL	0.334	5.307	0.000	0.083	2.495	Supported
H2b	AFT → FAL	0.294	3.500	0.000	0.036	2.495	Supported
H3	ETH → AFT	0.549	10.914	0.000	0.526	1.199	Supported
H4	POL → COT	0.462	7.026	0.000	0.206	1.903	Supported
H5	REG → COT	0.159	2.270	0.023	0.018	2.611	Supported
H6a	PRE → COT	0.145	2.500	0.012	0.022	1.794	Supported
H6b	PRE → AFT	0.298	6.180	0.000	0.155	1.199	Supported
	COT:	R <sup>2</sup> =	0.456		Q <sup>2</sup> =	0.287	
	AFT:	R <sup>2</sup> =	0.523		Q <sup>2</sup> =	0.328	
	DCL:	R <sup>2</sup> =	0.463		Q <sup>2</sup> =	0.396	
	FAL:	R <sup>2</sup> =	0.039		Q <sup>2</sup> =	0.029	

Note: ETH = Perceived ethics of data collection. POL = Perceived data protection policy. REG = Perceived governmental regulation. PRE = Perceived prevalence of information disclosure. COT = Cognitive trust. AFT = Affective trust. DCL = Willingness to disclose. FAL = Willingness to falsify.