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The Unintended Effects of Tamper-Evident Packaging

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EXTENDED ABSTRACT

As third-party food delivery (TPFD) continues to grow, the increasing popularity of providers such as GrubHub, Doordash, and Uber Eats presents new food quality and safety concerns for restaurants (Beagelman, 2021; US Foods, 2019). Specifically, the risk of contamination increases and is beyond the foodservice establishment's control while food is in the possession of the TPFD employee (Durbin, 2019). This is highlighted by the nearly 30 percent of food delivery drivers who report having taken food from an order and the 54 percent who admit to being tempted by the smell of their deliveries. Meanwhile, just 21 percent of customers suspect drivers of taking food (US Foods, 2019), suggesting that consumers are unaware of potential contamination. In an effort to reduce contamination, food operators are starting to implement tamper-evident closures and seals. In two studies, we show, counterintuitively (Jinkarn & Suwannaporn, 2015), that willingness to pay (WTP) for TPFD orders is negatively impacted by the presence of a tamper-evident closure, and that these effects are mediated by satisfaction and moderated by consumers' PRI from TPFD.

Across two studies, we examine the effect of tamper-evident food packaging closures in a TPFD context, revealing a negative effect of a tamper-evident seal on willingness to pay through decreased satisfaction.

In Study 1, a single-factor between-subjects experiment with two conditions (tamper-evident seal: no seal vs. seal) was conducted with 83 participants. Participants engaged in the process of placing an online order for the focal stimulus item, a fruit smoothie. After submitting their order, participants completed a series of filler questions unrelated to food consumption and food service. A smoothie was delivered to each participant by the research team. In the "no seal" condition, participants received the smoothie and a wrapped straw. In the "tamper seal" condition, the wrapped straw was placed over the opening in the center of the lid and held in place with a piece of red tamper-evident tape measuring. The tape extended over the lid on either side of the cup. Participants were asked to sample the smoothie and complete a questionnaire about the smoothie and the delivery. Participants completed a two-item measure of satisfaction.

Finally, they were asked to indicate WTP as an open-ended response measure. To examine the effect of a tamper-evident seal on WTP through satisfaction, PROCESS Model 4 with 5000 bootstrap samples was used (Hayes 2017). A significant negative effect of a tamper-evident seal (0 = no seal, 1 = tamper-evident seal) on satisfaction was found ($a = -.671, p = .023$), which in turn had a significant effect on WTP ($b = .457, p < .001$). In support of mediation, the indirect effect was significant (effect = $-.307$, 95% CI from $-.627$ to $-.061$), while the direct effect was nonsignificant.

In Study 2, we examined how perceptions of risk of illness from TPFD influence our findings, suggesting that the indirect effect of a tamper-evident seal on WTP through satisfaction would be moderated by perception of risk of illness from TPFD risk perceptions such that tamper-evident seals should be preferred by consumers with high (PRI) from TPFD over products without seals, thus increasing WTP. However, when consumers' (PRI) from TPFD is low, we expect tamper-evidence to reduce consumer preferences, thus leading to lower WTP. We proposed that a tamper-evident seal will increase satisfaction, which will increase WTP when perceived risk of illness from TPFD was high (vs. low). Therefore, we anticipated satisfaction will mediate the effects of a tamper-evident seal on WTP, dependent on the perceived risk of illness from TPFD. A single-factor between-subjects experiment with two conditions (tamper-evident seal: no seal vs. seal) was conducted with 243 participants (72.8% female; $M_{age} = 21$ years). Participants followed a scenario-based ordering process for a yogurt parfait. In the no seal condition, the parfait was placed inside a white paper bag with a cutlery set. In the tamper seal condition, prior to bagging the parfait, two red-and-white tamper-evident seals were placed on the outside of the parfait container where the lid attached to the cup. The sealed parfait was then placed into the bag. Participants reviewed and sampled the parfait and completed a brief online questionnaire which included the same two-item measure of satisfaction and open-ended WTP items as in Study 1. Finally, participants indicated their PRI from TPFD. PROCESS Model 14 with 5000 bootstrap samples was used to examine the indirect effect of a tamper-evident seal on WTP to pay through satisfaction at levels of perception of risk of illness from TPFD (Hayes, 2017). The index of the overall model was significant (moderated mediation index = $-.059$, 95% CI from $-.181$ to $.023$). Results indicated a significant effect of a tamper-evident seal (0 = no seal, 1 = tamper-evident seal) on satisfaction ($a = -.414, p = .018$). The interaction of satisfaction and perception of risk of illness from TPFD on WTP was significant ($b_3 = .089, p = .022$). The indirect effect of a tamper-evident seal on WTP through satisfaction was significant when perceived risk of illness from TPFD was high (effect = $-.207$, 95% CI from $-.417$ to $-.035$). For the low perceived risk of illness from TPFD, the indirect effect was nonsignificant (effect = $-.059$, 95% CI from $-.181$ to $.02$), as was the direct effect. Taken together, the results infer that a tamper-evident seal (vs. no seal) decreases satisfaction with the food item, which in turn increases WTP when perceived risk of illness from TPFD is high (vs. low).

Keywords: *Third-party food delivery, contamination, packaging, food and beverage, risk of illness*

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Marissa Orłowski holds a Ph.D. in Hospitality Management from the University of Central Florida, U.S.A. and Master of Business Administration from the University of Colorado at Colorado Springs, U.S.A. Her research interests include food and beverage consumption, food and beverage packaging and presentation, multisensory food experiences, restaurant management, and research methods. Dr. Orłowski's research has been published in journals such as *International Journal of Contemporary Hospitality Management*, *International Journal of Hospitality Management*, *Journal of Service Management*, and *British Food Journal*.

Sarah Lefebvre is an Associate Professor of Marketing at Murray State University, U.S.A. She holds a Ph.D. in Marketing from the University of Central Florida, U.S.A., a Master of Medical Science in Human Nutrition from the University of Sheffield United Kingdom, and a Master of Business Administration from the University of North Carolina at Greensboro. Her research focuses on food and beverage consumption, foodservice interactions, emerging food trends, and taboo topics. Dr. Lefebvre's research has been published in journals such as *Journal of Consumer Psychology*, *Journal of Business Research*, *Journal of Experimental Psychology: Applied*, and *International Journal of Hospitality Management*.

Laura Boman is an assistant professor of marketing at Mercer University, U.S.A. Laura earned her bachelor's degree from Auburn University, her M.B.A from Florida Gulf Coast University, and her Ph.D. from the University of Central Florida. Laura's research focuses primarily on how visual cues influence behaviors and evaluations. Specifically, she has studied how visual cues such as brand logos influence purchase intentions, and how a reduction of visual cues influences food product evaluation. Laura's research has appeared in the *Journal of Global Fashion Marketing*, the *Journal of Retailing and Consumer Services*, and in many national and global conferences.