



Perceived situational appropriateness for foods and beverages: consumer segmentation and relationship with stated liking

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ABSTRACT

A degree of inter-individual heterogeneity in perceived situational appropriateness for foods and beverages (F&B) was predicted to exist, and empirically confirmed in studies with > 1000 Australian and New Zealand adult consumers (urban dwelling). Two main consumer segments labelled “adaptive” and “conforming” were identified. The main difference between the segments was in the number of F&B items considered appropriate for a certain eating occasion, with this number being smaller in the segments that seemed to more strongly conform to common norms about what is appropriate to eat and drink at breakfast-, lunch- and dinner-time. There was a positive relationship between perceived appropriateness and stated product liking in accordance with previous reports, and generally less liked foods/beverages were regarded as less appropriate. However, there was also evidence of non-linearity in this relationship such that some highly liked foods were inappropriate for a focal eating occasion (e.g., cereal/muesli at dinner time). Demographic/socio-economic and psychographic variables were largely unsuccessful in explaining segment differences, and, in particular, generalised trait tendency to conform did not differentiate consumers in “adaptive” and “conforming” segments. Food neophobia was, in some instances, linked to reduced perceived appropriateness, but generally, consumers with high neophobia (FNS > 50) responded similarly to the aggregate sample in terms of F&Bs considered to be high vs. low in appropriateness for eating occasions taking place at breakfast-, lunch- and dinner- time. Future research should extend to other F&B stimuli relevant to Australia and New Zealand, to different consumer populations and culturally appropriate F&B stimuli, and also seek to better understand the antecedents of perceived situational appropriateness and how these underpin consumer segments based on appropriateness.

1. Introduction

1.1. Background

Hedonic responses remain a primary interest of sensory and consumer scientists since they serve as a performance indicator in commercial product testing. Yet, high acceptability does not necessarily translate to product success, especially because it does not guarantee that a product will be purchased often or that it is appropriate for its intended usage situation(s) (Jaeger & Porcherot, 2017; Rosas-Nexticapa, Angulo, & O'Mahony, 2005). The final decision to buy or consume a particular food/beverage depends as much on the anticipated usage context as it does on intrinsic product properties (e.g., Belk,

1975; Marshall, 1995; Ratneshwar, 1991; Giacalone, 2019).

Informed by this understanding, several authors have focused on the concept of situational appropriateness, defined as the perceived degree of fit between products and different usage situations (Cardello & Meiselman, 2018). Of particular relevance to the present paper is the item-by-use (IBU) method developed and popularised by Schutz (1988, 1994), where consumers are asked to evaluate the perceived appropriateness of a series of products across possible usage situations, typically by using a 7-point rating scale ranging from “never appropriate” to “always appropriate”. Evaluations of situational appropriateness have been conducted in various past sensory and consumer studies (see Giacalone, 2019 for a recent review), and the IBU approach has been proposed as an adjunct to hedonic testing of food and beverage

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Table 1

Overview of research objectives and empirical studies.

Obj. 1: To explore inter-individual variability in consumers' appropriateness of foods and beverages by establishing segments of consumers with different patterns of situational appropriateness	
Main Study	Obtains appropriateness ratings for F&B names for eating occasions taking place at breakfast-, lunch- and dinner-time 20 F&B names per eating occasion; 758 Australian consumers (online survey)
Follow-up Study 1	Considers impact of variations in eating occasion wording on situational appropriateness for breakfast-, lunch- and dinner-time 20 F&B names per eating occasion; 126 New Zealand consumers (CLT)
Obj. 2a: To characterise the consumer segments from Obj. 1 with regard to the relationships between situational appropriateness and product acceptability	
Main Study	Jointly analyses Obj. 1 appropriateness data and hedonic ratings for the same F&B items
Follow-up Study 2a	Extends Main Study to include F&B items which span further into the disliked range of the hedonic spectrum; dinner-time eating occasion only 30F&B names; 389 New Zealand consumers (CLT)
Obj. 2b: To describe the consumer segments from Obj. 1 with regard to demographic, socio-economic and psychographic characteristics	
Main Study	Compares Obj. 1 segments on demographic, socio-economic and psychographic characteristics
Follow-up Study 2b	Seeks to better understand reasons for unusual eating behaviours which may contribute to improved success for Obj. 2b Two exploratory questions, 366 New Zealand consumers (CLT)

Note. CLT = Central Location Test.

products in central location tests to evaluate whether the tested products have high appropriateness for the usage situation(s) they are intended for (Cardello & Schutz, 1996; Jaeger & Porcherot, 2017).

Several aspects of situational appropriateness need to be better understood, and this motivated the present research. Table 1 provides an overview of the empirical research and associated objectives. In the following sub-sections these objectives are justified.

1.2. Objective 1 – Inter-individual variability in appropriateness ratings

In sensory and consumer research, explorations of inter-individual variability are common, especially in relation to product acceptability (Næs, Varela, & Berget, 2018), and aligned with the view that “average” consumers do not exist (Köster, 2009; Meiselman, 2013). On this basis, within a certain consumer population, inter-individual variability in situational appropriateness would be expected, and a consumer study by Sosa et al. (2005) showed this to be the case for mayonnaise, ketchup, mustard and similar sauces among Argentinian consumers.

However, because situational appropriateness and acceptability are different types of product responses, it is not clear that inter-individual differences should exist to the same extent. Informed by Rucker and Schutz (1982), and referencing cultural norms and rules learned through experience about what is, and is not, appropriate (Marshall, 1993; Rozin, 2006), Schutz (1994, 1999) suggested that inter-individual variability is likely to be modest (compared to that usually obtained with liking data), and that it is possible to obtain stable mean ratings with as few as 25 consumers. The relative stability of situational appropriateness is likely due to its coenotropic character, in other words, the fact that such data are more likely to reflect the culturally agreed fact that a food occupies within a certain consumer group, compared to pure affective evaluations where subjective experiences dominate (Giacalone, 2019). Empirically this would imply that among groups of consumers who vary in perceived appropriateness for foods and beverages, the patterns of differences may be smaller rather than larger.

To unpack this latter notion, consider the case of breakfast foods. In pilot work with 29 New Zealand consumers (unpublished data) undertaken for Giacalone and Jaeger (in review), there was complete agreement that French fries, coleslaw and ice cream were inappropriate as breakfast foods while cereal was always appropriate. For 26 other food names in the pilot study, there were some differences in perceived appropriateness, notably for sandwiches, muffins and waffles which were perceived as appropriate breakfast foods by between 41% and 62% of participants. This was indicative of inter-individual variability, especially since not everyone who perceived muffins to be appropriate

for breakfast felt similarly about sandwiches and/or waffles. There was also significant variation among participants in the number of foods perceived to be appropriate for breakfast, from 6 to 17 of the 30 options, a further indicator that groups of consumers who differ in what foods are perceived as appropriate vs. inappropriate for breakfast may exist. The main study, also with New Zealand consumers (n = 112: Giacalone & Jaeger, in review) confirmed moderate appropriateness, on average, for sandwiches, muffins and waffles as breakfast foods, and near consensus regarding highly appropriate foods (cereal, toast, and bacon and eggs) and highly inappropriate foods (sushi, macaroni and cheese, French fries).

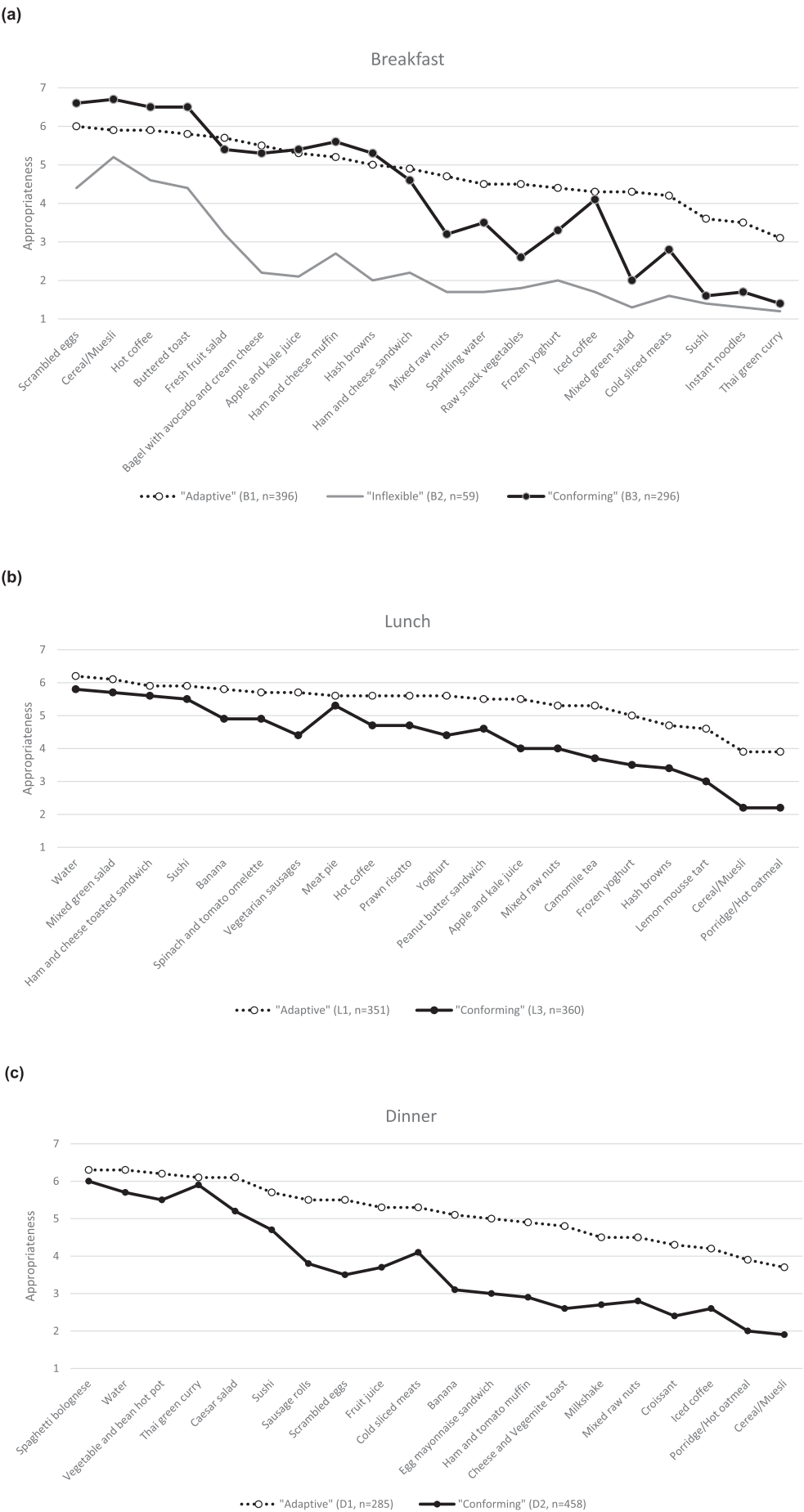
In summary, within a certain consumer population, inter-individual differences in situational appropriateness are expected, but likely to be modest. Objective 1 explores this empirically and attempts to establish segments of consumers within a single population with different patterns of perceived situational appropriateness for foods and beverages.

1.3. Objective 2a: Relationship between appropriateness and acceptability

Objective 2 sought to characterise the consumer segments established in Objective 1, and in Objective 2a the focus was on how appropriateness supplements hedonic-based product insights. This could not be readily predicted considering the lack of convergence of findings from previous studies, where a strong linear correlation between situational appropriateness and product liking (e.g., Cardello et al., 2000) seemed to contradict instances of large differences in situational appropriateness among samples that are not differentiated in terms of liking (e.g., Cardello & Schutz, 1996; Geertsen, Allesen-Holm, & Giacalone, 2016). The latter results fit with the notion that products which perform well in a sensory and hedonic sense can be inappropriate for the situation intended by a marketer or product developer (Schutz & Jaeger, 2010), and the first results fit with reports of products with low acceptability being perceived as situationally inappropriate (e.g., Lähteenmäki & Tuorila, 1997, 1998; Jaeger et al., 2013). This could point to a non-linear relationship which is shaped by the degree of product liking or disliking (or, *vice versa*, the degree of situational appropriateness or inappropriateness), and a fuller understanding of this relationship, coupled with an understanding of how it extends to consumer segments based on appropriateness shaped Objective 2a.

1.4. Objective 2b: Profiling appropriateness-based consumer segments

The purpose of Objective 2b was to characterize appropriateness-based consumer segments in terms of consumers' individual characteristics, a direction for future research initially suggested by Rucker



(caption on next page)

Fig. 1. Line plots for selected consumer segments in the main study showing mean values for appropriateness for each of 20 food and beverage (F&B) items in each of three eating occasions, where: (a) breakfast time, (b) lunch time and (c) dinner time. For each of Figs. 1a, 1b and 1c, F&B items are listed in the order of highest to lowest mean score for the “adaptive” segment. The number of consumers in each segment (n) is shown in the legend between brackets.

and Schutz (1982). Sosa et al. (2005) successfully established a link between appropriateness and frequency of consumption, but reported that inclusion of demographic variables did not improve their model's prediction. This fits with Giacalone and Jaeger (2016) who suggested that attitudinal and behavioural aspects, including previous experience with a product category are more likely than demographic variables to moderate appropriateness ratings.

Situated within this context, Objective 2b attempts to profile appropriateness-based consumer segments by linking appropriateness ratings and food-related attitudes and motives known to underpin food choice. Among many available measures and scales, food choice motives (e.g., Steptoe, Pollard, & Wardle, 1995) and trait food neophobia (e.g., Pliner & Hobden, 1992) were selected with reference to broad coverage and specific relevance for food likes and dislikes, respectively. Considering that evaluations of appropriateness reflect cultural norms regarding what foods are appropriate to eat in different situations, it was anticipated that tendency to conform, which is defined in the psychology literature as a predisposition to acquiesce to relevant social norms (Goldsmith, Clark, & Lafferty, 2005), could be relevant in characterising the consumer segments established in Objective 1. People are known to differ substantially with regards to their tendency to conform (Buboltz, Johnson, & Woller, 2003; Goldsmith, Clark, & Lafferty, 2005), suggesting that it might be possible to differentiate consumer segments based on whether they are more or less likely to defer to cultural norms on what is appropriate to eat in a specific situation (and whether this is different across different food consumption situations, as tendency to conform itself is also known to be situation-dependent (Bond & Smith, 1996)).

2. Materials and methods

The empirical work consisted of a main study which addressed objectives 1, 2a and 2b (Table 1). In addition there were three follow-up studies, which each addressed one objective and sought to rule out alternative explanations for the main study findings or deepen the insights gained herein.

2.1. Main study: Participants

The main study took place in Australia with 758 consumers (18–69 years old, 52% female) (see Part 1 of Supplementary Material for full participant details), who were involved in household grocery shopping and food preparation (more than once a week), and were free of major dietary restrictions and allergies (e.g., nut, lactose, gluten). Participants were recruited from major cities, which in the most recent Census (2016) represented 71% of the Australian population (www.abs.gov.au).

Participants were members of an online panel managed by Quality Online Research (New South Wales, Australia). If they qualified for participation, they completed the survey from a location of their choosing, using a laptop or desktop computer. The average time to complete the study was 18 min.

The research was covered by a general approval for sensory and consumer research from the Human Ethics Committee at the New Zealand Institute for Plant and Food Research. Participants were assured that their responses would remain confidential. As compensation for their time, participants earned loyalty points equivalent to \$AUD 4.

2.2. Main study: Eating occasions and F&B names

The three daily main eating occasions served as the focal contexts.

Not only are these very different in terms of, for example, caloric content, length, number of items consumed, social context, a strong dependency between type of eating occasion and liking for specific food and beverages is also well documented (e.g., Meiselman, 2006, 2008; Rozin & Tuorila, 1993).

Written stimuli, in the form of product names were used as they enjoy widespread use (e.g., King et al., 2015; Törnwall, Silventoinen, Hiekkalinna, Perola, Tuorila, & Kaprio, 2014; Oakes, 2006; Meiselman & Waterman, 1978), and are known to perform well in food-related consumer research including context and situational research (e.g., Cardello & Schutz, 1996). They are also highly compatible with survey research. Within each eating occasion, a total of 20 food and beverage (F&B) stimuli were used (3–4 beverages per eating occasion). While featuring some overlap, the lists of F&B items were specific to each eating occasion (Fig. 1) and a total of 42 different stimuli were included.

The process of identifying F&B items with relevance to Australia began by a brainstorming session among two of the authors (SRJ, CMR), who in discussion with another two consumer researchers developed an initial list of foods and beverages for each of the three eating occasions. Several criteria informed the selection of candidate F&B items, as follows: Since the study participants were recruited from a general population, F&B items expected to be relatively unfamiliar to many Australians (e.g., durian, kippers, kedgeree kombucha) were disregarded. Among foods and beverages expected to be widely known, those predicted to be quite disliked were disregarded since they are less frequently consumed and/or not common among commercially available products, and always expected to be associated with low situational appropriateness (Lähteenmaki & Tuorila, 1997). As a prerequisite to exploring variability in appropriateness and consumer segmentation, F&B items that were expected to span a range of perceived situational appropriateness (from high to low) were identified for each eating occasion. In acknowledgement of diversity in eating and drinking habits, F&B items that ranged from simple (e.g., water, croissant), to complex (e.g., Thai green curry, meat pie) were included.

Pilot work with Australian adults similar to the main study population were used to finalise the lists of F&B items. Based on responses from 100 people, mean values for stated liking and situational appropriateness were calculated and used to develop revised lists of candidate F&B items, which also benefitted from discussion with the online survey provider who contributed an Australian perspective on eating and drinking habits in the context of the three daily main eating occasions. The revised lists, with 20 F&B items per eating occasion were tested with another 100 people (again similar to those taking part in the main study), which confirmed their suitability (i.e., no highly disliked foods and a range of perceived situational appropriateness).

2.3. Main study: Data collection

The survey used for data collection, which all participants completed in full, comprised multiple sections as guided by the objectives of the research.

Respondents rated situational appropriateness for food and beverage names using a 7-pt scale that was labelled at the end-points with ‘not at all’ (1) and ‘very’ (7) (Schutz, 1988; Cardello & Schutz, 1996). The instructions were: “How appropriate are the following foods/beverages at < eating occasion > time?” (i.e., breakfast time, lunch time or dinner time). In Australia, these terms are widely understood to reference eating occasions taking place in the morning, mid-day and evening, respectively.

Each participant rated 20 stimuli for each of the three eating

occasions. The names were shown in randomised order across participants, and the eating occasions were also presented in randomised order. The 20 F&B items for one eating occasion were all completed before the next eating occasion was shown. Stated liking for each of the food and beverage items were obtained subsequent to all appropriateness evaluations, using a 9-pt scale (1 = 'dislike extremely', 9 = 'like extremely').

For background questions, in addition to standard demographic and socio-economic questions such as age, gender, income and household composition, a scale measuring food choice motives (FCQ: [Onwezen et al., 2019](#)) was used. In response to the prompt "It is important to me that the food I eat on a typical day ...," participants used a 4-pt scale (1 = 'not at all important', 2 = 'a little important', 3 = 'moderately important' and 4 = 'very important') to rate 11 statements which mapped onto food choice factors: health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical (comprising: environment, animal welfare and social justice). The 10-item Food Neophobia Scale (FNS) was also administered ([Pliner & Hobden, 1992](#)), with responses on a Likert scale (1 = 'disagree strongly', 7 = 'agree strongly'), as was a validated scale for measuring general tendency to conform ([Goldsmith, Clark, & Lafferty, 2005](#)). It presented seven word pairs as semantic differentials on a 7-pt scale (e.g., inflexible – adaptive, opposing – accommodating). Attempting to capture tendency to conform more specifically with regard to eating and drinking, a 10-item composite measure was developed by the authors and revised following discussion with colleagues. A 7-pt Likert scale was used to rate the items, which included: "Once in a while, I think it is okay to have cereal for dinner," and "I follow the social conventions about what foods should be eaten for breakfast, dinner and lunch." Part 2 of [Supplementary Material](#) has full details.

For all multi-item scales used in the background section of the questionnaire, items were presented in randomised order across participants. The order was always: food choice motives, tendency to conformity (general), food neophobia and tendency to conformity in eating and drinking behaviours eating (F&B specific).

2.4. Main study: Data analysis

Guided by Obj. 1, hierarchical cluster analysis (Manhattan distance, complete linkage method) was performed on appropriateness ratings to establish consumer segments. This was done separately for each of the three eating occasions using the 20 F&B names as input. The Manhattan distance was chosen over the more common Euclidian distance due to its resistance to outliers ([MacFie, 2007](#)). A benefit of the complete linkage algorithm is that it does not seek to form clusters of equal size, and is thus regarded as more realistic for food and beverage applications ([MacFie, 2007](#)).

The number of clusters were determined by cutting the dendrogram at a fixed height ($h = 80$), which resulted in 3 or 4 clusters per eating occasion. This strategy sought to account for a significant amount of individual variation while still providing a good account of the data (based on visual inspection of the respective dendrograms). In each eating occasion, two large clusters were established (285 to 458 people). One or two small clusters were always established, but excluded from further consideration except for illustrative purposes: B2 ($n = 59$), B4 ($n = 7$), L2 ($n = 47$) and D3 ($n = 15$) (where B represents breakfast-time, L represents lunch-time and D represents dinner-time).

In each eating occasion, internal validation of the cluster results was obtained by dividing the sample into three sub-groups (250, 250 and 258 people) which were analysed exactly as above. The results for individual sub-groups were compared to the aggregate data, and in each instance replicating the patterns of appropriateness found in the main consumer segments. Part 3 of the [Supplementary Material](#) shows this for one sub-group in each of the breakfast-, lunch- and dinner time eating occasions, and also details the number of participants in each cluster.

Linked to Obj. 2a, means and standard deviations for hedonic scores were calculated, either at the aggregate level or within clusters, and this was similarly done for appropriateness scores. Comparisons of means were performed using ANOVA, and correlation analysis served to determine the association between situational appropriateness and stated liking. Further characterisation of the established consumer segments (Obj. 2b) was done using the available person-specific responses, with a comparison across the main clusters using ANOVA. For three of the four consumer trait scales (excl. FCQ), additional pre-processing was required to establish groups based on a triadic split of summed scores (Part 4 of [Supplementary Material](#) has full details).

All analyses were performed using R software ([R Core Team, 2017](#)) using a 5% significance level.

2.5. Follow-up studies 1, 2a and 2b

Additional data collection in New Zealand provided an opportunity to explore some aspects of the results in the main study. Despite introducing participant nationality as a confounding factor, the benefit of additional data outweighed the limitations, especially considering the cultural similarity between New Zealand and Australia ([Green & Power, 2006](#); [Hofstede Insights, 2010](#)) also with regard to eating and drinking habits ([Worsley & Scott, 2000](#)).

When the patterns of situational appropriateness in the different consumer segments (Obj. 1) were established, it became relevant to consider if these could be linked to how participants interpreted the eating occasions. To this end, Follow-up Study 1 ($n = 126$, 50% female, 20–66 years old) made a comparison between two context variants: "a typical weekday < eating occasion name >" and "a weekend or holiday < eating occasion name >". The F&B names from the main study were used (20 for each of the three eating occasions).

Follow-up Study 2a ($n = 389$, 21% female, 20–66 years old) included F&B items (dinner-time eating occasion only) that were expected to be less well liked than those in the main study. The new items were intended to be less liked (and ideally disliked, on average), while being moderately to highly appropriate at dinner-time and included tofu stir-fry, tripe and onions, lamb neck stew, fried liver, fish tail soup.

Few differences between consumer segments in terms of participant characteristics motivated Follow-up Study 2b ($n = 366$, 20% female, 20–66 years old). Participants described something they had previously eaten for breakfast, lunch or dinner that others would regard as less conventional and not fitting with common norms for this type of eating occasion, and reasons behind this unconventional choice.

Part 5 of [Supplementary Materials](#) contains additional details about the three follow-up studies.

3. Results

3.1. Objective 1: Consumer segmentation

3.1.1. Main study: Data summary

Prior to consumer segmentation, the data was summarised at the aggregate level ($n = 758$) to verify fitness-for-purpose (Part 6 of [Supplementary Material](#) has full details). Mean hedonic scores confirmed that the F&B items were not disliked by consumers, on average (5.1 to 7.8 of 9), while representing a broad range of situational appropriateness (2.6 to 6.2 of 7). In each of the three eating occasions significant differences between the F&B items with regard to appropriateness and stated liking were established ($p < 0.001$). As additional confirmation of the internal consistency in the data, F&B items used in more than one eating occasion were compared, and always the mean appropriateness values fitted expectations.

3.1.2. Main study: Clusters with varying patterns of situational appropriateness

The cluster profiles for situational appropriateness across the three

Table 2

Summary statistics for main study that illuminate the relationship between situational appropriateness (1 = 'not at all' and 7 = 'very') and product liking as liking varies from 1 = 'dislike extremely' to 9 = 'like extremely.' For aggregate level data (n = 758), mean values are based on all F&B items across the three eating occasions (breakfast-time, lunch-time, dinner-time). Within the main consumer segments (n = 285–458), mean values are based on 20 F&B items in each of three eating occasions. Within columns, Tukey's test was used to compare means and letters indicate which values were significantly different at the 5% level. The Pearson correlation coefficient is calculated using mean values.

Stated liking	Mean values for situational appropriateness						
	Aggregate	Breakfast "Adaptive"	Breakfast "Conforming"	Lunch "Adaptive"	Lunch "Conforming"	Dinner "Adaptive"	Dinner "Conforming"
1: dislike extremely	3.2 ^a	3.7	3.1	5.2	3.2	4.3	2.6
2: dislike very much	3.4 ^b	4.0	3.6	5.0	3.3	3.9	2.8
3: dislike moderately	3.5 ^{bc}	4.0	3.7	4.8	3.3	4.5	2.7
4: dislike slightly	3.7 ^c	4.1	3.4	4.9	3.7	4.6	3.3
5: neither like nor dislike	3.8 ^d	4.3	3.5	4.9	3.9	4.6	3.3
6: like slightly	4.2 ^e	4.5	3.9	5.0	4.0	4.9	3.4
7: like moderately	4.5 ^f	4.8	4.1	5.2	4.3	5.0	3.7
8: like very much	4.8 ^g	5.1	4.5	5.5	4.8	5.2	4.1
9: like extremely	5.3 ^h	5.8	4.9	6.1	5.4	5.8	4.5
Correlation coefficient	0.98	0.95	0.91	0.66	0.96	0.93	0.98

eating occasions were similar. Not with respect to the F&B items which were occasion specific, but with regard to the pattern of the appropriateness scores across the clusters. Considering the two large clusters in each eating occasion (296–458 people per cluster), one cluster could be described as situationally "conforming," where the term conforming is used to convey that the mean appropriateness scores where 'high' to 'moderate' for F&B items typically consumed in that occasion, and 'moderate' to 'low' for F&B items not commonly regarded as typically for that type of eating occasion. The other cluster could be described as situationally "adaptive", where the term adaptive is used to capture the difference relative to the "conforming" segment in the way that more F&B items had 'high' to 'moderate' appropriateness scores. Visually this is seen in Fig. 1, which presents line plots for each eating occasion, showing mean appropriateness for the 20 F&B items. In each eating occasion, the situationally "adaptive" cluster (dotted line, white circles) had a more shallow slope as fitting with higher appropriateness ratings overall and less tendency to perceive many foods/beverages as inappropriate for a certain occasion (> 3 of 7 for all F&B items). Conversely, in the situationally "conforming" clusters (black lines, black circles), the lines were more steeply sloped and typically several F&B items within an eating occasion had low perceived appropriateness (~2 of 7). In the breakfast occasion a third cluster is shown (grey line), which could be described as situationally "inflexible" since only typical weekday breakfast foods were regarded as appropriate. Caution regarding this segment should be exercised since it is based on 59 people (compared to 296–458 people in the other segments).

A comparison of the percentages of consumers that belonged to the "adaptive" vs "conforming" cluster revealed differences across the three eating occasions. For the breakfast occasion, 57% of consumers were "adaptive", but this proportion reduced to 49% for the lunch occasion ($\chi^2_{(1)} = 9.2$, $p = 0.002$), and further dropped to 38% for dinner ($\chi^2_{(1)} = 18.6$, $p < 0.001$). Thus, the breakfast occasion was the occasion where most people were likely to have adaptive perceptions about what is appropriate to eat and drink. The opposite was true for the dinner occasion, and could suggest that changes in urban-dwelling Australians' norms about what to eat and drink occur less quickly for eating occasions at dinner-time than breakfast-time.

3.1.3. Follow-up study 1: Context wording

In the main study, the differential patterns of situational appropriateness across segments were interpreted as arising from differences among people who were situationally "adaptive" vs. "conforming." An alternative explanation is that the consumers in the different clusters are not different in their outlook on situational appropriateness *per se*, but rather approached the survey task differently, with situationally "conforming" consumers interpreting the meaning of eating occasions

taking place at breakfast-, lunch- and dinner-time more narrowly. For example, they could be considering regular occasions only (e.g., typical weekday) and disregarding more infrequent occasions (e.g., at weekends or during the holidays). Following this line of reasoning, the situationally "adaptive" consumers would have considered a wider range of eating occasions to be appropriate, resulting in higher appropriateness for some of the F&B items relative to situationally "conforming" consumers. The results of Follow-up Study 1 indicated that it was an unlikely explanation for the main study segmentation results. The within-occasion profiles of situational appropriateness were more similar than different, and because this magnitude of differences appeared to be smaller than those between the consumer segments in the main study, it could reasonably be inferred that differences between the situationally "adaptive" and "conforming" consumers segments were beyond those linked to context interpretation (full results in Part 7 of [Supplementary Material](#)).

3.2. Objective 2a: Segment characterisation – Relationship with liking

Objective 2 sought to characterise the consumer segments established in Objective 1, and in Objective 2a the focus was on how appropriateness supplements hedonic-based product insights. There were three parts to the analysis, progressing from more aggregate and generalised (Table 2, Fig. 2) to more specific (Fig. 3).

3.2.1. Main study: Characterising the appropriateness-liking relationship (aggregate level)

Table 2 was the starting point for characterising the relationship between stated liking and perceived appropriateness, and herein appropriateness responses are disassociated from the F&B items that they were elicited in response to. For all instances across the 758 participants where an F&B item was rated as being 'extremely disliked' (1) the mean appropriateness was calculated, and this was similarly done for all other scale points.

A strong linear relationship existed where appropriateness increased with liking ($r = 0.98$) to clearly establish that at aggregate level foods and beverages which are disliked are not perceived as appropriate. This interpretation extended to each of the three eating occasions ($r = 0.97$: Part 8 of [Supplementary Material](#)), and to consumer segments within eating occasions ($r > 0.91$). The latter revealed that while consumers in the situationally "adaptive" and "conforming" segments had different patterns of perceived situational appropriateness for F&B items, they responded similarly at the individual level: if a food or beverage was disliked, it was not be perceived as appropriate for consumption. The only partial exception to this relationship, based on $r = 0.66$, was the situationally "adaptive" consumer segment in the lunch-time eating occasion.

3.2.2. Main study and Follow-up study 2a: Characterising the appropriateness-liking relationship through F&B items (aggregate level)

To facilitate exploration of the appropriateness-liking relationship at the level of individual F&B items, Fig. 2a shows a scatter plot of mean values based on all data in the main study ($n = 758$). Two of the results reported in the extant literature were confirmed: a linear relationship when perceived appropriateness is higher (oval w/ dotted line) and a

Fig. 2. Scatter plots of mean values for stated liking (1 = ‘dislike extremely’, 9 = ‘like extremely’) against appropriateness (1 = ‘not at all appropriate’, 7 = ‘very appropriate’) in the main study, where: (a) Data from the aggregate sample ($n = 758$ consumers) for 20 food and beverage (F&B) items in each of three eating occasions (breakfast-time, lunch-time and dinner-time). The values shown between brackets in the legends is the overall mean for stated liking across the 20 F&B names for the focal eating occasion; (b) Data from Follow-up Study 2a ($n = 389$ consumers) for the 30 F&B items in the dinner-time eating occasion. The value shown between brackets in the legend is the overall mean for stated liking across the 30 F&B names; (c) Data from the neophobic consumers in the main study ($n = 38$ consumers) defined as those with a summed food neophobia score (FNS) of 50 or greater (of 70). The values shown between brackets in the legends is the overall mean for stated liking across the 20 F&B names for the focal eating occasion.

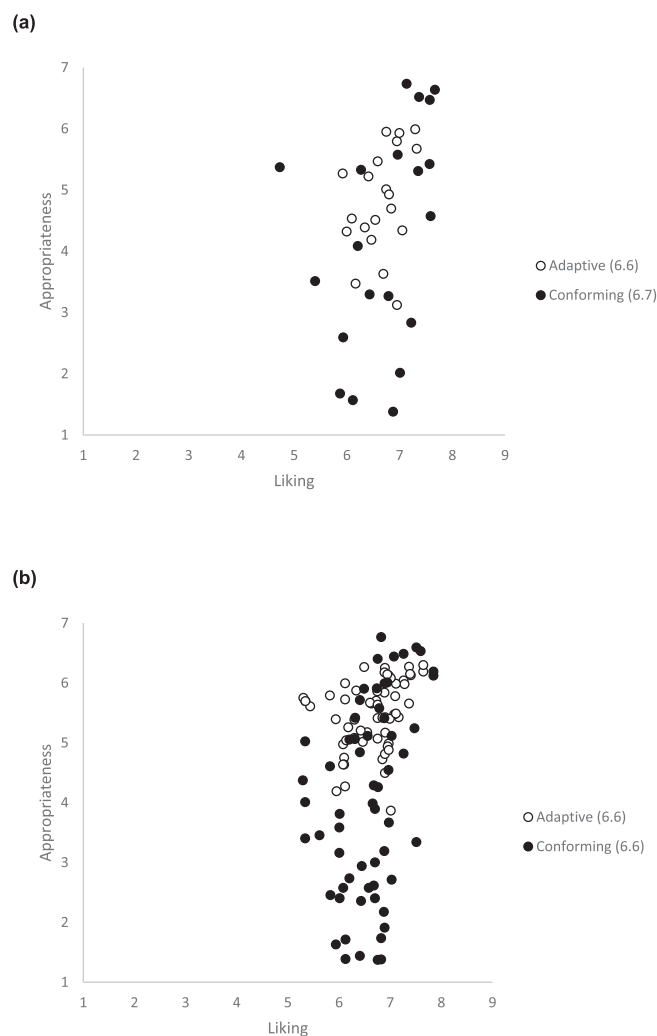
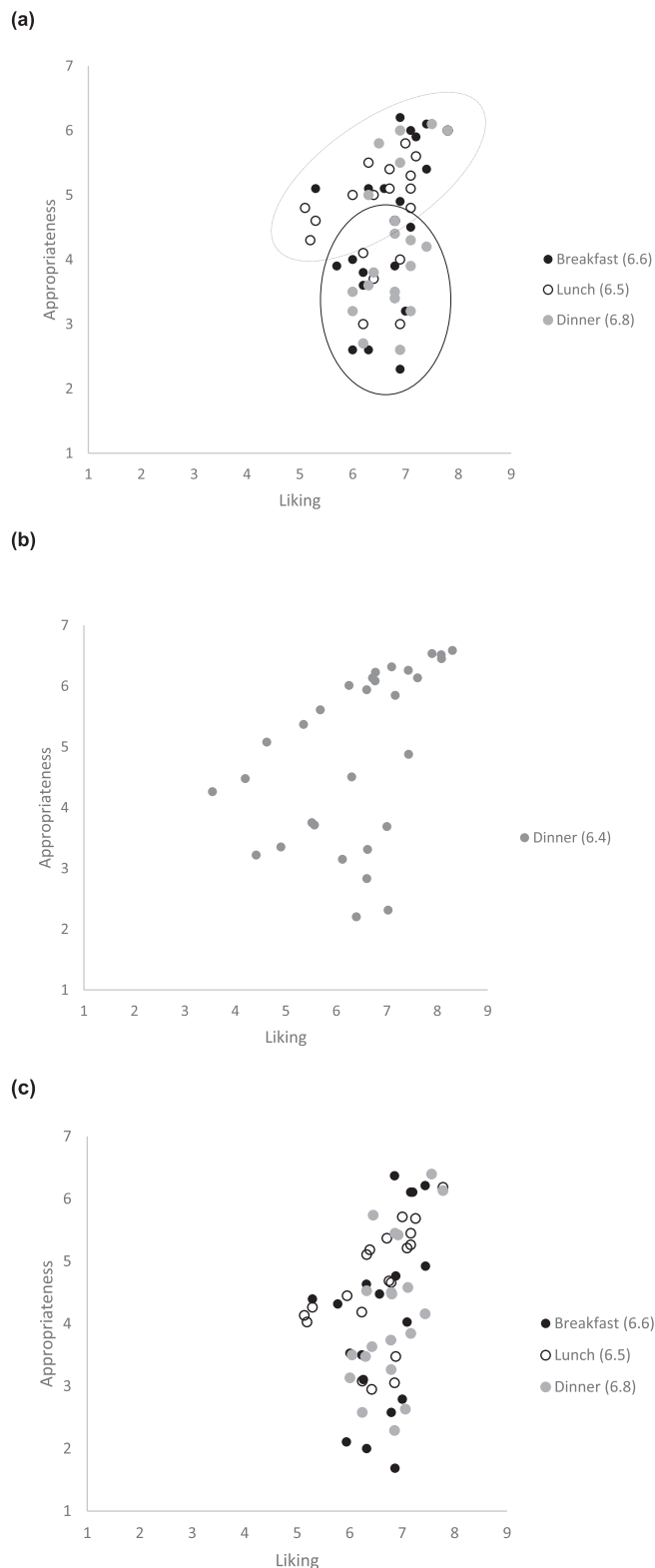


Fig. 3. Scatter plot of mean values based on aggregate sample for stated liking (1 = ‘dislike extremely’, 9 = ‘like extremely’) against appropriateness (1 = ‘not at all appropriate’, 7 = ‘very appropriate’) in the main study, where: (a) Data from the breakfast-time eating occasion showing the situationally “adaptive” consumer segment (white circles, $n_{B1} = 396$) and the situationally “conforming” consumer segment (black circles, $n_{B3} = 296$) with values between brackets in the legends being the overall mean for stated liking across the focal 20 F&B items; (b) Data from the people who consistently classify as more situationally “conforming” (black circles, $n = 132$) and the people who consistently classify as more situationally “adaptive” (white circles, $n = 148$). The plotted values represent the 60 food and beverage items presented as 20 names in each of the three eating occasions (breakfast-time, lunch-time and dinner-time). The values shown between brackets in the legends is the overall mean for stated liking across the 42 unique F&B names used in the main study.

lack of relationship when perceived appropriateness is lower (oval w/ black line). The two patterns were about equally common, but not equally dominant across the three eating occasions. The lunch-time F&B items were more likely to place in the oval that captured the linear relationship between situational appropriateness and liking.

Follow-up Study 2a included multiple F&B items expected to be more disliked than liked, while also varying in expected appropriateness (dinner-time eating occasion, $n = 389$) (see Part 9 of [Supplementary Material](#) for the 30 F&B wordings and means for stated liking and appropriateness). The scatter plot in [Fig. 2b](#) of the Follow-up Study 2a results replicated the two response patterns identified in [Fig. 2a](#): a linear relationship between liking and appropriateness and a disassociation between liking and appropriateness. Follow-up Study 2a also replicated the main study findings with regard to showing low appropriateness for disliked F&B items, and an increase in appropriateness from 2.9 to 6.0 (of 7) as liking increased from 'dislike extremely' (1) to 'like extremely' (9) ($r = 0.98$).

3.2.3. Main study: Characterising the appropriateness-liking relationship through F&B items (segment specific)

Within consumer segments, the relationships between situational appropriateness were similar to those found at the aggregate level. Using the breakfast-time eating occasion as the exemplar, [Fig. 3a](#) shows a scatter plot of mean values for stated liking and perceived appropriateness for the situationally "adaptive" and "conforming" clusters. The difference in the range of appropriateness scores between these clusters observed in [Fig. 1a](#) can be seen, and, interestingly, this appears to occur without large differences in overall mean values for liking of the F&B items (6.6 and 6.7, respectively). This supports the notion that within a certain consumer population, some people consider a greater range of foods/beverages to be appropriate for a given eating occasion, while among other people fewer foods/beverages are appropriate.

Table 3

Summary of consumer segments in main study based on appropriateness, stated liking and participant characteristics (mean values unless otherwise indicated). The last two columns represent the clusters defined by the participants who in all three eating occasions belonged to either the adaptive or conforming clusters. Comparative values for the aggregate sample and minor consumer segments are shown in Part 8 of the [Supplementary Material](#). Refer to Part 1 of [Supplementary Material](#) for numerical coding used to calculate mean values for participant characteristics.

Eating occasion	Breakfast-time			Lunch-time			Dinner-time			B, L & D		
	Adaptive	Conforming	<i>p</i> -value **	Adaptive	Conforming	<i>p</i> -value	Adaptive	Conforming	<i>p</i> -value	Adaptive	Conforming	<i>p</i> -value
Cluster name	Adaptive	Conforming		Adaptive	Conforming		Adaptive	Conforming		Adaptive	Conforming	
Cluster size	396	296		351	360		285	458		148	132	
Appropriateness	4.8	4.2	***	5.4	4.3	***	5.2	3.7	***	4.9	4.0	***
Stated liking	6.6	6.7	n.s.	6.8	6.3	***	7.1	6.6	***	6.6	6.6	n.s.
Correlation ^s	0.36	0.38	n.s.	0.13	0.41	***	0.41	0.50	n.s.	0.28	0.36	n.s.
Female (%)	53.3	54.7	n.s.	57.5	48.9	*	55.8	50.0	n.s.	52.0	49.2	n.s.
Age	3.7	3.9	*	3.7	3.9	*	3.8	3.9	n.s.	3.6	3.9	n.s.
Education level	5.3	5.0	***	5.3	5.0	**	5.1	5.1	n.s.	5.3	5.0	**
Income	3.4	3.3	n.s.	3.4	3.3	n.s.	3.3	3.4	n.s.	3.4	3.4	n.s.
Household size	2.7	2.7	n.s.	2.7	2.6	n.s.	2.7	2.6	n.s.	2.8	2.8	n.s.
Food shopping	2.8	2.8	*	2.8	2.8	**	2.8	2.8	n.s.	2.9	2.7	**
Food preparation	2.7	2.6	*	2.8	2.6	**	2.7	2.7	*	2.8	2.6	***
FCQ*: Healthy	3.3	3.3	n.s.	3.3	3.3	n.s.	3.3	3.3	n.s.	3.4	3.3	n.s.
FCQ: Mood	2.6	2.4	**	2.6	2.4	***	2.6	2.4	**	2.9	2.4	***
FCQ: Convenience	3.1	3.2	n.s.	3.1	3.1	n.s.	3.1	3.1	n.s.	3.1	3.2	n.s.
FCQ: Sensory	3.2	3.4	**	3.3	3.3	n.s.	3.3	3.3	n.s.	3.3	3.5	n.s.
FCQ: Natural	3.1	2.9	*	3.0	3.0	n.s.	3.1	2.9	*	3.2	2.9	**
FCQ: Price	3.3	3.5	***	3.4	3.4	n.s.	3.4	3.4	n.s.	3.3	3.5	n.s.
FCQ: Weight	2.9	2.8	n.s.	2.9	2.8	*	3.0	2.8	*	3.1	2.8	**
FCQ: Familiar	2.8	2.9	*	2.9	2.9	n.s.	2.9	2.8	n.s.	2.9	2.9	n.s.
FCQ: Ethical	2.6	2.4	***	2.7	2.4	***	2.6	2.5	**	2.8	2.4	***
Food Neophobia	31.2	31.3	n.s.	31.1	31.1	n.s.	31.0	31.6	n.s.	30.9	31.5	n.s.
Tendency to conform (General)	33.4	34.7	**	33.8	34.1	n.s.	34.1	33.8	n.s.	33.6	34.4	n.s.
Tendency to conform (F&B specific) ***	47.3	47.4	n.s.	47.7	46.6	n.s.	49.3	45.8	***	48.5	46.1	*

Notes. ^s) Value of Pearson correlation coefficient between appropriateness and liking. *) FCQ = Food Choice Questionnaire where mean values range between 1 and 4. **) Significant differences between the consumer segments were estimated using a) ANOVA (all quantitative variables), b) Fischer's exact test (gender), and c) Fischer's r-to-z transformation for testing the difference between correlation coefficients. All tests were two-tailed. Sig. levels: n.s. $p > 0.05$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ***) Scale is reverse coded so that higher means equate to higher tendency toward unconventional F&B eating patterns.

Table 4

Mean appropriateness scores (1 = 'not at all' to 7 = 'very') for F&B items in the dinner-time eating occasion of the main study, shown for groups of consumers defined by a tertile split of summed Food Neophobia Scores (FNS). F&B Items are sorted by mean appropriateness values for the "low" FNS tertile. F- and P- values are shown in the last two columns, and within F&B items Tukey's test was used to compare means (different letters indicate significantly different values at the 5% level).

Dinner-time F&B items	"Low" FNS	"Medium" FNS	"High" FNS	F _{2,755}	p-value
Thai green curry	6.6 ^c	5.9 ^b	5.5 ^a	43.3	< 0.001
Spaghetti Bolognese	6.5 ^c	6.1 ^b	5.7 ^a	24.7	< 0.001
Water	6.3 ^b	5.9 ^a	5.7 ^a	14.2	< 0.001
Vegetable and bean hot pot	6.2 ^b	5.7 ^a	5.4 ^a	18.6	< 0.001
Caesar salad	5.9 ^b	5.5 ^a	5.2 ^a	11.8	< 0.001
Sushi	5.5 ^b	4.9 ^a	4.6 ^a	19.4	< 0.001
Cold sliced meats	4.9 ^b	4.5 ^a	4.3 ^a	9.1	< 0.001
Fruit juice	4.5	4.3	4.2	1.9	0.15
Sausage rolls	4.5	4.4	4.4	0.2	0.79
Scrambled eggs	4.4	4.2	4.3	0.8	0.46
Banana	3.8	3.8	4.0	0.9	0.41
Egg mayonnaise sandwich	3.8	3.7	3.9	1.3	0.26
Ham and tomato muffin	3.7	3.6	3.6	0.2	0.80
Cheese and Vegemite toast	3.4	3.4	3.7	2.2	0.12
Mixed raw nuts	3.4	3.5	3.6	1.1	0.35
Milkshake	3.3	3.4	3.5	1.2	0.31
Iced coffee	3.2	3.2	3.3	0.3	0.73
Croissant	3.2	3.2	3.2	0.1	0.92
Porridge/Hot oatmeal	2.6 ^a	2.6 ^a	3.1 ^b	7.6	< 0.001
Cereal/Muesli	2.5 ^a	2.5 ^a	2.9 ^b	5.7	0.003

Notes. For "low" FNS group (n = 252), scores range between 10 and 26. For "medium" FNS group (n = 251), scores range between 27 and 36. For "high" FNS group (n = 255), scores range between 36 and 70. Theoretical range for the summed scores (FNS) of the 10 scale items is 10 to 70.

choice decisions. With regard to tendency to conform, there was some support for this trait (general or F&B specific) being higher among consumers in the "conforming" segments.

3.3.2. Main study: Comparison of consumers with varying levels of food neophobia

Relative to the main consumer segments (Table 3), a somewhat higher value for food neophobia was observed in the minor segments, which for L2 (n = 47) and D3 (n = 15) indicated placement in the "high" FNS tertile (Part 10 of Supplementary Material). In these minor segments overall F&B liking was also lower (< 6), which fitted with the inverted relationship between food neophobia and liking reported by Jaeger, Rasmussen, and Prescott (2017). Considering the positive relationship between liking and appropriateness in Section 3.2, this prompted a hypothesis that situational appropriateness would vary for more vs. less food neophobic consumers.

To explore this, groups of consumers classified as "low" (n = 252), "medium" (n = 251) and "high" (n = 255) in food neophobia based on a triadic split of summed FNS scores were compared. Analysis of variance revealed a pattern of results which replicated in the three eating occasions: when situational appropriateness was high (> ~5 of 7), the most neophilic participants ("low" FNS; FNS ≤ 26) rated F&B items as more appropriate than the most neophobic participants ("high" FNS; FNS ≥ 36). In the dinner-time occasion (Table 4), *Thai green curry* illustrates this with mean appropriateness scores of 6.6, 5.9 and 5.5, respectively in the "low", "medium" and "high" FNS tertiles (p < 0.001). Part 12 of the Supplementary Material contains the full results pertaining to the breakfast and lunch occasions, as well as results from a confirmatory analysis with two more extreme FNS groups (FNS ≤ 19 (n = 113) and FNS ≥ 41 (n = 137)).

The influence of food neophobia was not stable across the range of appropriateness scores, and among the 2–3 least appropriate F&B items in each eating occasion an opposite pattern was established. Notably, the most neophobic participants ("high" FNS) perceived F&B items with low appropriateness as slightly, but significantly more appropriate than other participants. In the dinner-time (Table 4), this was seen for *cereal/muesli* (2.9 vs. 2.5) and *porridge/hot oatmeal* (3.1 vs. 2.6) (Part 12 of Supplementary Material has full details).

Continuing a progressive exploration of increasing food neophobia, the most neophobic consumers (FNS ≥ 50, n = 38) were considered

last. Specifically, to explore the appropriateness-liking relationship a scatter plot of means developed to parallel that based on the main study aggregate level data. This showed the 20 food and beverage (F&B) items used in each of the three eating occasions, and perhaps surprisingly there were many similarities between this plot (Fig. 2c) and the aggregate level data (Fig. 2a). A weak positive relationship could be discerned (r = 0.39), and there was also an indication of the dual relationship with: i) a linear relationship between appropriateness and liking, and ii) a disassociation between these two sets of values. Further, the mean values for overall liking and overall appropriateness were only slightly lower in the FNS ≥ 50 segment (6.6 vs. 6.8 for overall liking and 4.3 vs. 4.5 for overall appropriateness). With regard to other participant characteristics, this highly neophobic segment seemed to comprise older people with less education, who placed greater importance on familiarity, sensory factors, price and convenience in their food choice decisions (Part 13 of Supplementary Material).

3.3.3. Follow-up study 2b: Motives for unconventional eating

Follow-up Study 2b sought to compensate for the poor ability to characterise the consumer segments based on situational appropriateness (Obj. 2b). Motives for unconventional / non-conforming eating were established qualitatively: personal taste preferences (28%), ease, convenience and to save time (16%), healthy/nutritious option (11%), what I felt like eating at this point in time (9%), because it fills me up/ because I only want something small (8%), to try something new/different (6%), not being bound by others' norms of what is right and wrong (5%), to limit food waste (5%), lack of other food options at the time (4%) and upbringing/family tradition (4%).

4. Discussion

4.1. Consumer segmentation based on situational appropriateness

4.1.1. Consumers with "adaptive" and "conforming" perceptions of situational appropriateness

Using an urban Australian consumer population as the exemplar, Obj. 1 sought to establish appropriateness-based consumer segments, and two segments with different patterns of perceived appropriateness for 20 F&B items were uncovered in each of the three daily main eating occasions. There was a consistency to these segments, which always

defined consumers who were more “conforming” to common norms about what/what not to eat and drink, and those who were more situationally “adaptive” and generally regarded a larger number of F&B items as appropriate for a focal occasion (Fig. 1).

The segmentation results were occasion specific, and a consumer belonging to the “adaptive” breakfast-time cluster did not necessarily belong to the “adaptive” lunch-time and/or dinner-time clusters. Among 758 consumers, only 148 consistently classified as “situationally adaptive” while another 128 consistently classified as “situationally conforming”, meaning that the majority of participants were “adaptive” in some of the focal eating occasions while “conforming” in some of the others. Furthermore, this fitted with differences across the three occasions in the proportion of consumers that were classified as “adaptive” vs. “conforming”: for the dinner occasion 62% of consumer were “conforming,” while for the breakfast occasion 57% were “adaptive.” The fact that segment membership was contingent on eating occasion resonates with a dual influence of personal preferences/circumstances and societal/cultural norms within a certain population about what is/ is not appropriate to eat in a certain situation (Marshall, 1993; Schutz, 1994; Rozin, 2006). It is plausible that people, for health reasons eschew cereal-based products at breakfast time and opt for products containing meat, potatoes, vegetables and/or eggs (Follow-up Study 2b; Spence, 2017a,b). Yet, the same people could eat “conforming” F&Bs at other times, and in line with most others agree that *mixed raw nuts* have low appropriateness for a dinner-time eating occasion.

There was little opportunity to directly compare the consumer segments established in this research and those based on past research. Baird (1976) identified consumer segments based on ratings of appropriateness for 20 foods in 25 use situations among ethnically diverse homemakers in the USA; and these shared some similarities with the segments established by Rucker and Schutz (1982) in a study with a broader group of foods and uses. The Baird segments - Hostiles, Social Isolates, Unhappy Eaters, Sociables and Confident Independents - were named to capture the essence of people, whereas our segments were named to reflect patterns of appropriateness. Whether or not to expect invariance in appropriateness-based consumer segmentation is unclear at this stage and worthy of further investigation. A sensible first step could be to determine if the present findings of “adaptive” and “conforming” segments replicate and extend to other culturally relevant F&B stimuli for Australia. Next, other eating occasions and consumer populations should be studied. The latter is paramount considering socio-cultural determinants on situational appropriateness (e.g., Nantachai et al., 1991; Jaeger, 2000), and means that both sub-groups within a single national/cultural group, as well as different nationalities need to be studied (using culturally appropriate F&B stimuli, anchored in the dominant eating occasions). It will also help to overcome a limitation of the present research which is the focus on a single population. Non-urban populations may be of particular interest due to differences in diets relative to urban populations (e.g., Tripathy, Thakur, Jeet, Chawla, Jain, & Prasad, 2016; Hakeem, Thomas, & Badruddin, 2000).

Tenability of naming the segments situationally “adaptive” and “conforming” needs to be confirmed through future research. Additional validation could be sought by asking participants the extent to which they agree/disagree with statements such as “I would describe myself as “conforming” to society’s norms about what to eat and drink at different meal times,” which people in the situationally “conforming” segments would be expected to agree more strongly with. Additional statements with greater situational specificity, for example, “for weekday breakfasts, I like to eat hot dishes including leftovers from dinner” would help to discriminate ‘always’ vs. ‘sometimes’ situationally “conforming” (or “adapting”) consumers, or those with “inflexible” perceptions about situational appropriateness such as seen in the smallest of the three breakfast-time clusters (Fig. 1a).

4.1.2. Dependency on F&B stimuli and occasions?

The appropriateness-based consumer segments in the main study

were established in response to written F&B items that were rated for appropriateness relative to eating occasions described in minimal detail. While based on past studies on situational appropriateness (e.g., Cardello & Schutz, 1996; Geertsens, Allesen-Holm, & Giacalone, 2016; Lähteenmäki & Tuorila, 1997, 1998; Jaeger, 2000), these empirical conditions may have influenced and limited the results.

With regard to the F&B stimuli, limitations could pertain to those that were included vs. excluded, and lack of specificity. Consider ‘spaghetti Bolognese’ which was used in the dinner-time eating occasion. Would the results have been different if ‘lasagne’ had been used instead, or if ‘butter chicken’ had replaced ‘Thai green curry’? Although new data collection (with same consumer population) is the only way to answer this question for certain, we speculate that any effect will be smaller rather than larger considering the process whereby the F&B items were selected. In the case of ‘spaghetti Bolognese’, probably ‘lasagne’ would have performed similarly since pilot work identified both as being well-liked and highly appropriate for the dinner-time eating occasion. Regarding specificity of the F&B stimuli, this was deliberately low, but not too low, and we used, for example, ‘cheese and ham sandwich’ rather than ‘sandwich,’ and differentiated between ‘buttered toast’ and ‘cheese and Vegemite toast.’ We regarded more specificity as likely being detrimental since it would be unlikely that everyone in Australia eats, for example, ‘white toast with margarine.’ Moreover, partial ambiguity (e.g., ham and cheese sandwich) gives survey participants the opportunity to draw on personal memories and interpretations, and form a mental image of a ham and cheese sandwich that is relevant to them (Köster & Mojet, 2015).

In the case of the eating occasions, a similar logic to the F&B stimuli was applied. Descriptions of the eating occasions were kept very brief since more narrowly defined occasions (e.g., eating a sit-down breakfast at home on a weekday before going to work) was expected to have limited relevance for many participants within the target population, which, in turn, could lead to task disengagement. Mindful, however, that idiosyncrasy could exist, Follow-up Study 1 sought to disregard the possibility that differences in consumers’ context interpretations underpinned the segments, and, indirectly, this was confirmed by only establishing a few instances where appropriateness varied significantly for two variants of the same type of eating occasion, which always were in the expected direction (Part 7 of Supplementary Material).

To further confirm context wording/interpretation as not underpinning the “adaptive”/“conforming” segmentation of consumers, other explanations should be explored. Fig. 1c point to social context being of possible relevance since “conforming” consumers regarded *scrambled eggs* and *cheese and vegemite toast* as much less appropriate for the dinner occasion than “adaptive” consumers. Assuming that these items are more likely to be eaten alone than in the company of others, this could mean that “conforming” consumers have a more traditional perspective on dinner meals that extends beyond ‘what is eaten’ and ‘when’, to ‘with whom’ it is eaten. Physical context may also matter (where eaten: ‘at home’ vs. ‘in car’, for example), and possibly be connected to more general differences in perceptions about what is a meal, and what is not. For some Australians, drinking a cup of coffee in the car on the way to work may not constitute a breakfast occasion.

Finally, it is necessary to explore a potential limitation regarding elicitation of the appropriateness ratings. The focal question is whether consumers evaluate how appropriate in general an F&B item is for a given eating occasion, or evaluate whether an F&B item is appropriate *for them* for that eating occasion. The theoretical premises of the appropriateness construct (see e.g. Marshall, 1995) leads us to expect it to be the latter, and this is also what the results suggest in the form of low variance between and within consumers as noted by several authors for this type of data (Schutz, 1988, 1994; Giacalone et al., 2015). If subjective influences were more prevalent (i.e., evaluating if this appropriate for me?), greater variation between consumers would likely be higher. However, it is probably reasonable to assume that the two perspectives were partly compounded since personal experience is one

of the ways that consumers learn about the associations between foods and beverages and eating occasions. The decision to not empirically investigate if the frame of reference for appropriateness evaluations alters the results is a limitation of this research.

4.1.3. Profiling of consumer segments

The second objective of the research, which sought to profile consumers in the segments based on appropriateness was partially achieved with regard to ability to differentiate the main consumer segments (Obj. 2b). Significant differences were established for several of the profiling variables and despite the differences in mean values between segments being small (Table 3; Part 11 of [Supplementary Material](#)), they were mostly consistent across eating occasions and formed a pattern whereby consumers in “adaptive” segments were somewhat younger, more educated, more involved in food shopping/preparation and placed somewhat greater importance on neutral ingredients, weight management, mood and ethical issues in daily food choice decisions. Collectively, these differences pointed to a certain consumer typology that seem to fit with modern urban living. A degree of overlap with consumer segments established using the Food Related Lifestyle questionnaire (e.g., [Grunert, 2018](#); [Grunert, Brunsø, Bredahl, & Bech, 2001](#)) was also noted, especially in the linkage between the present “adaptive” and “conforming” segments which somewhat resemble segments these authors refer to as “adventurous” and “conservative”.

Food neophobia showed some promise in discriminating between consumer segments (Table 4, Part 12 of [Supplementary Material](#)), but a strong and direct influence of FNS on appropriateness was not established. Instead, it seemed more probable that consumers’ initial hedonic response to a product primed the subsequent appropriateness rating. This would fit with previous reports that neophobic people gain less pleasure from food ([Jaeger et al., 2017](#)), while acknowledging that product-specific influences exist ([Laureati et al., 2018](#)).

Despite limited ability to discriminate the main consumer segments, it was noteworthy that demographic, socio-economic, psychographic and behavioural variables all contributed to differentiation. This fitted with [Sosa, Martinez, Arruiz, Hough, and Mucci \(2005\)](#) who found demographic and socio-economic variables ineffective in differentiating appropriateness-based consumer segments, and was also in line with reports that these variables have limited value in food-related consumer research (e.g., [Köster & Mojet, 2015](#); [Piqueras-Fiszman & Jaeger, 2016](#); [Mueller & Szolonoki, 2010](#)).

Reaching a stage where antecedents of perceived situational appropriateness can be comprehensively measured is important not only for Obj. 2b, but also for validation of the segmentation results. The latter can be achieved through new research, but is also required within individual studies to ascertain that the segmentation results are not artefacts of cluster analysis, which is structure-imposing despite being structure-seeking as a research strategy ([Aldenderfer & Blashfield, 1984](#)). Ability to differentiate clusters on background variables that have theoretical relevance to the segmentation topic (e.g., tendency to conform) makes it more likely that the clusters reflect real patterns in the data. It compliments replication as a strategy to internally validate a cluster solution (e.g., [Weiner, Freedheim, & Schinka, 2003](#)), and in future research personal value orientation (e.g., [Rokeach, 1973](#)) could contribute in this regard.

4.2. Relationships between situational appropriateness and liking

Through Obj. 2a the present research integrated conflicting past reports on the relationship between appropriateness and liking by repeatedly finding a relationship that can be decomposed into a positive linear linkage and a decoupling of perceived appropriateness and liking (Fig. 2). This explains how products with low appropriateness often couple with disliking (e.g., [Lähteenmäki & Tuorila, 1997, 1998](#); [Jaeger et al., 2013](#)), and how products with similar average liking/disliking

can be differentiated based on appropriateness, but may not always be (e.g., [Cardello & Schutz, 1996](#); [Cardello et al., 2000](#); [Elzermann, Hoek, van Boekel, & Luning, 2011](#); [Geertsen, Allesen-Holm, & Giacalone, 2016](#); [Lähteenmäki & Tuorila, 1997, 1998](#); [Stolzenbach, Bredie, Christensen, & Byrne, 2016](#)). Hence, the implication for product testing is that the inclusion of appropriateness characterisation will be most useful when working with a set of products that are more liked, and more similarly liked, whereas it would be of limited value when working with products with large expected differences in degree of liking/disliking.

The relationship between appropriateness and liking for the group of very neophobic participants (FNS > 50, n = 38) was initially surprising (Fig. 2c). Lower scores for stated liking of the F&B items relative to the aggregate sample (Fig. 2a) would have been expected based on [Jaeger et al. \(2017\)](#), and not finding this could place a question mark over these earlier results. But more likely this was a consequence of F&B item selection in the main study which purposefully excluded items expected to be strongly disliked, which, in turn, meant that many items with stronger/unusual flavours were disregarded such as vindaloo curry, paella, braised beef cheeks, broccoli and celery soup, raw kale salad, aged cheese, etc. In future research, broader coverage of the food and beverage spectrum is recommended, not only in terms of expected liking/disliking, but also with regard to sensory characteristics. Hereby, a further stream of appropriateness research could be integrated – that which seeks to establish linkages with sensory product characteristics (e.g., [Jack, Piggott, & Patterson, 1994](#); [Hersleth et al., 2005](#); [Mejlholm & Martens, 2006](#)).

5. Conclusions

The research was successful in its primary objective and established within an urban Australian population, segments of consumers based on situational appropriateness for three eating occasions: breakfast time, lunch time or dinner time. The larger segments always defined consumers who were more “conforming” to common norms about what/what not to eat and drink, and those who were more situationally “adaptive” and generally regarded a larger number of F&B items as appropriate for a focal eating occasion. The consumer segments were profiled using demographic/socio-economic and psychographic variables, but these were only partly successful in explaining the different patterns of situational appropriateness. Future research is needed to address limitations of these studies, which include studying a single consumer population using a modest number of eating occasions and F&B stimuli. Seeking to confirm “adaptive” and “conforming” consumer segments, future studies should extend to different consumer populations (global and rural), different countries and food/beverage stimuli (incl. less liked products), and, they should also attempt to more fully understand why inter-individual heterogeneity in situational appropriateness exists. Finally, the research extended to the relationships between appropriateness and liking, establishing a relationship that can be decomposed into a positive linear linkage and a decoupling of perceived appropriateness and liking.

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Author contributions

SRJ and DG planned the research, analysed the data and wrote the paper. DIH contributed to data analysis, while other authors supported data collection.

Declaration of conflicts

All authors declare no conflicts of interest.

List of Supplementary Material (Parts 1 to 13)

1. Summary of main study participant characteristics and coding scheme.
2. Information about consumer trait scales used in main study.
3. Internal validation of clustering results for main study.
4. Pre-processing for consumer trait scales used in main study.
5. Materials and methods for Follow-up Studies 1, 2a and 2b.
6. F&B names for main study (breakfast-, lunch- and dinner-time eating occasions) with mean values (and SD) for stated liking and situational appropriateness.
7. Results from Follow-up Study 1.
8. Appropriateness means from main study for liking at 1, 2, 3 ... 9 in each of the three eating occasions.
9. Results from Follow-up Study 2a.
10. Scatter plots from main study of liking against appropriateness for selected consumer segments in lunch- and dinner-time eating occasions.
11. Characterisation of selected minor consumer segments in main study.
12. Comparison of F&B appropriateness for consumer segments (main study) defined by differences in food neophobia (breakfast- and lunch-time eating occasions).
13. Characterisation of the “neophobic” consumer segment in main study and comparison with the consumer cohort defined by FNS < 50 (n = 720).

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.foodqual.2019.05.001>.

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