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Changes in U.S. Shopper Attitudes about Shopping Lists, Private Labels, and Self-Checkouts

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Abstract

The Covid-19 pandemic changed many consumer behaviors. This research replicates three studies that used a 2015 survey to learn whether shopping list use, private-label perceptions, or self-checkout preferences shifted. A July 2022 survey (N = 1,399) of U.S. adults found that shopping list use appeared to have decreased, and demographics continued to provide little help in profiling users. Direct perceptions of private-label riskiness increased, some relationships changed, and there was a greater willingness to serve meals made with private labels to guests. Shoppers who were older or who experienced higher technology anxiety continued to dislike self-checkouts.

Keywords: consumer behavior; demographics; privacy concerns; impulsivity; technology anxiety; risk preferences; time preferences

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Introduction

The COVID-19 pandemic and related policies were linked to many consumer behavior changes during 2020 and 2021. Literature reviews noted "profound and transformative" impacts for retailers and suggested that there would be long-term consequences (Verhoef, Noordhoff, and Sloot, 2023; Yao et al., 2024). Some customers felt "forced" to shop for groceries online (Tyrvainen and Karjaluoto, 2022), and others did not want to interact with store employees (Shamim, Ahmad, and Alam, 2021). Ghost kitchens (i.e., prepare food without seating) grew in the United States during the pandemic, and online ordering and delivery were projected to remain strong (Chen and House, 2022; Li and Fisher, 2022). In the United States, people became accustomed to doing things in their homes instead of going out, and the frequency of outdoor activities in 2022 was below the level in 2019 (Shi and Goulias, 2024). Surveys in several countries suggested that consumers wanted to continue many of their new behaviors (e.g., Charm et al., 2020 [US]; Gupta and Mukherjee, 2022 [India]; Galushko and Riabchyk, 2024 [Canada]; Kumar and Pole, forthcoming [US]). Other research found strong interest in returning to pre-pandemic shopping and consumption behaviors (e.g., Sorrentino, Leone, and Caporuscio, 2022 [Italy]; Lee et al., 2022 [US]; Inoue and Todo, 2023 [Japan]; Handrinos et al., 2023 [US]). Following the pandemic, grocery visits quickly returned to near normal levels in Germany and the United States (Bruggemann and Olbrich, 2023; Dennis-Bauer, Jaller, and Amador, 2024); Walmart laid off more than 2,000 workers who fulfilled website orders (Valinsky, 2023); and many U.S. ghost kitchens were closed (Creswell, 2024). Questions about the pandemic's long-term effects on consumer shopping behaviors remain unanswered.

This paper focuses on three consumer traits—shopping list use, private label preferences, and interest in using self-checkouts—and examines whether relationships shifted between 2015 and 2022, pre- versus post-pandemic. This research considers questions such as, "Did shopping list use change?", "Did the profiles shift for people who believe private label purchases are risky?", and "Did attitudes toward self-checkouts improve or deteriorate?" The objective is to replicate three prior studies (Larson, 2018, 2019a, 2022) using the same survey methodology to determine whether the identified associations changed between 2015 and 2022. After the updated findings for the three traits have been examined, this study's implications and limitations are summarized.

Literature Review

Shopping Lists

Shopping lists can help consumers plan purchases, check to see if important needs are met when shopping, and save both time and money (Larson, 2022). A summary of 14 industry-funded studies suggested that age, gender, marital status, and ethnicity can help profile frequent shopping list users (Larson, 2022, Table 1). However, these studies did not use multivariate analysis or test for statistical significance. Another set of 26 academic studies was reviewed, and several suggested that age, gender, and household size may be related to list use (Larson, 2022, Table 2). However, much of the cited research was more than 20 years old and no new research has been found since the 2022 paper. Larson (2022) compared the regression results from six surveys and concluded

that demographics could not consistently identify list users. The two significant factors were privacy concerns and impulsivity.

One survey reported that people were more likely during the pandemic to make a list before shopping (Breen, 2020). A possible contributing factor was the economic challenges faced by households that may have encouraged more planning to limit nonessential purchases. Consumers shopped more online (Dennis-Bauer, Jaller, and Amador 2024), and they used a list while buying online, which tends to reduce spending (Davydenko and Peetz 2020). During the early part of the pandemic, store traffic at supermarkets in Northern Ireland decreased and transaction sizes increased (Boyle et al., 2022). Thus, lists might make less frequent store trips more efficient. If list use increased during the pandemic for online or offline shopping, we might expect some people to continue making lists. This leads to two hypotheses:

H1: Shopping list use during 2022 was higher than in 2015.

H2: Privacy concerns and impulsivity will continue to identify list users while demographics will not identify them.

Private Labels

Because demographic segmentation cannot identify likely private-label buyers, targeting specific demographic groups with promotions is not efficient (Larson, 2018). To identify possible segments to target, Larson (2018) profiled the shoppers who believed that buying private labels was risky and who would not serve products with private labels to guests in their homes. The perception that private labels were risky was linked to education, risk preferences, and impulsivity. Attitudes about serving private-label products to guests were associated with gender, education, income, risk and time preferences, and impulsivity measures. These variables could be used for targeting information about private-label quality.

When households experience economic challenges, private-label sales often increase. Between 2019 and 2023, private-label dollar sales in the United States increased by 34.2% (Circana, 2024). In addition to the economic downturn, supply chain problems during the pandemic meant some shoppers did not find their favorite brands. The economic pressure and brand switching (i.e., private-label trial) could have reduced the perceived riskiness of private labels (Pinto et al., 2022). Stores also increased the availability of private labels. The resulting trial and distribution gains may have enhanced private-label reputations and encouraged repeat purchases. U.S. private-label shares also rose when the pandemic ended (Mookherjee et al., 2024). These factors may have increased shopper comfort levels when buying private labels and serving them to guests, leading to four hypotheses:

H3: Perceptions of private-label riskiness during 2022 were lower than in 2015.

H4: Perceptions of private-label riskiness will continue to be associated with education, risk preferences, and impulsivity measures.

H5: Willingness to serve private labels to guests during 2022 was higher than in 2015.

H6: Willingness to serve private labels to guests will continue to be associated with gender, education, income, risk and time preferences, and impulsivity measures.

Self-Checkouts

Larson (2019a) reported that two variables were associated with lower interest in self-checkouts, older age groups and technological anxiety. Several other surveys noted the importance of age (e.g., Fernandes and Pedroso, 2017; Lee and Lyu, 2019). For example, 56% of Americans preferred staffed checkouts when given a choice between them and self-checkouts (Shriber, 2023). However, only 40% of those aged 25 to 44 preferred staffed checkouts compared to 66% of those aged 55 and older who preferred staffed checkouts. Technology anxiety could also limit the use of self-service technology (e.g., Demoulin and Djelassi, 2016; Lee and Lyu, 2019; Lian, 2021; Duarte et al., 2022). A review of 22 studies from the hospitality and tourism fields confirmed this relationship (Shiwen, Kwon, and Ahn, 2022).

Several other measures have been linked with self-service technology interest, including privacy concerns (e.g., Safaeimanesh et al., 2021; Sohn, Schnittka, and Seegebarth, 2024). Reliability and risk of failure tended to affect interest in using the technology (Fernandes and Pedroso, 2017; Baabdullah et al., 2019; Le, Hill, and Troshani, 2022; Thomas-Francois and Somogyi, 2023; Ingale et al., 2024). Therefore, risk preferences may be important. Customers may perceive self-service systems to be faster and choose them to save time (Amorim et al., 2016; Rinta-Kahila et al., 2021; Xu, Jeong, and Baiomy, 2022). Also, time preferences may affect checkout choices (Park, Kim, and Hyun, 2021). Some studies suggest that social influence or obligation could increase technology use (e.g., Bulmer, Elms, and Moore, 2018; Baabdullah et al., 2019; Hamza, Maidawa, and Muhammed, 2019; Jeon, Sung, and Kim, 2020; Liang, Lee, and Workman, 2022). Therefore, social desirability bias (SDB) may affect self-checkout preference scores. These other measures were not significant in 2015 but may be important in 2022.

Many changes have occurred since 2015. Stores have added self-checkouts and shoppers tried self-checkouts during the pandemic (to reduce contact with store employees). Recent data suggest that nearly 40% of U.S. grocery cash registers are self-checkouts (CapitalOne Shopping, 2024). Approximately 30% of supermarket transactions involved self-checkouts in 2023, nearly double the percentage in 2018 (Baker, 2024). The wider availability and trial during the pandemic may have boosted acceptance, leading to the final two hypotheses:

H7: Preference for using self-checkouts during 2022 was higher than in 2015.

H8: Age and technology anxiety will continue to identify those who preferred using self-checkouts and privacy concerns and risk and time preferences. Social desirability bias measures are also significant.

Methodology

The earlier studies used a survey, fielded in October 2015 by Qualtrics, a professional marketing research company. It randomly selected adults aged 25 to 65 from online panels. The original sample had 605 subjects. Subsequent analysis identified one outlier, a respondent whose demographic responses were unreasonable. Therefore, the October 2015 analyses shown in this paper were run with 604 respondents. The 2015 sample profile, shown in Table 1, was similar to the U.S. population, except that nonwhites were underrepresented.

To replicate the October 2015 results, Qualtrics fielded another survey in July 2022. After data cleaning (e.g., removing straight-line responses), Qualtrics provided 1,405 responses. Six respondents were dropped for being far outside the target age range, leaving a sample size of 1,399. Qualtrics reported that at least 250 responses came from each of the four U.S. Census regions, indicating good geographic diversity. The respondent demographic profile, shown in Table 1, was similar to the U.S. population, except that females were overrepresented.

Shopping Lists

The dependent variable was based on the statement, "I usually prepare a shopping list before I go grocery shopping." Between 2015 and 2022, the percentage who agreed or strongly agreed with the statement (using a 7-point Likert scale) fell from 62.7% to 56.6%. The average response score was also significantly lower in 2022 than in 2015 (see Table 1), in contrast to H1.

Table 1. Profiles of Survey Respondents

Demographic Measures and Other Variables	Proportion of the Oct. 2015 Sample	Proportion of the July 2022 Sample
Female	0.68	0.72
Nonwhite	0.14	0.45
Age 35 to 44 years	0.21	0.29
Age 45 to 54 years	0.25	0.21
Age 55 years or higher	0.36	0.28
Single/widowed/divorced (i.e., not married)	0.39	0.50
Some college (including 2-year degree)	0.42	0.44
College graduate (4-year degree or more)	0.33	0.26
Presence of children in the household	0.36	0.41
Household income of $40,000 to $79,999	0.34	0.31
Household income of $80,000 to $119,999	0.16	0.10
Household income of $120,000 or more	0.07	0.08
Household size of 2 members	0.34	0.30

Table 1 (cont.)

Demographic Measures and Other Variables	Proportion of the Oct. 2015 Sample	Proportion of the July 2022 Sample
Household size of 3–4 members	0.36	0.37
Household size of 5 members of more	0.12	0.14
First born with (younger) brothers or sisters	0.28	0.30
Mixed-handed (i.e., not strong left- or right-handed)	0.48	0.47
Social desirability bias score average (range 0 to 16)	6.79	7.25
Risk tolerance score (insurance deductibles) average (range 2 to 14)	8.56	8.25
Risk concern score (compared to others) average (range 2 to 14)	9.07	9.16
I usually prepare a shopping list before I go grocery shopping (average)	5.61	5.35
The decision to try a store brand (private label) food product involves risk	3.61	3.79
If I were preparing a meal for guests, I would only buy brand-name ingredients (average)	3.73	3.40
When buying a few items at a grocery store, I prefer using self-checkouts (where I scan the groceries myself) (average)	4.38	5.14
Sample size	604	1,399

Larson (2022) used factor analyses to construct environmental attitudes, privacy concerns, and impulsivity variables. The green attitudes factor was formed from responses to a six-item scale (Haws, Winterich, and Naylor, 2014) that reflects environmental attitudes. To measure privacy concerns, principal component analysis was employed using scale items from Smith, Milberg, and Burke (1996) and Parasuraman and Igbaria (1990). After varimax rotation, the results in Table 2 were similar to those from the prior survey, except that one item ("Companies should never share personal information with other companies unless it has been authorized by the individuals who provided the information") moved from the first factor to the third factor. Impulsivity was assessed with the Hausman (2000) scale. Table 3 shows the results from both surveys after varimax rotation. Although the factor structures were the same, one item ("I go shopping to watch other people") fit the structure better in 2015. Other research could explore whether this result reflects a shift in shopping attitudes.

Table 2. Privacy Scale Varimax-Rotated Factor Scores for 2022 Survey

	Information Protection Factor	Technology Anxiety Factor	Data Errors/ Authorization Factor
It bothers me to give personal information to so many companies	**0.764**	0.317	0.018
When companies ask me for personal information, I sometimes think twice before providing it	**0.754**	0.156	0.142
People should refuse to give information to a business if they think it is too personal	**0.684**	-0.033	0.192
Companies should take more steps to make sure that the personal information in their files is accurate	**0.596**	-0.084	0.492
Computer databases that contain personal information should be protected from unauthorized access—no matter how much it costs	**0.539**	-0.053	0.473
Companies should never sell the personal information in their computer databases to other companies	**0.490**	-0.034	0.410
I am easily frustrated by computerized bills	-0.046	**0.715**	-0.121
I am anxious and concerned about the pace of automation in the world	0.094	**0.704**	-0.008
I am sometimes frustrated by increasing automation in my home	-0.084	**0.689**	-0.004
Sometimes I am afraid that data processing department will lose my data	0.043	**0.558**	0.283
Computers are a real threat to privacy in this country	0.306	**0.520**	0.017
Company should take more steps to make sure that unauthorized people cannot access personal information in their computers	0.062	0.086	**0.802**
Companies should have better procedures to correct errors in personal information	0.282	0.084	**0.744**
Companies should never share personal information with other companies unless it has been authorized by the individuals who provided the information	0.500	-0.100	**0.539**
Cronbach's alpha		0.771	

Note: Bold indicates the largest score for an item.

Table 3. Factor Scores for Impulsive Behavior Scale after Varimax Rotation

	October 2015		July 2022	
Items from the Hausman (2000) Impulsive Behavior Scale	**Hedonic Buying Factor**	**Impulsive Trait Factor**	**Hedonic Buying Factor**	**Impulsive Trait Factor**
Shopping satisfies my sense of curiosity	**0.871**	0.185	**0.801**	0.164
I feel like I'm exploring new worlds when I shop	**0.858**	0.168	**0.773**	0.132
I like to shop for the novelty of it	**0.842**	0.261	**0.735**	0.287
Shopping offers new experiences	**0.814**	0.071	**0.747**	0.115
I go shopping to be entertained	**0.803**	0.288	**0.745**	0.248
I get a real high from shopping	**0.806**	0.296	**0.727**	0.269
I go shopping to watch other people	**0.363**	0.289	**0.296**	0.249
I often buy things without thinking	0.190	**0.835**	0.132	**0.837**
"Buy now, think about it later" describes me	0.173	**0.800**	0.234	**0.701**
Sometimes I'm a bit reckless about what I buy	0.098	**0.802**	0.069	**0.773**
I often buy things spontaneously	0.264	**0.784**	0.255	**0.759**
"Just do it" describes the way I buy things	0.223	**0.707**	0.323	**0.686**
Sometimes I feel like buying things on the spur of the moment	0.175	**0.680**	0.190	**0.656**
If I see something I want, I buy it	0.248	**0.640**	0.362	**0.441**
Cronbach's alpha	0.913		0.891	

Note: Bold indicates the largest score for an item

A social desirability bias (SDB) indicator was included in the models. SDB occurs when some respondents change their answers for impression management, self-deception, or identity definition (Larson, 2019b). SDB can affect results when a significant portion of the sample tends to change their answers to match social expectations, and these individuals all perceive the same social norm that guides them to adjust in the same way. In this study, the 16-item scale by Stober (2001) was used to identify subjects who tend to adjust their answers to be consistent with social norms. The raw score for each individual ranged from 0 to 16, and a logistic transformation was used, as suggested by Larson (2019b).

Private Labels

The October 2015 and July 2022 surveys included a direct question and an indirect question to assess perceived private-label risks: "The decision to try a store brand (private label) food product involves risk," and "If I were preparing a meal for guests, I would only buy brand-name

ingredients." The average scores for the questions, shown in Table 1, were significantly different, with more agreeing that buying private labels was risky in July 2022 (not supporting H3) and less agreeing that subjects would only buy brand-name ingredients to prepare a meal for guests (supporting H5). One possible explanation for these conflicting trends is that the reaction of guests may not be the only type of risk that concerns prospective private-label buyers. This possibility could be explored in other research. Responses of at least "somewhat agree" (top-three-box) served as the dependent variables in binary logistic regressions.

Because this analysis deals with perceived purchase risks, respondent risk preferences may be important. Instead of trying to directly assess risk preferences (which is difficult), four proxy variables were used to test the importance of risk preferences. The first measure, risk tolerance (insurance deductibles), sums the scores from two questions: "If I were shopping for homeowners or renters insurance, I would prefer a policy with a higher deductible and lower costs over a policy with higher rates and better coverage," and "If I were shopping for car insurance, I would choose a policy with a higher deductible and lower costs over a policy with higher rates and better coverage." The second measure, risk concern (compared with others), combines two questions: "I tend to be more concerned about harmful risks than my friends and neighbors," and "I tend to avoid taking risks more than my neighbors and friends." Another risk proxy variable is birth order. Later-borns tend to take more risks than first-borns (Krause et al., 2014). Studies of company founders in China and business managers in Kosovo found that first-borns were more risk-averse (Zheng et al., 2021; Lajci, Berisha, and Krasniqi, 2022). The final risk measure was handedness. Mixed-handed subjects tended to focus on an activity's perceived risks while consistent-handed people focused on the perceived benefits (Christman et al., 2007).

Like risk preferences, time preferences are difficult to directly assess. The surveys included four questions, answered with 7-point Likert scales, that dealt with today-focus: "The joy in my life comes from what I am doing now, not from what I will be doing later," "I try to live one day at a time," "I tend to focus on what is going on now instead of what will happen in the future," and "If I take care of the present, the future will take care of itself." A factor analysis combined them into one variable.

Self-Checkouts

The dependent variable is based on responses to the following statement: "When buying a few items at a grocery store, I prefer using self-checkouts (where I scan the groceries myself)."

The average score increased, consistent with H7. All of the independent measures in the model have been defined previously. Ordered probit regressions identify which variables contributed to higher (or lower) scores for self-checkout preferences.

Results

Shopping Lists

The results from the ordered probit regressions are shown in Table 4. For the July 2022 regression, the female variable was significant and positive. Women and married subjects gave shopping lists higher scores in the July 2022 survey, but not in the October 2015 survey. The green attitude factor was also significant in July 2022, but not in October 2015. Three measures were significant in both surveys. Two privacy concern factors, information protection and data errors/authorization, were both positive, which implies that list users had above-average privacy concerns. The impulsive trait factor was negative in both surveys; list users tend to be less impulsive. Two other measures—hedonic shopping and SDB—were significant and positive in July 2022 and not in the prior survey. The hedonic shopping factor suggested that users enjoyed shopping. The positive score also contributes indirectly to greater impulsivity, contrasting with the negative coefficient on the impulsive trait factor. The positive coefficient on SDB implied that some believed using shopping lists was socially expected.

Table 4. Ordered Probit Regressions for Using Shopping Lists

	October 2015			July 2022		
	B	**S.E.**	**T-Stat**	**B**	**S.E.**	**T-Stat**
Female	0.3064	0.1677	1.8271	**0.4193***	0.1074	3.9029
Nonwhite	-0.4561	0.2366	-1.9275	-0.1465	0.1012	-1.4471
Age 35–44 years	-0.0622	0.2530	-0.2458	-0.1622	0.1380	-1.1757
Age 45–54 years	0.0259	0.2548	0.1016	-0.1014	0.1511	-0.6710
Age 55 years or more	-0.1563	0.2491	-0.6277	0.1306	0.1502	0.8696
Single, divorced, widowed	-0.3345	0.1761	-1.8993	**-0.2474***	0.1036	-2.3879
Some college (including 2-year degree)	-0.0713	0.1976	-0.3607	0.0931	0.1187	0.7844
Four-year college degree or more	-0.0099	0.2232	-0.0442	0.1036	0.1408	0.7360
Income $40,000–$79,999	0.1295	0.1914	0.6765	-0.0282	0.1126	-0.2507
Income $80,000–$119,999	**0.6108***	0.2663	2.2934	0.0707	0.1751	0.4039
Income $120,000 or more	-0.0385	0.3192	-0.1206	-0.1898	0.1897	-1.0009
Household size 3–4 members	-0.0007	0.1807	-0.0041	-0.0463	0.1133	-0.4086
Household size 5 members or more	-0.0057	0.2712	-0.0211	-0.0887	0.1572	-0.5640
First born with brothers/sisters	**-0.4020***	0.1730	-2.3237	0.0970	0.1063	0.9126
Green attitudes factor	0.0553	0.0870	0.6361	**0.2798***	0.0600	4.6679
Information protection factor	**0.1663***	0.0792	2.0998	**0.1576***	0.0523	3.0147
Technological anxiety factor	0.0974	0.0825	1.1811	0.0646	0.0552	1.1707

Table 4 (cont.)

	October 2015			July 2022		
	B	**S.E.**	**T-Stat**	**B**	**S.E.**	**T-Stat**
Data errors/authorization factor	**0.3603***	0.0848	4.2516	**0.1485***	0.0528	2.8127
Hedonic shopping factor	0.0186	0.0881	0.2117	**0.2166***	0.0581	3.7264
Impulsive trait factor	**-0.4877***	0.0842	-5.7917	**-0.2168***	0.0543	-3.9897
Social desirability bias (transformed)	0.1251	0.2100	0.5956	**0.5332***	0.1336	3.9915
Dallas area	0.0076	0.3012	0.0252	0.2373	0.1586	1.4956
Seattle area	-0.7461	0.3872	-1.9267	0.1821	0.2559	0.7116
Denver area	-0.3874	0.4820	-0.8039	0.3169	0.3148	1.0066
Phoenix area	**0.7654***	0.3313	2.3101	-0.0846	0.2247	-0.3765
Intercept 1|2	-3.5001	0.3993	-8.7648	-2.9844	0.2361	-12.6406
Intercept 2|3	-2.5537	0.3642	-7.0123	-1.9494	0.2118	-9.2030
Intercept 3|4	-2.1949	0.3561	-6.1630	-1.5240	0.2070	-7.3625
Intercept 4|5	-1.7836	0.3502	-5.0923	-0.9871	0.2036	-4.8477
Intercept 5|6	-0.5913	0.3432	-1.7228	0.1091	0.2022	0.5396
Intercept 6|7	0.4603	0.3432	1.3414	1.3528	0.2056	6.5810

Note: * and bold indicate significant at the 5% level

The Larson (2022) paper included a third Qualtrics survey, fielded in January 2015. Regressions with this data also found significant positive coefficients for female, green factor, hedonic shopping factor, and SDB variables. Although these four measures were not significant in the October 2015 data, their significance in July 2022 should lead future researchers to consider them in their studies. Marketers might also use these measures to design messages that resonate with shopping list users. The main conclusions from the Larson (2022) paper were generally confirmed: demographics provide little information for identifying list users, while privacy concerns and impulsivity are significant, supporting H2.

Private Labels

The results from the binary logistic regressions involving the perception that private labels are risky are shown in Table 5. Only part of H4 was supported. While college education was an important measure in October 2015, it was not significant in July 2022. This finding suggests that college education may not be useful for targeting private-label quality information. Older respondents (55 years and over) did not agree that private labels were risky in July 2022. However, that variable was not significant in October 2015. Two proxies for risk preferences suggested that people who were concerned about risk (or more tolerant of risk) also believed private-label products were risky purchases. In the 2022 regression, both impulsivity factors were significant and positive. These results suggest that some tactics suggested by Larson (2018) (e.g., targeting

people who enjoy shopping, staging informative sampling events, offering satisfaction guarantees, etc.) could continue to be effective options to convert skeptical consumers into private-label buyers.

Table 5. Binary Logistic Results for Top-Three-Box: Purchasing Private Label Products Is Risky

	October 2015			July 2022		
	B	**S.E.**	***P*-value**	**B**	**S.E.**	***P*-value**
Female	0.029	0.202	0.884	-0.020	0.136	0.883
Nonwhite	0.259	0.273	0.343	0.174	0.124	0.159
Age 35–44 years	-0.302	0.299	0.313	0.130	0.165	0.432
Age 45–54 years	-0.328	0.294	0.264	0.014	0.184	0.941
Age 55 years or more	-0.170	0.282	0.547	**-0.374***	0.186	0.044
Single, divorced, widowed	-0.081	0.245	0.741	0.114	0.136	0.400
Some college (including 2-year degree)	**0.549***	0.246	0.026	-0.151	0.145	0.299
Four-year college degree or more	**0.636***	0.277	0.021	-0.258	0.179	0.148
Income $40,000–$79,999	0.173	0.230	0.452	0.044	0.142	0.756
Income $80,000–$119,999	0.487	0.299	0.103	0.245	0.215	0.253
Income $120,000 or more	0.321	0.400	0.423	0.443	0.240	0.065
Household size 2 members	0.031	0.328	0.925	-0.221	0.190	0.245
Household size 3–4 members	-0.312	0.324	0.335	-0.221	0.189	0.243
Household size 5 members or more	-0.218	0.417	0.601	-0.394	0.232	0.089
Risk tolerance (insurance deductibles)	0.051	0.033	0.120	**0.090***	0.022	0.000
Risk concern (compared to others)	**0.083***	0.042	0.049	**0.131***	0.026	0.000
First born with brothers/sisters	**-0.563***	0.216	0.009	-0.228	0.134	0.089
Mixed-handedness	-0.249	0.185	0.178	0.127	0.121	0.295
Today-focus factor	0.148	0.099	0.137	0.064	0.066	0.332
Hedonic shopping factor	**0.294***	0.100	0.003	**0.270***	0.069	0.000
Impulsive trait factor	0.061	0.099	0.535	**0.210***	0.063	0.001
Constant	**-1.959***	0.714	0.006	**-2.487***	0.422	0.000

Note: * and bold indicate significant at the 5% level

Table 6 shows the regression for people who said they would only serve food made with name-brand ingredients to guests. In both October 2015 and July 2022, men tended to agree. In October 2015, education and income were important measures, but not in July 2022, so only part of H6 was supported. Education and income may not be useful for segmentation. Single-member households tended to agree with the statement in 2022. Perhaps targeting smaller households might improve private-label sales. The three nondemographic concepts, risk preferences, time

preferences, and impulsivity, were significant in 2015 and 2022. These results confirm the importance of using in-store promotions and addressing risk concerns when communicating with customers about private labels.

Table 6. Binary Logistic Results for Top-Three-Box: Buy Brand-Names for Meals Served to Guests

	October 2015			July 2022		
	B	**S.E.**	***P*-value**	**B**	**S.E.**	***P*-value**
Female	**-0.490***	0.204	0.016	**-0.674***	0.150	0.000
Nonwhite	0.169	0.283	0.552	0.123	0.140	0.379
Age 35–44 years	-0.108	0.313	0.731	0.070	0.186	0.707
Age 45–54 years	-0.090	0.306	0.769	0.000	0.211	0.999
Age 55 years or more	0.245	0.292	0.403	0.028	0.207	0.892
Single, divorced, widowed	-0.067	0.252	0.791	-0.035	0.155	0.822
Some college (including 2-year degree)	**0.572***	0.254	0.024	0.021	0.163	0.899
Four-year college degree or more	**0.654***	0.286	0.022	-0.324	0.205	0.114
Income $40,000–$79,999	0.177	0.237	0.455	0.122	0.161	0.449
Income $80,000–$119,999	**0.628***	0.306	0.041	0.100	0.245	0.684
Income $120,000 or more	**0.821***	0.411	0.046	0.508	0.271	0.061
Household size 2 members	0.089	0.341	0.793	**-0.531***	0.215	0.014
Household size 3–4 members	0.023	0.331	0.944	-0.260	0.210	0.215
Household size 5 members or more	-0.760	0.451	0.092	**-0.613***	0.264	0.020
Risk tolerance (insurance deductibles)	-0.012	0.034	0.713	**0.057***	0.025	0.020
Risk concern (compared to others)	**0.100***	0.044	0.023	**0.140***	0.030	0.000
First born with brothers/sisters	**-0.564***	0.221	0.011	**-0.359***	0.155	0.021
Mixed-handedness	-0.222	0.191	0.246	-0.178	0.138	0.197
Today-focus factor	**0.301***	0.105	0.004	**0.299***	0.077	0.000
Hedonic shopping factor	**0.391***	0.104	0.000	**0.587***	0.081	0.000
Impulsive trait factor	0.171	0.102	0.093	**0.255***	0.071	0.000
Constant	**-1.677***	0.739	0.023	**-2.117***	0.466	0.000

Note: * and bold indicate significant at the 5% level

Self-Checkouts

The results of the self-checkout analysis are shown in Table 7. Like in the October 2015 survey, the July 2022 analysis found older respondents and those with higher technology anxiety were less interested in using self-checkouts. Technology anxiety was unrelated to age; the correlation was 0.09. The July 2022 regression had other significant variables, supporting all the measures listed

in H8. The two privacy concern factors were both significant and positive, suggesting that retailers who want to promote self-checkout use should take extra steps to protect customer privacy. The today-focus factor was significant, so stores could highlight the potential time savings from using self-checkouts (although professionals can often scan purchases faster, self-checkout users may have biased time perceptions [Djelassi, Diallo, and Zielke, 2018]). Both impulsivity factors were significant and positive. Retailers might want to merchandise impulse-driven items near self-checkout stations.

Two variables were not significant in October 2015, and were positive and significant in July 2022. Married respondents expressed more interest in using self-checkouts. However, households with children did not express more or less interest. The significant SDB measure suggests that some respondents believed that using self-checkouts was socially expected. Studies on self-checkouts that do not control for SDB may overstate interest in the technology.

Table 7. Ordered Probit Regressions for Using Self-Checkouts

	October 2015			July 2022		
	B	**S.E.**	**T-Stat**	**B**	**S.E.**	**T-Stat**
Female	-0.094	0.159	-0.593	-0.007	0.107	-0.066
Nonwhite	0.339	0.232	1.460	-0.164	0.100	-1.646
Age 35–44 years	-0.177	0.243	-0.729	-0.083	0.136	-0.613
Age 45–54 years	**-0.602***	0.241	-2.494	**-0.447***	0.150	-2.987
Age 55 years or more	**-0.945***	0.235	-4.018	**-0.925***	0.153	-6.048
Single, divorced, widowed	-0.118	0.168	-0.703	**-0.245***	0.101	-2.433
Some college (including 2-year degree)	-0.045	0.186	-0.242	0.063	0.117	0.536
Four-year college degree or more	-0.201	0.211	-0.951	-0.007	0.140	-0.053
Children present	0.022	0.174	0.126	0.031	0.109	0.282
Income $40,000–$79,999	0.011	0.180	0.060	0.173	0.112	1.542
Income $80,000–$119,999	0.214	0.237	0.906	-0.189	0.173	-1.089
Income $120,000 or more	0.196	0.331	0.592	0.177	0.194	0.913
Green attitudes factor	0.107	0.085	1.259	-0.013	0.059	-0.218
Information protection factor	0.048	0.076	0.633	**0.190***	0.052	3.689
Technological anxiety factor	**-0.201***	0.082	-2.440	**-0.241***	0.056	-4.337
Data errors/authorization factor	0.042	0.079	0.528	**0.202***	0.053	3.836
Risk tolerance (insurance deductibles)	0.050	0.028	1.811	0.022	0.018	1.215
Risk concern (compared to others)	0.030	0.037	0.809	-0.019	0.023	-0.831
Today-focus factor	0.009	0.083	0.111	**0.144***	0.057	2.530

Table 7 (cont.)

Hedonic shopping factor	0.073	0.085	0.857	**0.121***	0.059	2.049
Impulsive trait factor	0.002	0.084	0.020	**0.179***	0.054	3.305
Social desirability bias (transformed)	0.188	0.208	0.906	**0.397***	0.136	2.914
Intercept 1|2	-1.768	0.541	-3.270	-3.203	0.335	-9.576
Intercept 2|3	-0.965	0.536	-1.800	-2.418	0.325	-7.445
Intercept 3|4	-0.449	0.535	-0.840	-1.995	0.322	-6.205
Intercept 4|5	-0.020	0.534	-0.038	-1.279	0.318	-4.022
Intercept 5|6	0.704	0.535	1.317	-0.426	0.316	-1.347
Intercept 6|7	1.586	0.539	2.943	0.819	0.318	2.578

Note: * and bold indicate significant at the 5% level

Implications and Limitations

This study found that shopping list usage, the profiles of people who believed private-label purchases were risky, and the attitudes toward self-checkouts changed between 2015 and 2022. For shopping lists, usage decreased and demographics continue to provide little help in identifying users (with the possible exception of gender). Lower list use suggests that more shoppers may not plan their trips, so store merchandising may generate more impulsive purchases. List users also tended to have higher privacy concerns. These concerns may limit list user excitement about loyalty programs. List users also were concerned about the environment, enjoyed shopping, and believed list use was socially expected. Marketers could use these traits to design messages that appeal to this group. Showing images of shoppers enjoying shopping while using a list, scheduling sampling and other events in stores, and offering incentives for bringing reusable bags could appeal to this group.

The private-label attitude changes were mixed. Although private-label sales in the United States have grown, retailers need to continue marketing the items. Demographics, with the possible exceptions of gender and household size, provide little guidance for market segmentation and targeting. Targeting the consumers who believed the purchases were risky with product information could be successful. Other tactics could include highlighting single-serve, masculine, premium, or indulgent products that are easy to prepare. Images could show consumers having fun while shopping, and informative store displays could introduce private labels to new buyers.

Interest in using self-checkouts appeared to be higher in 2022. However, attitudes were negatively associated with age. The generations model of consumer behavior would suggest that, as older generations die off, acceptance of the technology may increase. However, if the lifestage model applies to self-checkout use, as people age they would adopt the attitudes that are typical of older shoppers and acceptance would not improve (Larson, 2019a). Technology anxiety also tended to limit self-checkout use. Stores could install self-checkout systems that generate less anxiety or add more fun to the experience (Fernandes and Pedroso, 2017; Shin and Dai, 2022; Reid et al., 2024).

One factor making self-checkouts attractive to stores is their potential to reduce labor costs. However, the reasons shoppers assign to their deployment (e.g., improve service or lower costs) can influence their reactions (Nijssen, Schepers, and Belanche, 2016; Van de Sanden, Willems, and Brengman, 2022). Some shoppers may feel empowered by the self-checkouts, while others may be disempowered (Schweitzer and Simon, 2021; Kim and Chen, 2025). Differences in the need for human interaction may also split shoppers into segments (Chen et al., 2018; Kim, Kim, and Lee, 2023). For shoppers who prefer human interaction, the clerks at staffed registers should strive to enhance shopper experiences. Stores should describe self-checkouts as part of their efforts to improve customer service and make users feel empowered.

Some stores periodically close staffed checkouts, so all customers must use self-service during those times. A literature review concluded that customers should not be forced to use self-service (Baer and Leyer, 2018), as forcing may reduce future patronage (Feng et al., 2019). Another problem with self-checkouts is intentional theft. A survey by LendingTree found that 15% of shoppers who used self-checkouts confessed to intentional stealing (Davis, 2023). The self-check-out theft (shrink) rate of 3.5%–4% is about four times the rate for purchases at staffed check-outs, leading some to question their deployment (Basiouny 2024). A benefit of staffed check-outs is they can boost customer loyalty (Sharma, Ueno, and Kingshott, 2021; Nusrat and Huang, 2024). However, when a chain eliminated self-checkouts, some customers were disappointed (Rinta-Kahila et al., 2021). Therefore, stores may want to continue providing some self-checkouts.

Like most studies, this research is not without limitations. Because the data are from surveys, this study measured attitudes instead of actual behaviors. The samples either underrepresented nonwhites or overrepresented women. Measure interactions were not tested, and some important variables may have been omitted. For example, separating the private-label purchase risk into components could provide new insights. The basic conclusions are strong. During the 7-year period that included the pandemic, shopping list use appears to have declined, private labels continue to be perceived as risky purchases, and self-checkout acceptance has increased. Many of the relationships identified with the 2015 data continued to be significant. Food marketers and retailers can use these results in their marketing.

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