Shop Employees at Risk of Customer Aggression in Self-Scan Areas?
A Video Observational Pilot Study of Everyday Encounters in Shops

Although self-scan checkouts have become a common feature in many retail stores and used by many, they may also cause annoyance. In this pilot, researchers analyze frustration and aggression in customers-employees interactions in the self-scan area.

Self-scan checkouts provide customers with the convenience of scanning and bagging their own purchases, eliminating the need to wait for a cashier to perform these tasks. Despite the conveniences of the self-scans, various factors can disrupt the efficiency of the process. These disruptions can be product of scanning errors or the necessity of scanning checks, which both require the assistance of employees. Therefore, employees often encounter unhappy customers in these situations. Sometimes the customers even become aggressive. However, how often the employees encounter aggressive customers at the self-scan checkouts and what factors in the situation that increase the risk of aggression by customers remain unclear.

The aims of the current explorative research pilot are two-fold: First, we will establish the feasibility of collecting video data in shops and use it for behavioral analysis. Second, we will develop a measurement instrument for the study of frustration and aggression in customers-employees interactions in the self-scan area and use this to explore the role of employee behaviors for customer aggression.

We conducted the study following an inductive and deductive approach. In a first inductive phase, we engaged in conversations with the store managers to get insights into the standard procedures adopted by the employees during the self-scan checkouts. This allowed us to identify the situations that could potentially lead to conflicts during employees-customers interactions based on the experience of the employees. Moreover, we watched all the video footage collected in order to detect the relevant behaviors that employees and customers perform during the self-scan checkouts process. Second, we identified in our material the presence of the behaviors and the situations at risk of escalation that have been already documented in the existing literature on aggressive interactions and conflict management strategies in public spaces (Troisi, 2002; Ihme, et al., 2018; Ejbye-Ernst, 2022; Pallante et al., 2023). Through these two

steps, we developed a codebook of the behaviors occurring in the self-scan areas and used it to analyze the behavior of customers and customer-employee interactions.

As a result of this analytical process, we put forth two expectations about customer aggression in relation to self-scan checkouts. We expected that customer-employee interactions could escalate into aggression if i) a problem was detected during the self-scan process; and ii) ID was checked when customers wanted to purchase alcohol.

Methods

Sample

We selected two supermarkets because they had high rates of aggressive incidents. In these two supermarkets we collected two samples.

A first sample consisted in a total of 213 hours of video footage collected between February and March 2023, of which we observed five full days of the first supermarket location and two full days of the second supermarket location.

We also obtained a second sample of footage that included three incidents of aggression between employees and customers recorded in 2022 in one of the two supermarkets. These incidents did not take place at the self-scan area but in other parts of the store. However, we decided to include them in order to gain insights into employees-customers aggressive encounters and compare them with conflicts occurring during the self-scan checkouts.

Coding procedure

In the first sample, customers-employees interactions were selected as potential sources of aggression. We coded interactions between employees and customers in the self-checkout area that were engendered by a problem that the customer encountered during the checkout process which required the assistance of an employee. These problems were: randomly selected scanning checks, alcohol checks, and asking for help. We identified a total of 60 incidents between customers and employees in the self-scan area. As a following step, we developed a codebook for coding customer frustration. Based on customers' behavior, we developed a scale of frustration that involved five different levels ranging from no frustration (level 0) to aggression (level 4). We defined each level on the basis of the behavior displayed by the customer both before and during the interaction with the employee (Table 1).

Table 1: Frustration scale

Frustration level	Behavior customer before interaction	Behavior customer during interaction
Level 0: No frustration	The customer looks around or looks at phone while waiting for the employee	The customer waits patiently when employee solves problem
Level 1: Impatience	The customer shows signs of impatience by sighing, dropping their head or walking to another checkout	The customer tries to get the attention of the employee, e.g., attention seeking hand gestures or talking to the employee from a distance
Level 2: Irritation	The customer facial expression shows irritation (e.g. corners of the mouth turned downwards, lip tightener, eyes rolling or brows lifting up or down), the customer ticks his/her fingers on the counter or the customer is shaking his/her head	The customer ignores the employee
Level 3: Frustration	The customer claws his/her hands	Customer walks away in the middle of a conversation with the employee, the customers gestures towards the employee are frustrated (e.g. fast swinging of the arms, hand palms turned upwards)
Level 4: Aggression	(Not detected, we only observed aggressive behavior during interactions)	Aggressive gesturing, blocking the path of the customer, invading personal space and physical restraining

We followed a matching-procedure where a customer who displayed signs of frustration was matched with the previous customer who had an interaction with an employee, but did not show any sign of frustration. To ensure that their frustration level was not influenced by each other, we selected customers that were not present in the self-scan area at the same time. The frustration level of the customers was coded before and after interaction with the employee. By doing so, we were able to investigate if the frustration of the customer changed after they have interacted with an

employee. We identified 16 independent variables which might influence the frustration level which were included in the codebook (Table 2).

Table 2: List of the variables

Variables	Categories/ description
Gender of the customer	1=male figure; 2=female figure; 3=unclear
Age of the customer	An estimate of the age of the customer in years
Ethnicity of the customer	1=white; 2=non-white
T0	Red lamp goes on (inferred from waiting behavior)/ waiting behavior starts
Number of customers in the self-scan area at T0	
Number of employees in the self-scan area at T0	
Availability employee	0=employee is not available (i.e. helping another customer, cleaning, chatting); 1=employee is available (standing in the area, gaze directed to the self-check outs); NA=if number of employees is zero
T1	Time employee is near checkout or customer/or when employee has pressed the notification away from a distance
Gender of the employee	1=male figure; 2=female figure; 3=unclear
Age of the employee	An estimate of the age of the employee in years
Ethnicity of the employee	1=white; 2=non-white
Multitasking employee	0=employee does not engage in another task or interaction during the task of helping the customer; 1=employee engages in another task or interaction during the task of helping the customer
Reason for interaction	1=scanning check; 2=alcohol check; 3=asking for help with green lamp; 4=other
Description reason of interaction	Clarification if the reason for interaction is 4
Type of approach of the employee	1=the helpful employee (attentive, greets the customer, smiles and provides the help that's needed);

	2=the efficient employee (attentive and provides the help that's needed); 3=the defensive employee (inattentive, irritated facial expressions and hand gestures).
Was there another interaction with an employee related to an issue previous to the coded interaction?	1= yes; 2= no

As for the second sample of video footage including the three incidents of aggression between employees and customers, due to the restricted sample size, we did not code these incidents with the coding scheme we previously developed for the self-scan area, but we conducted a qualitative analysis.

Data analysis

After the development of the coding scheme and prior to the coding of the video material, we tested the inter-coder reliability (ICR). Because observational data can be influenced by subjective interpretation, the ICR is used to evaluate the consistency of coders' observations by determining whether they reported the same behaviors. Agreement among multiple observers indicates that the observed behavior is not due to chance. The agreement was estimated by double-coding and comparing approximately 10% of the entire material. Each coder received a list of codes and recorded in an excel sheet the presence/absence of the behavior. The intercoder reliability was estimated through the Cohen's Kappa (κ). We obtained an interobserver reliability score of 0.67 (substantial agreement). After calculating the ICR, we proceeded with the coding of the incidents selected. In order to evaluate the effect of the variables potentially leading to frustration, we run correlation tests and chi-square tests on the data.

Findings

We observed no aggression in the sample of the 60 incidents that occurred in the self-scan area. However, we did observe signs of frustration among the customers (see Figures 1 for the distribution of frustration over the different levels). The frustration was mostly of a low level, with the most common level 1. We observed a decrease in the frustration level of the customer after the interaction with an employee ($\chi^2(1,119)=12.879$, $p<0.001$). For instance, after interacting with an

employee frustration dropped to level 0 or level 1, with only one case of frustration at level 2 (Figure 1). We found no evidence that the type of approach of the employee is connected to the frustration level of the customer ($\chi^2(1,60)=10.368$, $p=0.110$). However, we found indications of the influence of waiting time, with higher frustration observed by customers who had to wait longer for employees ($r(58)= 0.314$, $p<0.05$). For the customers, it thus seems most important that they can proceed the check-out process without (further) delay.

Figure 1: Distribution of frustration (number of behavioral occurrences) before and after the interaction
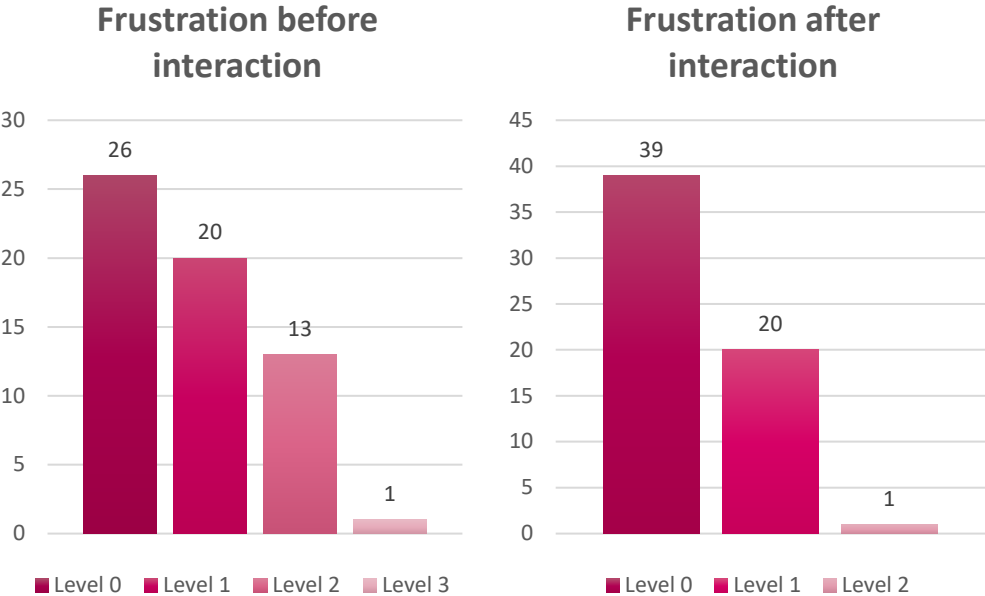
The number of employees present in the self-scan area also seemed to be linked with the frustration level of the customers: the more employees present in the self-scan area, the lower the level of customer frustration ($r(58)=-0.288$, $p=<0.05$). However, this finding could potentially has to do with the waiting time, as when more employees are present, customers will typically receive assistance faster or at least have the perception that they will receive the necessary help soon. Finally, we found a relationship between customers' age and employees' sex. Older rather than young customers show more signs of frustration ($r(58)=0.316$, $p<0.05$) and frustration was higher when the approaching employee was male ($\chi^2 (1, 57)=21.741$, $p<0.001$).

In the second sample, all three incidents of aggression that we observed were following a failed attempt to shoplift, suggesting a potential relationship between aggressive behavior and shoplifting. In all three cases, we observed that the behavior of the employee appeared to play a crucial part in

the escalation of the incident into aggression. We observed that employee behaviors such as physically restraining the customer, blocking the path of the customer, or invading personal space appeared to escalate these situations.

Conclusion

The first aim of this pilot study was to establish the feasibility of collecting video data in shops and use it for behavioral analysis. Our approach consisted in collecting full time recordings of self-scan checking involving employees-customers interactions, which provided valuable insights into the occurrence of aggression incidences and the nature of encounters involving frustration. However, only few incidences included actual aggression.

The second aim of the study was to develop a codebook and investigate the frequency of occurrences of aggression and frustration in the self-scan areas of the two supermarkets. We expected to observe aggression in employees-customers interactions when facing problems in the self-check process, especially when this involved alcohol check. However, we did not identify any aggressive behavior in the footage we observed. We did, on the other hand, observe signs of frustration, especially in relation to the waiting time. Therefore, we developed a codebook focused on customer frustration rather than aggression.

While we thus identified no aggressive behaviors by the self-scan area, we did observe three cases of aggression in other parts of the stores. These cases all followed failed shoplifting attempts, indicating that aggression and failed shoplifting might be related. During these events, we observed that certain behaviors by the employees appeared to lead to escalation, including physically restraining, blocking the path, or invading personal space. These types of behaviors have also been found to lead to escalation of ticket inspectors and passenger interactions in another work-related context, namely public busses (Friis et al., 2020). Across these conflict contexts, the same behavior seems to be related with customer aggression. Our findings suggest that some forms of employee behaviors correlate with customer aggression, indicating the relevance of exploring this further in a future study involving a larger sample size. If aggression against employees primarily takes place in confrontations with people who attempted to shoplift, improving employees' training in how they are supposed to engage in such confrontations would be valuable for their safety.

For our second aim of identifying employee behaviors correlating with aggression of customers, the lack of aggression observed in the self-scan area is obviously a methodological challenge. For future research we suggest to combine two sample selection approaches, including both full-time

recordings and registered incidences of aggression. Nonetheless, our work represents a first attempt to explore customers and employees' interactions in shops, opening the door to further research able to provide a clearer picture of the impact that new changing technologies has on people every day encounters.

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