THE EFFECTS OF TABLE PARTITION TRANSPARENCY ON DINING BEHAVIOR IN PUBLIC SPACES

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ABSTRACT

With the emergence of solo dining culture, customer needs have diverged from those of traditional group diners, and the use of table partitions has generated both positive and negative effects. This study examines changes in dining patterns and proposes a research framework grounded in customers' psychological perceptions and physical seating regulations. A mixed-method approach was adopted, including questionnaire surveys, non-participant observation, and behavioral mapping. The study aims to analyze the effects of table partitions on customer behavior, with the goal of informing future partition designs that reduce dining-related discomfort while addressing solo diners' privacy needs and facilitating smooth conversation among group diners.

The results indicate that customers with different dining types exhibit varying expectations and sensitivities regarding perceived spatial crowding. Diners respond differently in terms of behavior and seating choice when exposed to table partitions with varying levels of transparency. The majority of solo diners prefer seats with opaque partitions and are more tolerant of constrained spatial conditions, showing little inclination to adjust or relocate the partitions. These findings suggest that restaurants may strategically employ different types of table partitions to provide dining environments that are both safe and comfortable for diverse customer groups.

Keywords: *privacy, solo dining, table partitions, perceived crowding, dining satisfaction*

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1 INTRODUCTION

With shifts in societal demographic structures, a new dining culture—solo dining—has emerged in recent years. Solo dining refers to the practice of individuals eating alone in public dining environments. It has evolved from a “reluctant necessity” into a “self-determined lifestyle choice.” Rather than being perceived as an indicator of loneliness, solo dining is increasingly regarded as a means of enjoying personal time, focusing on food, and engaging in ritualized consumption practices. Previous research has classified solo diners into several categories, including enjoyers, economically motivated diners, social-oriented diners, and relaxation-seeking diners (Koay et al., 2024).

In contrast, shared meals refer to dining experiences in which multiple individuals gather to eat together. According to Baek(2023), shared meals play a significant role in strengthening social bonds, mitigating interpersonal conflict or tension, facilitating intergenerational interaction, and supporting cultural transmission and sustainability.

From the perspective of restaurant operators, however, accommodating solo diners may reduce seating efficiency when operational costs are taken into consideration. Consequently, some restaurants are less inclined to accept single patrons, which may induce psychological pressure among solo diners. The overall dining experience provided by a restaurant—including food quality, service quality, convenience, and spatial atmosphere—significantly influences customers’ perceptions, repurchase intentions, and willingness to recommend the restaurant to others (Richardson et al., 2019).

Due to the boundary effect, individuals tend to seek spatial support elements and prefer locations with clearly defined boundaries (Hsu & Yang, 2021). Solo diners often lack sufficient interpersonal distance or physical partitions from adjacent patrons, and the gaze of nearby diners may reduce their perceived privacy, thereby negatively affecting the dining experience. This observation aligns with the concept of perceived territoriality proposed by Moon et al. (2020), which suggests that territorial perception is shaped not only by physical environmental attributes but also by psychological boundaries. Given the practical limitations of increasing table spacing for solo diners, greater emphasis should be placed on the arrangement of objects at the seating level to establish a more favorable dining environment.

Furthermore, crowding perception is conceptually distinct from environmental density, with the key difference residing in individuals’ psychological perceptions of spatial proximity. As articulated by Stokols (1972), density constitutes a necessary condition for crowding perception but does not, in itself, account for all contributing factors.

Therefore, it is recommended that subsequent research pay attention to (a) behavioral measures pertaining to the augmentation of one's space, (b) subjective reports of restriction and discomfort, (c) observational indexes of tension (e.g., laughter, aggression, reduced eye contact), and (d) physiological indicators of strain.

Andereck and Becker(1993) noted that consumers' expectations regarding environmental density significantly influence their perceived level of spatial crowding. Their study further revealed significant differences between seating configurations and perceived crowding. Compared with side-by-side seating areas, seating types such as high-top seating and multi-person table arrangements were associated with lower levels of perceived crowding among consumers.

Deng(2015) found that seating arrangements were categorized into three types based on social environment theory: general seating, social centrifugal design seating, and social centripetal design seating. Different types of customers in various settings tend to select seating arrangements that best align with their needs.

Lin(2009) investigated the amount of table space required for individuals to dine comfortably and identified the upper limit of personal tabletop territory as 108 cm in width and 63 cm in depth. Although personal tabletop territory varies with table size, it does not continue to increase once this threshold is reached.

The COVID-19 pandemic in 2019 presented both a crisis and an opportunity for the restaurant industry. During the pandemic, restaurants were compelled to implement table partitions as a preventive measure to inhibit virus transmission and maintain safe dining distances, while simultaneously creating physical and social barriers between diners. Even after restrictions were lifted, some establishments continued to use table partitions, as they were found to offer additional functional and operational benefits.

Accordingly, this study seeks to examine whether different transparency designs of table partitions can provide solo diners with a sense of privacy, maintain visual connectivity and conversational openness for group diners, and enhance spatial utilization efficiency.

2 METHODS

The study employed the following research methods for data collection and analysis, including questionnaire survey, non-participant observation, and behavioral mapping. First, a questionnaire survey was conducted to examine participants' prior impressions of restaurant table partitions and their individual sensitivity to the surrounding environment. The experiment primarily utilized non-participant observation and behavioral mapping to investigate diners' behaviors and situational responses under conditions with and without table partitions during the dining process.

This study focused on dining spaces within university campus cafeterias in Taipei City, which had previously been equipped with table partitions. The primary table configuration consisted of four-seat tables measuring 70 cm in depth and 110 cm in width; however, these tables were frequently used by customer groups that did not conform to four-person arrangements, making the site suitable for empirical observation. In addition to serving students for dining, relaxation, social interaction, and reading, the cafeteria was also open to off-campus visitors and local residents.

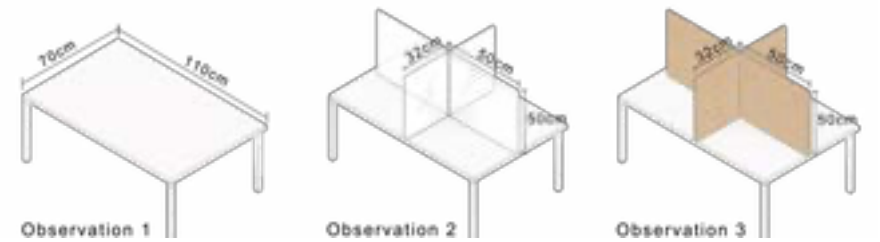


Figure 1 Table partition diagram

A non-participant observation method was employed in the experiment, which was divided into three observation phases: Observation I, Observation II, and Observation III. These were conducted on three separate days under different conditions—without partitions, with transparent partitions, and with opaque partitions, respectively. Observations recorded included group size, frequency of partition adjustments, interaction behaviors, and gaze direction. Based on these observations, inferences were made regarding customers' spatial perceptions, sense of privacy, and conversational convenience, with the aim of understanding current patterns of partition use and evaluating the relationship between observed behaviors and the presence of table partitions.

3 RESULTS

3.1 Questionnaire Survey

When individuals' perceptions of intimacy with others do not align, three types of privacy invasions—physical, visual, and auditory—may occur, resulting in discomfort (Robson, 2008). This study's questionnaire incorporated the Highly Sensitive Person (HSP) Scale developed by Aron et al. (1997), the crowding measurement dimensions proposed by Stokols (1972), and a seven-point Likert scale to quantify participants' subjective experiences.

A total of 104 participants completed the survey, with a gender distribution of 41.3% biologically male and 56.7% biologically female. Participant ages ranged from 11 to 65 years, with the largest age group being 26–30 years (n = 27, 25.9%).

Regarding dining habits, participants reported an average of 5 occasions per week of eating out (dining inside a restaurant), with the most frequently reported frequency being 3 times per week (n = 24, 23.1%). The majority of participants usually dined in pairs (n = 40, 28.4%). Popular types of frequent dining included hot pot (58.6%), Chinese-style snacks (45.1%), and Western-style restaurants (44.2%). The average duration of restaurant visits was 1.4 hours, with the maximum stay not exceeding 3 hours.

Table 1 Reliability Analysis Table for Each Questionnaire Dimension

Item	Scale Dimension	Cronbach's alpha	Number
Part 1	restriction and discomfort	.926	4
Part 2	augmentation of one's space	.85	9
Part 3	Highly Sensitive Person Scale	.888	15

The questionnaire consisted of four sections: (1) restriction and discomfort, (2) augmentation of one's space, (3) Highly Sensitive Person Scale, and (4) open-ended questions. Reliability analysis indicated acceptable internal consistency for all three scale dimensions, with Cronbach's alpha coefficients exceeding 0.85.

3.2 Pearson Correlation analysis

Pearson correlation analyses were conducted between the scores of the three measured dimensions and other variables. The results indicated that restriction and discomfort were significantly negatively correlated with support long-term use of partitions in restaurants [$r(102) = -.332$, $p = .001$]. In the dimension of augmentation of one's space, the tendency to avoid seats near others was significantly positively correlated with support for long-term partition use [$r(102) = .358$, $p = .001$]. Age was significantly negatively correlated with personal sensitivity [$r(102) = -.289$, $p = .003$].

Regarding willingness to support long-term use of partitions, Pearson correlation analysis with other variables revealed that agreement level was significantly negatively correlated with "The presence of partitions restricts my freedom to move my hands or body" [$r(102) = -.369$, $p < .001$], and significantly positively correlated with "I prefer partitions to block the view of others rather than merely separating seats" [$r(102) = .484$, $p < .001$] and "I tend to avoid choosing seats near others" [$r(102) = .358$, $p < .001$]. These findings provide insight into the characteristics of participants who support long-term partition use.

For dining types that involve frequent eating out (dining inside restaurants), Pearson correlation analyses with other variables showed the following patterns:

Hot pot diners were positively correlated with "I do not like people sitting too close to me or talking to me," "I tend to avoid seats near others," and "I do not like too many things happening at once," indicating a preference for spaces that allow for solitary enjoyment.

Light meal diners were positively correlated with "I feel muscle tension or stiffness in such environments," "I sweat or feel anxious when there are too many people around me," "Crowding makes me feel physically uncomfortable or fatigued," "I am easily affected by the emotions of others," "I feel distressed by strong stimuli such as loud noise or chaotic situations," and "Total personal sensitivity score," suggesting a heightened awareness of their surrounding environment.

Chinese snack diners were negatively correlated with "I feel muscle tension or stiffness in such environments," "Crowding makes me feel physically uncomfortable or fatigued," and "Behavioral expansion of personal space and stress total score," indicating less avoidance of close proximity to others and greater suitability for shared dining experiences.

3.3 Qualitative Analysis of Open-Ended Responses

The questionnaire data captured participants' perceptions of the impacts of existing table partitions on their dining experiences. Participants' open-ended responses were analyzed using thematic analysis, resulting in the categorization of user statements. Among the respondents, 14 participants (13.5%) expressed positive perceptions, 52 participants (50%) reported negative

perceptions, and the remaining 38 participants (36.5%) provided neutral responses or indicated no particular opinion.

After consolidating the affective descriptors used in the responses, the most frequently reported negative themes were spatial constraint and discomfort caused by transparency. Neutral themes emphasized the separating function of partitions, noting that while they block the gaze of strangers, they may simultaneously hinder conversation among friends. The most prevalent positive theme was hygiene, followed by perceptions of enhanced privacy and a sense of safety.

3.4 Observation 1

Observation 1 was conducted under existing conditions without table partitions. Pedestrian flow and seating selection changes were recorded at 30-minute intervals during operating hours from 7:30 a.m. to 7:30 p.m. Occupied seats were marked on a floor plan and categorized by group size, including single diners, pairs, groups of three, and groups of four or more. Overlay mapping was then applied to identify areas with the longest duration of solo diner occupancy, the most frequently selected seats, and peak and off-peak traffic periods.

The results showed that among the 153 seats within the observed area, seat utilization was extremely low before 8:00 a.m., at less than 10%. Seat occupancy peaked between 12:00 p.m. and 12:30 p.m., reaching 50%. The highest number of solo diners was observed between 11:30 a.m. and 12:30 p.m., after which pedestrian flow declined noticeably around 1:30 p.m.

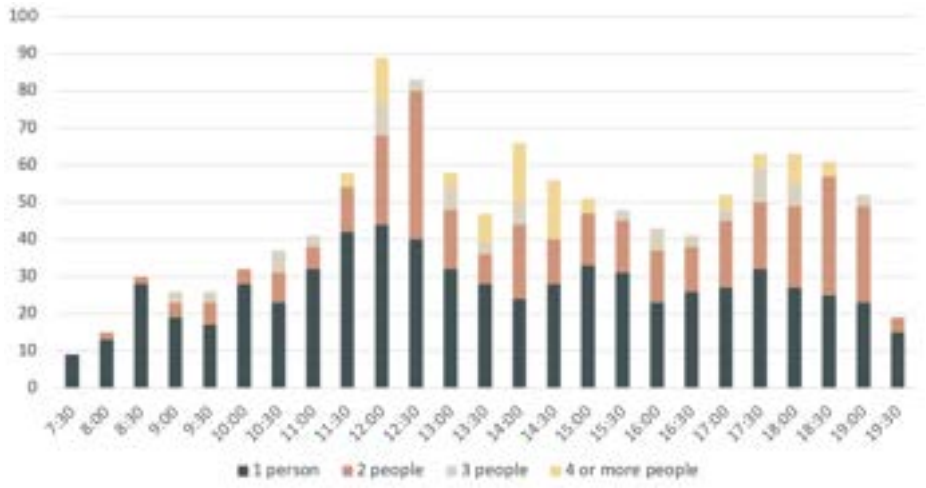


Figure 2 Cumulative bar chart of the number of diners without partitions

For seats selected by solo diners, occupied seats were recorded every 30 minutes. In this study, the Green Courtyard seating area was divided into areas, each consisting of three four-person tables, and usage frequencies were aggregated accordingly. The areas were labeled A through K, as shown in Figure 4.2. The statistical results indicated that Area D, located in front of the convenience store, had the highest frequency of solo diner occupancy (73 instances), followed by Area E, situated near the entrance and adjacent to a column (60 instances).

Subsequent Observation 2 and Observation 3 were designed based on these findings. On two different days, observations were conducted between 7:30 a.m. and 1:30 p.m., covering transitions from off-peak to peak and back to off-peak periods, in order to examine variations in pedestrian flow and partition use. On each day, two high-traffic areas—Area D in front of the convenience store and Area E near the entrance—were equipped with either fully transparent or opaque partitions to increase the number of observable samples.

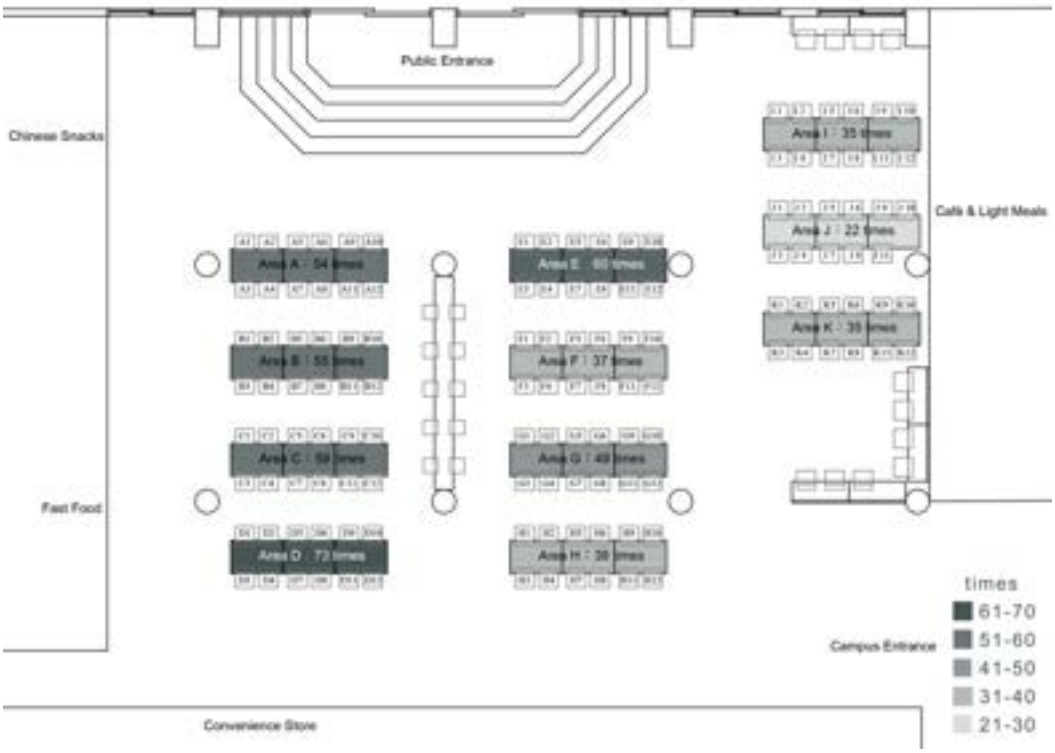


Figure 3 Distribution of seating duration for solo diners without partitions

3.5 Observation 2

Observation 2 was conducted with transparent table partitions installed in two areas: Area D (12 seats) and Area E (12 seats). During operating hours from 7:30 a.m. to 1:30 p.m., pedestrian flow, seating selection, seat-occupying behaviors, and individual behavioral changes within these two areas were recorded at 10-minute intervals. Occupied seats and observed behaviors were marked on a floor plan, and overlay mapping was applied to calculate seating selection proportions as well as to analyze seat occupation and individual behavioral patterns.

Statistics on customer types in Areas D and E indicate that solo diners accounted for the largest proportion, comprising 57% (70 instances) in Area D and 64% (56 instances) in Area E. Other shared-meal diners were randomly distributed across the seating areas and were not limited to areas primarily used by solo diners.

3.6 Observation 3

Observation 3 was conducted with opaque table partitions installed in two areas: Area D (12 seats) and Area E (12 seats). During operating hours from 7:30 a.m. to 1:30 p.m., pedestrian flow, seating selection, seat-occupying behaviors, and individual behavioral changes within these two

areas were recorded at 10-minute intervals.The distribution of customer types in Areas D and E showed that solo diners accounted for the highest proportions, at 85% (89 instances) and 75% (60 instances), respectively. These proportions were markedly higher than those observed when transparent partitions were installed. In contrast, no customers dining in groups of three or four or more (0 instances) selected seating in either of these two areas.

Table 2 Statistics of Diners by Group Size in Areas D and E under Different Conditions

Number of people dining together	Transparent Partition		Opaque Partition	
	Area D	Area E	Area D	Area E
1 person	70	56	89	60
2 people	7	28	16	20
3 people	27	0	0	0
4 or more people	20	4	0	0

Because some groups had zero counts in the ''three-person'' and ''four-or-more-person'' categories, dining group size was recoded as ''≤ 2 persons'' and ''≥ 3 persons'' to avoid low expected frequencies and to focus on group-size effects. Fisher's exact test was conducted separately for each area to examine the association between partition transparency (transparent vs. opaque) and the proportion of larger groups (≥ 3 persons). In addition, under the transparent-partition condition, proportional differences between Areas D and E were compared.

In Area D, the proportion of ≥ 3-person dining under transparent partitions was 37.9% (47/124), compared with 0% (0/105) under opaque partitions; Fisher's exact test indicated a significant difference ($p < .001$). In Area E, the proportion of ≥ 3-person dining under transparent partitions was 4.5% (4/88), compared with 0% (0/80) under opaque partitions; this difference did not reach significance ($p = .122$). Furthermore, under the transparent-partition condition, the proportion of ≥ 3-person dining was significantly higher in Area D than in Area E (37.9% vs. 4.5%, $p < .001$), indicating that larger groups predominantly appeared in transparent-partition settings, with this pattern being more pronounced in Area D.

In Area D and E, customer behaviors were recorded at 10-minute intervals and aggregated under conditions with opaque partitions installed. To examine whether the distribution of customer behavior categories was consistent across the four conditions (Area D with transparent partitions, Area D with opaque partitions, Area E with transparent partitions, and Area E with opaque partitions), Pearson's chi-square test was employed. The results indicated a significant association between experimental condition and the distribution of customer behaviors, $\chi^2(15, N = 426) = 38.20$, $p = .001$, demonstrating that customer behavior distributions differed across conditions. Further comparisons revealed a significant difference in behavior distributions between Area D with transparent partitions and Area D with opaque partitions, $\chi^2(5, N = 254) = 13.62$, $p = .018$. This finding indicates that, within the Area D context, partition transparency is more strongly associated with variations in customer behavior distributions.

A contingency table was constructed with behavior categories (7 types) and contextual conditions (4 types: transparent/opaque × Areas D/E), and Pearson's chi-square test of independence was conducted. The results indicated that the distribution of customer behaviors differed significantly across the four conditions, $\chi^2(18, N = 427) = 40.17$, $p = .00198$, with Cramér's $V = .177$. Given the presence of small expected frequencies, a fixed-margin Monte Carlo simulation (50,000 iterations) yielded consistent results ($p = .00128$), demonstrating the robustness of the observed differences.

Further examination using adjusted standardized residuals revealed that "Dining-related" behaviors were significantly higher than expected in the Opaque–Area E condition and significantly lower than expected in the Transparent–Area D condition. In addition, the Transparent–Area D condition exhibited higher-than-expected frequencies of "Interaction among co-diners," "One-way interaction," and "Temporarily put" behaviors. Overall, the contextual conditions not only produced statistically significant differences in behavioral proportions with a modest effect size ($V = .177$), but these differences were also concentrated in the relative increases and decreases of "Dining-related" and "Interaction / Temporarily put" behaviors under specific conditions. These findings suggest that partition visibility and area-specific characteristics may jointly influence customers' patterns of stay and interaction within the dining environment.

Table 3 Frequency Table of Customer Behaviors across Different Conditions

Behavior	Transparent Partition		Opaque Partition	
	Transparent – Area D (n=142)	**Transparent – Area E (n=91)**	**Opaque – Area D (n=112)**	**Opaque – Area E (n=82)**
Dining-related	33 (23.2%) ↓ *	23 (25.3%)	36 (32.1%)	38 (46.3%) ↑ *
Interaction among co-diners	28 (19.7%) ↑ *	14 (15.4%)	12 (10.7%)	8 (9.8%)
One-way interaction	5 (3.5%) ↑ *	1 (1.1%)	1 (0.9%)	0 (0.0%)
Personal behavior	54 (38.0%)	46 (50.5%)	50 (44.6%)	32 (39.0%)
Looking down	1 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Temporarily put	19 (13.4%) ↑ *	3 (3.3%)	7 (6.2%)	2 (2.4%)
Sleeping	2 (1.4%)	4 (4.4%)	6 (5.4%)	2 (2.4%)

Pearson $\chi^2(18, N = 427) = 40.17$, $p = .00198$；Monte Carlo（50,000 times）$p = .00128$；Cramer's $V = .177$。

4 CONCLUSION

Based on the results of the questionnaire survey, this study analyzed participants' psychological expectations through three dimensions: subjective restriction and discomfort, augmentation of one's space, and personal sensitivity. The findings indicated that customers with different dining

types—including hot pot, light meals, and Chinese snack diners—exhibited varying expectations regarding spatial crowding and environmental sensitivity.

In addition, using thematic analysis, participants' positive and negative perceptions of table partitions were categorized. Negative perceptions were primarily associated with spatial constraint and discomfort caused by transparency, while positive perceptions emphasized hygiene, privacy, and a sense of safety.

Following the non-participant observation experiment, the relationship between table partitions and customer dining behavior was analyzed. The results showed that diners exhibited different behaviors and seating choices depending on the transparency of the table partitions, with behavioral distributions demonstrating significant differences. During the observations, the majority of solo diners preferred seats with opaque partitions and were willing to accept constrained space without relocating the partitions. Based on these findings, it is recommended that restaurants strategically employ different types of table partitions to provide safe and comfortable dining environments tailored to diverse customer needs.

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