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## Research Notes

## Self-reference bias in students' and managers' selection of target market segments



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## ABSTRACT

Self-reference is a fundamental aspect of the learning process; all students use themselves as a model to understand others and the things around them. In this paper, we consider how self-reference as a learning technique leads students to unconsciously use themselves as a model for target segments in marketing plans. As many business teachers have probably experienced, students tend to choose to market most products to young adults in their assessments. The act of studying marketing within a business degree should effectively reduce this bias; students should use business and marketing models and empirical approaches as per their teaching when defining a target segment for their marketing plans. What this paper shows, however, is that this self-referential bias remains present in students and even persists among qualified managers working in marketing departments, despite marketing tools and even stereotypes. We identify an immediate practical strategy for business and marketing educators to use to respond to this issue.

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## 1. Introduction

Self-salience – the idea that 'I' am at the centre of my own personal universe (Catrambone, Beike, & Niedenthal, 1996; Klein & Loftus, 1988) – is a well-developed and frequently-used construct relevant to business education and practice. The self is a central marker in the understanding and interpretation of events and how they affect the individual (Rogers, Kuiper, & Kirker, 1977); indeed, individuals tend to define themselves in terms of their personal relationships with other people and social groups (Brewer & Gardner, 1996), a classic example being students using their classmates as frameworks for social comparisons to evaluate their own academic standing (Gest, Rulison, Davidson, & Welsh, 2008). This self-reference bias – defined consistently across literature as an encoding strategy used during the learning process to enable the organisation and elaboration of new information (Gest et al., 2008; Klein & Loftus, 1988; Symons & Johnson, 1997) – occurs naturally in learning, when individuals are presented with large amounts of information to interpret, organise and store. The self in this context functions as a superordinate schema, and plays a significant role in processing, understanding and recollecting information (Rogers et al., 1977), assisting students in mastering new knowledge and skills.

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Processing information self-referentially is a normal, and indeed highly efficient, learning mode (Catrambone et al., 1996), and because of this, all students use themselves as a model to understand the things around them to some extent (Cho & Knowles, 2013; Preckel & Brüll, 2010). The danger of this learning mode, is that business graduates with marketing specialisations who regularly use it in preference to other modes may fall into the habit of over-emphasising their own personal characteristics (including age and gender) when choosing a target segment in a marketing plan, without realising that they are doing so; this may lead to the creation of flawed and ineffective marketing plans. This paper aims to raise awareness of the problems associated with self-referencing as a learning strategy for students, and to offer empirical evidence that these issues can persist amongst not only business-marketing students, but also qualified practitioners.

### 1.1. *Self-reference and learning*

Learning strategies, styles and preferences influence the academic performance of students (Debicki, Kellermanns, Barnett, Pearson, & Pearson, 2016). Thus, it is important to acknowledge the benefits and drawbacks of self-referent encoding. The application of the self is deeply involved in the processing, interpretation and memorisation of all kinds of information (Rogers et al., 1977); the retrieval processes of episodic memory are localised in the right cortex of the brain, and self-referent encoding activates the same area, suggesting that there is a connection between self-referent encoding and the retrieval of memories (Zhu & Zhang, 2002). Speed of attention, facility of memory and neurobiological correlates of processing are all affected by how relevant the information being processed is to the self (Wisco, 2009). The memory of an object has been shown to be stronger when the object is encoded with reference to the self than when it is encoded with reference to another person, or for general meaning (Brown, Keenan, & Potts, 1986). This suggests that self-reference can facilitate the effective encoding and easy retrieval of information (Klein & Loftus, 1988).

Using self-referent encoding strategies leads to faster and more accurate recall than other referent encoding strategies, and results in mnemonic superiority in both organisation and elaboration tasks (Symons & Johnson, 1997). When individuals subconsciously use themselves to create a mental shortcut to the new information they are encoding, the superior organisation makes elaboration of that information much easier (Klein & Kihlstrom, 1986). Self-reference is therefore a much more efficient encoding strategy than other strategies such as semantic coding, particularly when a high memory load is present, as is the case in schools and with students in a college classroom (Symons & Johnson, 1997). This is especially true for young adults, who tend to have superior recognition of self-referenced items compared to older adults (Gutchess, Kensinger, Yoon, & Schacter, 2007).

However, self-referent encoding strategies can also cause problems for students with regard to applying what they have learned effectively. Elaborating encoded information is easier for individuals who do it regularly and as a habit, and the strategy chosen and habit drawn on to do so are more influential than the depth of information processing (Anderson & Reder, 1979). Over-reliance on self-referent encoding can lead to shallow processing of information. Self-reference bias means that individuals are more likely to recall a stream of words if their own name is included in it, because their name functions as a self-relevant stimulus (this is known as the 'cocktail party effect': Wood & Cowan, 2004). Individuals also show a higher level of recall when the stream of words in question contains descriptive words that are relevant to them (Wisco, 2009), and better recall of positive trait adjectives than of negative trait adjectives when these adjectives are encoded with reference to the self (Carver & Scheier, 1981). Finally, when individuals look at a word on a computer screen, they are more likely to be distracted when an image of their own face appears in the screen next to it than when an irrelevant image does. This distraction occurs because more intentional resources are required to attend to self-relevant words and images: in other words, individuals can be distracted from other tasks by their own self-relevance (Bredart, Delchambre, & Laureys, 2006). The implications of this are plain. Due to the highly efficient, habit-forming and distracting nature of self-referent encoding, and the shallow processing of information it promotes, we should be particularly concerned about the presence of self-reference bias in the work of business-marketing students, as it has the potential to distort their selection of target segments. Business educators must therefore work to counter it in the construction of business-marketing education programs and assignments.

### 1.2. *The impact of self-reference on marketing strategy choices*

As self-referencing occurs naturally in all individuals' cognitions (Catrambone et al., 1996), some degree of self-reference bias is only to be expected in the work of the majority of students, even though their education should lead them to ignore the self when identifying target segments. The danger of self-reference bias being allowed to flourish is that students who use self-referent encoding as their primary learning style may continue to inadvertently overemphasise the importance of their personal characteristics of gender and age when choosing a target market segment in a marketing plan, despite having tools to avoid doing so. If they fall into the habit of emphasising target segments that are like themselves, then even after they are qualified, they may fail to register that segments of the market that are not like them might be more profitable to pursue, or might offer advantages that self-reference bias has led them to overlook. They will therefore end up spending money on sub-optimal targeting and communication plans.

There are multiple tools designed to help students make accurate targeting decisions, and these are explicitly taught during training; however, self-reference bias may still be strong enough to override these tools even after extensive exposure. We therefore aim to identify whether students, and indeed qualified managers, are subject to self-reference bias in their decision-making despite their training and exposure to these tools, and what factors, if any, can affect it.

### 1.3. The potential of consumer stereotypes to counteract self-reference bias

Many products and services have stereotypical images of ideal consumers attached to them. Stereotypes regarding the consumers of specific products or services can help students to overcome the habit of using the self as a major basis of – or indeed potential bias in – decision-making processes for these products, by supplying another image of the target market that is strong enough to supplant the self. Gender, age and other stereotypes are present in many advertisements; the stereotypical consumer for milk products, for instance, is female, young to middle-aged, and a mother. Consumer stereotypes such as this can have negative side-effects in that they increase the general misconception that specific groups of consumers are defined largely, or wholly, by specific sets of physiological, psychological and/or behavioural traits (Browne, 2013; Martin, Ruble, & Szkrybalo, 2002). However, as the associative processing that stereotypes promote leads to the creation of powerful false memories (Lenton, Blair, & Hastie, 2001), they also have the ability to increase students' recognition of stereotypical traits to the point where they enter the decision-making processes of business students and professionals, and counteract self-reference bias.

This is not, however, invariably the case. Stereotyping can only operate to counteract self-reference bias if a product has a clear consumer stereotype strongly attached to it, and while this is the case for some products which are purchased only by a specific group, or for which that group makes up the vast majority of consumers (e.g. women as the stereotypical consumers of cosmetics), most products have only weak stereotypes associated with them, or none at all. Products such as grocery and food items, utilities, and technology can be argued to have at best weak stereotypes attached to them: the act of grocery shopping, for example, may be stereotyped as a female activity, but the specific grocery product of bananas is not associated with either male or female consumers (Deutsch, 2010). The impact of stereotyping is therefore likely to be relatively minor in the majority of marketing decisions for specific products, and the absence of strong stereotypes will allow self-reference bias to flourish. Other methods of counteracting self-reference bias are therefore required.

## 2. Study 1

### 2.1. Research hypotheses

As self-reference bias is a naturally occurring cognitive process, we speculate that it will be present in business-marketing students who have completed one or more units of study to some degree. This has led us to formulate two hypotheses for this group:

Hypothesis 1: That participants will choose a target gender biased toward their own gender; that is, that target gender and own gender are related for this group.

Hypothesis 2: That participants will choose a target age biased toward their own age; that is, that target age and own age are related for this group.

We anticipate that there will be a weaker correlation between target gender and own gender, and target age and own age, for a product which has a moderately strong consumer stereotype attached to them than for products with weak or no consumer stereotypes.

### 2.2. Method

An online instrument asked participants to identify which market segment/s a business should target in its next marketing campaign. They were asked this question for seven products and services, which were: a bottle of milk; a phone service provider; an internet service provider; a gas utility; a local rail/train operator; a clothing shop; and a coffee shop. Of these products and services, only the bottle of milk had a consumer stereotype attached to it.

For each product/service, participants were asked to state the gender and age to which they would market the product. At the end of the survey students were asked to state their year of birth, their gender, and how many units of marketing study they had completed.

This method examines business students who have completed at least one unit/course in marketing. To pre-empt our findings, we identify both gender and age self-reference biases in these students' targeting decisions. Given that the small sample size used in this study would make obtaining useful data difficult, we do not test for self-reference bias in the area of race/ethnicity. Therefore, this study only measures the presence of self-reference bias in both gender and age in students because these variables are most commonly used by marketers for segmentation purposes (Lin, 2002; Schewe & Noble, 2000), therefore increasing the study's external validity. The conclusions from the study will enable us to examine whether self-reference bias is present in students after they have been exposed to at least some of the tools that should allow them to overcome it. While we acknowledge that conducting market research prior to selecting target segments would ensure greater objectiveness in decision-making, and thus best practice, biases and heuristics will always exist even before the research starts. For this reason, marketers continue to use heuristics to inform and simplify their practice (Meszaros, 1999). The survey questions used in this study can be found in the Appendix.

### 2.3. Sample

Participants were recruited using a convenience snowball sampling technique from an Australian university during 2014 and 2015. The online survey itself was distributed as widely as possible. Participants who were under the age of 18, who had not completed at least one marketing unit or who did not fully complete the online survey were omitted from the sample. The final sample consisted of 57 participants, with 18 (32%) males and 39 (68%) females, and an average age of 22.825 (SD = 4.158). Participants could win one of several \$20 prizes after completing the survey.

### 2.4. Analysis approach

The study achieved a final sample of 57 respondents. A Chi-square was used to assess the relationship between the participants' target gender and own gender, as per Hypothesis 1. Chi-square analysis was chosen because it minimises the probability of type 1 error compared to alternative methods such as t-tests, which would compare the proportions chosen by one participant gender group at a time. For ease of interpretation, we present the differences in actual and observed frequencies in the relevant cells in the Chi-square table as percentages above or below the expectation. For example, if the cell for male participants selecting males in their target segment showed an actual frequency of 18 and an expected frequency of 15.2, we report that as male participants selecting 118% of the expected number of males as their target.

Due to the lack of age variability in the data in Study 1, a one sample *t*-test was also run comparing target age to the median population age in Australia, 37.3 years (Australian Bureau of Statistics, 2014). This approach allowed us to address Hypothesis 2 in Study 1.

### 2.5. Results

The Chi-square analysis showed there is minimal evidence that students who have studied at least one marketing unit of study exhibit a self-reference bias regarding gender. Only one category, the internet service provider, saw both male and female respondents exhibit a tendency to over-emphasise their own gender. The contingency table generating an expected probability for males to choose a male target market ( $p$ ), the observed probability that males would choose a male target market is ( $1.18 \times p$ ), and females doing likewise for a female target market by ( $1.45\% \times p$ ).

In reference to Table 1, the categories of milk, phone service provider, gas utility, local rail/train operator, clothing store, and coffee shop did not show any over-selection of the respondent's own gender. This provides extremely limited support for Hypothesis 1.

Stronger evidence of self-reference bias can be seen in the results for Hypothesis 2. From Table 2 it apparent that students identified target ages that were significantly lower than the known population median for the categories of milk, phone service provider, gas utility, clothing store and coffee shop. Only one category, the rail/train operator, did not show over-selection in the direction of the respondent's own age. This provides clear evidence in support of the hypothesis that business-marketing students exhibit a self-reference bias when selecting the age of target markets.

### 2.6. Discussion

These results suggest that while there may be little evidence to support Hypothesis 1 (that participants will choose a target gender biased toward their own gender; that is, that target gender and own gender are related for this group), there is substantially more to support Hypothesis 2 (that participants will choose a target age biased toward their own age; that is, that target age and own age are related for this group). Therefore, these students appear prone to selecting a target age biased toward their own (younger) age for all products, regardless of whether these products have an older consumer stereotype attached to them or not. That this is an instance of bias, rather than accurate identification of an ideal target segment, is supported by the Global Markets Information Database's Consumer Expenditure by Age of Household Head. This database identifies the primary purchasers of food and non-alcoholic beverages (milk), communications (phone service provider), household goods and services (gas utility), transport (rail/train operator) and clothing (clothing shop) as consumers aged

**Table 1**  
Hypothesis 1 Chi-square analysis.

	$\chi^2$	$p$
Bottle of Milk	0.433	0.510
Phone Service	0.264	0.607
Internet	4.933	0.026
Gas Utility	0.053	0.819
Rail/Train	2.614	0.106
Clothing Shop	0.010	0.922
Coffee Shop	0.053	0.819

**Table 2**  
Hypothesis 2 T-test analysis.

	$\bar{x}$	$t$	$p$
Bottle of Milk	32.561	−3.668	0.001
Phone Service	29.895	−3.755	<0.000
Internet	29.877	−4.880	<0.000
Gas Utility	33.193	−3.059	0.003
Rail/Train	34.439	−1.243	0.219
Clothing Shop	23.474	−13.822	<0.000
Coffee Shop	29.158	−5.792	<0.000

between 40 and 49, with 20–29 year-olds consistently representing the second smallest segment of the market (comparable data for the internet service provider and coffee shop categories was not available for comparison).

According to Table 3, for food and non-alcoholic beverages, consumers aged 40–49 represented 26.2% of the market while consumers aged 20–29 represented only 9.3%. For communications, this proportion was 25.6% compared to 10.1%; for household goods and services, 25.7% compared to 8.9; for transport, 25.6% compared to 10.1%; and for clothing, 26.2% compared to 11.1% (*Global Markets Information Database, 2014*). With this in mind, University students should be selecting older target markets because they comprise a larger proportion of the total population, and allocate greater expenditure toward products and services. However, Study 1 shows that business-marketing students indeed exhibit a self-reference bias, inferring that students would select target markets reflective of their own age (predominantly buyers aged 20–29, which occupy a smaller segment of the market and spend less).

It is notable that the category of milk, the only product with a consumer stereotype attached to it, showed identical results to the majority of other products in both gender and age selection. The stereotype attached to the product was not strong enough to counteract respondents' self-reference bias to any observable degree. To test how strong a stereotype needs to be to overcome the effects of self-reference bias, it would be interesting to replicate this study using a range of product categories with clearly identifiable buyer stereotypes attached, ranging from strong to moderately strong, weak and non-existent. In future studies with a larger sample size, it would also be advisable to assess whether self-reference bias occurs in the area of race/ethnicity.

### 3. Study 2

#### 3.1. Research hypotheses

For Study 2, we modified the hypotheses established for Study 1 to create the following statements:

Hypothesis 3: That members of the general population will choose a target gender biased toward their own gender; that is, that target gender and own gender are related for this group.

Hypothesis 4: That members of the general population will choose a target age biased toward their own age; that is, that target age and own age are related for this group.

Hypothesis 5: That qualified managers working in the marketing department are less likely to choose a target gender biased toward their own gender than the general population; that is, that target gender and own gender are less related for this group.

Hypothesis 6: That qualified managers working in the marketing department are less likely to choose a target age biased toward their own age than the general population; that is, that target age and own age are less related for this group.

Because self-reference is a normal feature of learning, we anticipate that Hypotheses 3 and 4 will hold for the general population. However, we anticipate that self-reference bias will be decreased in managers due to their prolonged exposure to professional tools designed to correct it. We also anticipate that manager responses will show more evidence of a response to the consumer stereotype associated with milk than those of the general population.

#### 3.2. Method

The same base survey instrument was used for Study 2 as for Study 1; however, in Study 2 respondents were asked additional questions about their employment status, industry and education history at the end of the survey.

This method uses the same categories of own characteristics, gender and age, as tested in Study 1, with race/ethnicity again excluded, despite the larger sample size, to maintain consistency with Study 1. To confirm that the self-reference bias identified in Study 1 arises as a part of learning rather than being a product of the training of students, Study 2 tested a sample of the general population for evidence of the same bias in choosing target segments. Study 2 was also used to test whether managers with degree qualifications perform better than the general population in their selection of target segments. The Survey Questions in this study can be found in the Appendix.

**Table 3**  
Expenditure (%) for each product/service category by age of household head.

Age	Clothing and Footwear (Clothing)	Household Goods and Services (Gas Utility)	Transport (Rail/Train Operator)	Communications (Phone Service Provider)	Food and Non-Alcoholic Beverages (Milk)
Under 20	0.4	0.3	0.4	0.4	0.3
20–29	11.1	8.9	10.1	10.1	9.3
30–39	21.6	21.4	20.8	20.9	20.6
40–49	26.2	25.7	25.6	25.6	26.2
50–59	22.0	21.7	23.4	23.4	22.3
60+	18.8	22.0	19.7	19.6	21.3

### 3.3. Sample

Participants for Study 2 were recruited from the United States using an international online panel data provider – Amazon’s Mechanical Turk. The same pattern in shopping behaviour are present in Australia and US (Wright, Sharp, & Sharp, 1998), and there is considerable similarity in management education and practice. To participate in the survey, respondents were required to have a US internet provider (IP) address and be at least 18 years of age. The survey task was integrated into a much larger survey-based experiment examining issues of health behaviour, in which the task for this study functioned as a distraction task. There were six blocks of unrelated questions before the task for this research.

Response quality was assessed using two simple math questions. Respondents who answered these questions incorrectly were removed from the sample. The initial sample of 1070 participants was reduced to 962 participants after cleaning. The final sample consisted of 459 (48%) males and 503 (52%) females with an average age of 33.340 (SD = 11.296). Participants received a small financial incentive for completing the survey.

### 3.4. Analysis approach

As in Study 1, a Chi-square was used to assess the relationship between target gender and respondents’ own gender, and the Pearson product moment correlation was used to assess the relationship between target age and own age, allowing us to address Hypotheses 3 and 4. Regression was then used to assess whether managers working in the marketing department differ from the general population in terms of the presence or absence of self-reference bias, allowing us to address Hypotheses 5 and 6.

### 3.5. Results

To understand whether the level of self-reference bias in students is unique to younger, less experienced people with some training in market selection techniques or a general feature of all people, we replicated our findings in a more general sample in Study 2. Compared to Study 1, this sample saw a significant bias toward the selection of own gender for all products. As per Table 4, a significant gender bias was present for milk, with male participants over-selecting their own gender at a rate of 140% and females doing likewise at a rate of 107%. The same result was seen for: the phone service provider for both males (115%) and females (110%); the internet service provider for both males (109%) and females (143%); gas utility for both males (112%) and females (117%); the local rail/train operator for both males (102%) and females (123%); the clothing store for both males (139%) and females (102%); and the coffee shop for both males (121%) and females (106%). This provides substantial support for Hypothesis 3: that there is a bias between own gender and target gender chosen in the general population.

A similar bias regarding age can be seen for the majority of the listed products. As per Table 5, there was a relationship between target age and respondent’s age for: the internet service provider, the gas utility, the local rail/train operator, the clothing store, the coffee shop, and to a lesser extent the phone service provider. The only exception was for milk. These results provide substantial support for Hypothesis 4.

**Table 4**  
Hypothesis 3 Chi-square analysis.

	$\chi^2$	<i>p</i>
Bottle of Milk	23.450	<0.000
Phone Service	15.337	<0.000
Internet	41.385	<0.000
Gas Utility	46.128	<0.000
Rail/Train	25.478	0.019
Clothing Shop	10.703	0.001
Coffee Shop	13.833	<0.000

**Table 5**  
Hypothesis 4 Correlation analysis.

	<i>r</i>	<i>p</i>
Bottle of Milk	0.043	0.184
Phone Service	0.055	0.091
Internet	0.185	<0.000
Gas Utility	0.197	<0.000
Rail/Train	0.123	<0.000
Clothing Shop	0.264	<0.000
Coffee Shop	0.291	<0.000

To determine whether the managers present in this sample were less susceptible to self-reference bias than the members of the general population, two regressions were run examining the relationship between target gender and own gender, and target age and own age, where being a manager was introduced as a dummy coded variable. In total, 88 participants (9% of the sample) were classified as managers who both had a degree and worked in marketing departments.

The first regression, a linear probability model, addressed the potential bias in gender choice for target market. A linear probability model is capable of regressing onto a discrete dependant variable, which in this case is the target gender chosen by the respondent (0 = female; 1 = male). The independent variables were: respondent's gender (0 = female; 1 = male); respondent working as a manager (1 = work in 'Marketing, PR or Sales' and had a degree qualification; 0 = otherwise); and the interaction between these. The key result in this regression is that of the interaction term ( $\beta_{int}$ ). This interaction will show whether the participant being a manager moderates the relationship between the respondent's gender and the gender they chose as the target market. This regression was performed for each product, with the results shown in Table 6. Each row of the table shows the results of a single linear probability model for the product category stated in the second column.

The choice of target gender by managers only deviates from the rest of the participants for one product category: the internet service provider ( $\beta_{int} = 0.175$ ,  $t = 2.114$ ). The remaining categories showed no significant differences in choice of target gender compared to the general group of target participants ( $|t_{int}| < 1.96$  for all other  $\beta_{int}$ ), which we have already established were biased toward their own gender in choice of target market.

A different set of regressions was used to address the potential bias in age choice for target markets. The dependent variable in these multiple regressions was the target age that was chosen by the respondent, with the independent variables being respondent's age, respondent's status as a manager (coded as above), and the interaction between them. As with the prior analysis the key result is the interaction term ( $\beta_{int}$ ), this interaction shows whether the participant being a manager moderates the relationship between the respondent's age and the age they chose as the target market. Separate regressions were conducted for each of the product categories, as shown in Table 7. Each row in the table represents a single regression for the indicated product category.

Again, the target age chosen by managers only deviated from that chosen by the other participants for one product category; however, in this case the category was the clothing shop ( $\beta_{int} = .302$ ,  $t_{int} = 3.330$ ). The remaining categories saw no difference in choices of (biased) target age compared to the general group of participants ( $|t_{int}| < 1.96$  for all other  $\beta_{int}$ ). These results highlight that being a manager does not moderate (i.e. improve) the choices regarding target market; managers' choices are just as subject to self-reference bias as the general population and student. This refutes hypotheses 5 and 6, that asserted that they would be better, as their experience would lead them to be less susceptible to the bias.

### 3.6. Discussion

The two regressions discussed above support Hypotheses 3 (that members of the general population will choose a target gender biased toward their own gender; that is, that target gender and own gender are related for this group) and 4 (that members of the general population will choose a target age biased toward their own age; that is, that target age and own age are related for this group), but disprove Hypotheses 5 (that qualified managers working in the marketing department are less likely to choose a target gender biased toward their own gender than the general population; that is, that target gender and own gender are less related for this group) and 6 (that qualified managers working in the marketing department are less likely to choose a target age biased toward their own age than the general population; that is, that target age and own age are less related for this group), making it clear that qualifying as a manager within a marketing department does not automatically eliminate or even lessen the incidence of self-reference bias. Self-reference bias starts across all populations at a very early age, being evident in the wider population and despite intervention by marketing educators, appears to persist in students. The strong correlation between target gender and own gender, and target age and own age for milk shown by all respondents except for the general population suggests that the presence of a moderately strong consumer stereotype attached to a product is not sufficient to override the effect of self-reference bias either for students or for managers; since the general population only showed lack of correlation between target age and own age for milk, with the result not being replicated for gender, this cannot be reliably attributed to the influence of the relevant consumer stereotype.

In future studies, in addition to testing for the presence of self-reference bias in response to stronger and weaker consumer stereotypes (this assumes the stereotype is self, linking these product categories to self) as discussed for Study 1, it would be

**Table 6**  
Regression (linear probability model) onto chosen target gender<sup>a</sup>.

Regression No		$R^2$	$\beta_0$	$t_0$	$\beta_{gender}$	$t_{gender}$	$\beta_{QMkter}$	$t_{QM}$	$\beta_{Int}$	$t_{Int}$
1	Bottle of Milk	0.027	0.141	7.444	0.134	4.909	0.099	1.640	-0.058	-0.642
2	Phone Service	0.017	0.371	16.019	0.128	3.836	0.049	0.669	-0.220	-0.195
3	Internet*	0.048	0.768	44.689	0.139	5.618	-0.108	-1.985	0.175	2.114
4	Gas Utility	0.048	0.678	34.963	0.189	6.777	0.022	0.363	-0.047	-0.507
5	Rail/Train	0.007	0.896	68.397	0.037	1.973	-0.016	-0.391	0.056	0.897
6	Clothing Shop	0.013	0.044	3.658	0.060	3.471	0.016	0.414	-0.068	-1.169
7	Coffee Shop	0.018	0.216	10.644	0.097	3.319	-0.116	-1.805	0.066	0.676

<sup>a</sup> The dependant variable in these linear probability models are the 'chosen gender of the target market', each row shows the result of a single model for the product category shown.

**Table 7**  
Regression onto chosen target age.<sup>b</sup>

Regression No.	Product or Service	$R^2$	$\beta_0$	$t_0$	$\beta_{gender}$	$t_{gender}$	$\beta_{QMkter}$	$t_{QM}$	$\beta_{Int}$	$t_{Int}$
1	Bottle of Milk	0.005	28.530	26.436	0.031	1.026	-2.353	-0.569	0.120	1.008
2	Phone Service	0.007	31.820	22.359	0.047	1.165	-8.271	-1.516	0.289	1.842
3	Internet	0.035	24.618	26.595	0.148	5.619	1.017	0.287	0.000	0.000
4	Gas Utility	0.043	33.144	41.662	0.127	5.646	-3.395	-1.114	0.134	1.522
5	Rail/Train	0.016	33.319	27.993	0.117	3.462	-3.511	-0.770	0.120	0.910
6	Clothing Shop*	0.082	19.091	23.214	0.172	7.380	-8.989	-2.852	0.302	3.330
7	Coffee Shop	0.087	18.903	22.642	0.209	8.807	-2.901	-0.907	0.109	1.179

<sup>b</sup> The dependant variable in these regression models are the 'chosen age of the target market', each row shows the result of a single model for the product category shown.

worthwhile to examine a more detailed breakdown of product categories, to determine whether there are systematic biases that are more or less pronounced for sub-classes of the products examined here. In both Study 1 and Study 2, the one product that had a consumer stereotype attached to it (milk) still showed evidence of self-reference bias. Future studies could separate this product and others into sub-categories (e.g. full-cream milk, skim milk and soy milk) to determine whether self-reference bias persists under these conditions. This strategy could also explore whether self-reference bias is greater or less for products with which the manager has more or less personal experience, to determine whether different degrees of self-reference bias influence individuals' marketing decisions to different extents. Finally, as discussed with regard to Study 1, in future studies it would be worthwhile testing for self-reference bias in the area of race/ethnicity, as a student's or manager's position of racial or ethnic (dis)privilege may also work to override self-reference bias.

#### 4. Practical strategy in response to the self-reference bias

As previously noted, self-reference is a critical component in the processing, interpretation and memorisation of information (Klein & Kihlstrom, 1986; Rogers et al., 1977), and the level of efficiency it provides to people trying to encode new information (Symons & Johnson, 1997) makes it very attractive to learners. The self is also a primary reference when an individual is trying to understand and interpret events and how they will affect the individual in question (Rogers et al., 1977). Indeed, Self-Attention Theory emphasises that a focus on the self is actually required in order for individuals to conform their behaviour to salient standards sufficiently for them to operate successfully in any given learning environment and encode the information given to them (Carver & Scheier, 1981); such environments, of course, include both classrooms and businesses. Because of the important role of the self in learning, it was hypothesised that both students and, to a lesser extent, managers working in the marketing department might inadvertently overemphasise their own personal characteristics of gender and age when choosing a target market segment during the development of a marketing plan. The two studies discussed above confirm that a self-reference bias does exist among students, and moreover that this bias can persist and even strengthen among managers when they are choosing the target segment for a product, with negative implications for the effectiveness of their marketing plans.

A business-marketing education or qualification therefore does not guarantee that any individual will approach marketing strategies in an empirical way. This is not to suggest that all managers exhibit self-reference bias consistently, or even occasionally; however, educators and managers must be aware that self-reference bias can continue into professional practice and have a detrimental impact on marketing decisions. It is vital to be aware of its existence and the problems it can create, and to ensure that all marketing strategies have a rational basis that is explicitly grounded in marketing models and market research.

Educators also need to respond to this issue actively in the classroom. The most obvious practical strategy for doing so is simply to make students aware of the existence of self-reference bias and encourage them to consciously challenge their own decisions when choosing a target segment for any given product. Using 'developing awareness' as a strategy to overcome biases in professional practice is also supported in other fields of work. In the medical field, training in the awareness and



prevention of weight biases is recognised as a debiasing strategy for medical practitioners (Davis-Coelho, Waltz, & Davis-Coelho, 2000; Puhl, Wharton, & Heuer, 2009). The success of this strategy (for example, McVey (2013)) shows that such a procedure is effective in correcting biases in professional practice. Therefore, Business/Marketing educators may also discover this same success. Regarding strategy implementation, educators could highlight the consequences of poor target segment choices: sub-optimal business outcomes and even, in particularly egregious cases, business failure.

However, while building student awareness of the nature and consequences of self-reference bias is necessary, on its own it is insufficient to address the problem. Even when we are aware of biases, they can be exceptionally difficult to overcome due to their innate nature (Heuer, 1999; Tversky & Kahneman, 1974). It is therefore recommended that educators encourage students not only to actively select their target market segment and justify its selection, but also to actively identify, consider and reject the other market segments, and justify their rejections. The active identification and processing of information regarding all possible market segments will render those segments 'visible' to students, and help them to overcome any heuristics or biases that form an innate component of their decision-making, making them less likely to unintentionally overlook viable target segments.

Educators should both build the active rejection of market segments into their marking criteria, and reward students for undertaking this extra activity, in order to encourage positive work habits. However, despite its practical benefits, this strategy is liable to be ineffective in isolation. It needs to be supported by broader changes in education. We therefore recommend that educators also work to develop their students' awareness of how their own (dis)privilege in areas including gender, age, and race/ethnicity can bias their work and in some cases reinforce self-reference bias. This will enable students to unpack their biases, consciously counteract them, and develop a broader set of positive and effective work habits that will mitigate the effects of self-reference bias.

## 5. Conclusion

The two studies conducted here indicate that self-reference bias in target segment market selection can persist through the process of education and into the decision-making of qualified managers working in the marketing department, and that consumer stereotypes cannot be relied upon to disrupt its effect. Making the justification of target market segment exclusion as much standard practice as the justification of segment selection will assist in increasing its normalcy amongst new practitioners, and work to counteract the effect of any self-reference bias in industry. However, more work needs to be done on understanding how self-reference bias interacts with consumer stereotypes and manager (dis)privilege, and on developing practical methods to counteract its effects in both education and professional practice.

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## Appendix

### Survey questions

- 1 Do you work OR study in the marketing field?
  - 2 Pick the option that best describes your role. (survey branches)
  - 3a How many years have you worked in the Marketing Field?
  - 4a What is your job title?
  - 3b In what year of University study are you in?
  - 4b How many subjects/units/modules of Marketing have you studied so far?
- Product/Services listed
- Bottle of milk
  - Phone service provider
  - Internet provider (ISP)
  - Local rail/train operator
  - Gas utility
  - Clothing shop
  - Coffee shop
- 5 Target Customer Age
  - 6 Target Customer Gender
  - 7 Description of Target Customer
  - 8 In what year were you born?
  - 9 What is your gender?
  - 10 What is your highest level of education completed?

## 11 In which country do you reside?

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