Utilizing Self Perception Theory to Explain Social Media Behavior Relative to Print Advertisement 2-D Codes

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Abstract
Marketers are using more traditional marketing channels to drive traffic to the social media platforms. Embedding two-dimensional (“2-D”) barcodes, also known as QR codes, in print advertising is one example. In an effort to provide marketers some guidance on how best to implement such a strategy, reported in this article is the study of the effects of this tactic on consumer response. We draw upon self-perception theory to derive three key insights: 1) the use of 2-D barcodes can elicit pro-brand behavior (snapping), and self-perception of this behavior can enhance attitudes; 2) conversely, a failure to engage in snapping behavior may actually undermine attitudes; 3) any boost in attitudes may be confined to light users of a brand, who do not have strongly established attitudes, and to situations where snapping behavior is perceived to be voluntary, such as when prizes or rewards are absent. Data from two experiments, utilizing two different product category contexts, support this theorizing.

Keywords: Mobile media, Advertising, Attitudes, Self-perception
1. Introduction

A 2-D barcode, sometimes called a “quick response code,” enables a marketer to link a consumer to online content that can supplement the substance of a print ad. The purpose of this paper is to explore the effects of including these barcodes in a print advertisement. 2-D barcodes are more advanced cousins of familiar checkout-scanner-friendly codes that, for example, are printed on most supermarket items. 2-D barcodes capture information very efficiently, by using both vertical and horizontal dimensions to embed data. A number of specific systems, featuring different shape configurations, have been introduced (see Figure 1).

![Figure 1. Examples of Two-Dimensional Barcodes](image)

To gain access to auxiliary digital material, a consumer scans (or “snaps”) the barcode in the ad with a device such as a smartphone. S/he is then led to an online location, where a special offer—perhaps a coupon or entry into a sweepstakes—may await as a reward. Developments have also enabled the post-snap destination to be a brand’s Facebook or Twitter account. This is advantageous, because it allows the cultivation of beneficial behaviors such as “liking” the brand and sharing with friends. To wit, consumers who snapped a barcode in a recent ad for online retailer Zappos had an immediate opportunity to like the brand on Facebook.

2. Application of 2-D Barcodes to Print Advertising

How might response to a print ad that includes a 2-D barcode differ from the response to a print ad without this mechanism? One striking difference would be the degree of immediate and explicit action that is invited from the consumer. Whereas exposure to a conventional print ad (without a barcode) may often be rather passive, the presence of the barcode elicits an overt behavior to pursue a supplementary online experience – that is, the snap. This observation begs an important question of how this difference might influence cognitive processing.

Theoretical guidance on this issue may be gained from the paradigm of self-perception theory (e.g., Bem 1965; 1967). Five decades of research has demonstrated significant support for self-perception effects and attests to the continued utility of the theory (e.g., Burger and Caldwell 2003; Dolinski 2000; for reviews, see Burger 1999, Cialdini and Goldstein 2004). Moreover, self-perception is compatible with emergent theories of advertising evaluation, such as the recently described “activation technique,” which promotes viewers’ engagement with an advertisement by inducing them to perform a motor activity (i.e., folding a print ad
Self-perception theory posits that people observe their own actions to make inferences about inner states such as attitudes. This is likely to occur when the behavior is perceived as voluntary and when awareness of the inner state is weak or ambiguous. By implication, self-perception effects may thus be prominent when a consumer believes s/he has performed a pro-brand behavior of his/her own volition and when attitude toward the brand is not especially strong or well-articulated in his/her mind. In such cases, the individual may derive a better understanding of feelings toward the brand by stepping back to observe how he or she has behaved toward it.

These notions provide foundation for predicting different consequences for consumers who do versus do not have an option to snap a barcode. An ad that elicits overt positive behavior – i.e., snapping a barcode – may help to generate a signal that a brand is valued: “I must like it, or else why bother with the snap?” By contrast, when the opportunity to engage in such behavior is absent, because a 2-D barcode is not available, the opportunity for the overt act is foregone, and so is the correspondingly positive signal. As a result, attitudes toward a brand may be more favorable among those who snap a 2-D barcode than those who do not have the opportunity.

This analysis has assumed that if a barcode is available, a consumer will decide to snap it. However, this may not always be the case. Hence, a related issue is how a decision not to snap an available 2-D barcode may impact brand attitudes. Carrying out the prevailing logic, a decision not to snap would, in effect, constitute a behavior of deciding not to further engage with a brand. Self-observation of this decision itself may imply that a brand is less than highly esteemed. The resulting prediction is thus that for consumers who are exposed to an ad with a 2-D barcode and choose not to snap it, attitudes may be less favorable than for those who do choose to snap and also than for those who are not exposed to the 2-D barcode at all.

The notion that a 2-D barcode can enhance or detract from brand attitudes raises a corollary issue of when these advantages or disadvantages might be expected to occur. A potential limiting condition is discussed next.

3. When Will A 2-D Barcode Have the Greatest Impact on Post-Advertising Attitudes?

To understand when a 2-D barcode may most heavily influence brand attitudes, we revisit the theoretical foundation of self-perception theory and recast the question in the broader terms: When is self-perception expected to play a greater or lesser role in a consumer’s thinking?

Self-perception is a superficial manner of processing (Eagly and Chaiken 1993) and thus tends to influence judgments in circumstances where individuals are unwilling or unable to engage in more demanding judgment processes. For example, experiments indicate effects for self-perception on judgment when subjects have low motivation, have limited prior knowledge and/or lack access to relevant sensory data (Taylor 1975; Tybout and Scott, 1983; Wood 1982).
These findings suggest that the effects of snapping/not snapping a 2-D barcode may be confined to certain types of circumstances. These would include situations where the advertised product category is not important to a consumer, where s/he has little familiarity with it, or where there is little sensory information to leverage (e.g., have not previously touched/tasted/etc. the product). With this in mind, and noting research that indicates that such characteristics may be typical of light users of a product category (Goldsmith, Flynn and Bonn 1994; Goldsmith and Litvin 1999), the following proposition may be derived: snapping activities (or lack thereof) may be more likely to influence the judgments of light users rather than heavy users.

As an example, let us again consider the Zappos initiative. The implication is that the tendency to leverage self-perception of snapping or not snapping a 2-D barcode in a Zappos print ad will be greater for light rather than heavy users of online shoe shopping. Light users may consider online shoe retailers (including Zappos) unimportant. They may have less extensive knowledge of attributes of online shoe retailers, because they have ordered infrequently and thus have had few chances to interact with them. As such, light users’ sense of how they feel about Zappos and other online shoe retailer brands may be more malleable than that of heavy users.

If light users note that they have (not) invested energy and time in snapping the 2-D barcode from a Zappos ad, they may interpret this as an indication that they (do not) have an affinity for the brand. However, if heavy users are more involved with the category and have more familiarity with relevant brands, then they may be more likely to have an abiding attitude toward the Zappos brand. There would thus be less need for heavy users to infer attitudes from observations of their own behavior. It can therefore be predicted that for heavy users, there would be no difference in attitude as a function of propensity to snap a barcode.

4. Experiment 1

Experiment 1 tested the predicted effects of 2-D barcodes on heavy and light users of a product category. In addition, it also anticipated and examined a potential alternative explanation for our findings, namely that the barcodes may not have been noticed by those who chose not to snap. This counter-explanation is discussed in greater detail at the conclusion of this study.

4.1 Method

The design for the experiment was a 2 (light users, heavy users) X 3 (2-D barcode present and snapped, 2-D barcode present and not snapped, 2-D barcode absent) fully crossed factorial. Ninety-four participants were randomly assigned to view versions of the ad representing the “Barcode Present” versus “Barcode Absent” conditions.

Recruiting materials specified that respondents must have a smart phone and bring it to the study session. Participants were also notified in advance that study sessions would be videotaped for analysis, and they signed releases to allow use of the taped data.

The experiment was conducted in private sessions with individual respondents. To begin, the
experimenter remotely activated the videotaping equipment, so as to not sensitize participants to the taping process. An instruction was then read aloud: “You are asked to examine a print ad. In doing so, please read and interact with it exactly as you really would in everyday life – for example, as if you saw it while reading a magazine at home, over a lunch break, etc.”

An experimental booklet was distributed, which featured a print ad for “the Runnaire,” a (faux) new shoe from Nike. Copy highlighted two benefits that a pretest (N=14) indicated were perceived to be moderately positive (mean rating 4.3 on 1-7 scale). These were, namely, that this shoe 1) offered glow-in-the-dark markings for safe after-dark jogging, and 2) had a sole that was especially durable and long-lasting. For subjects in the “Barcode Present” conditions, a facsimile of a 2-D barcode appeared in the lower left corner of the ad, accompanied by the caption, “Snap here for more info.” The ad in the “Barcode Absent” condition was identical in all respects, except for the elimination of the picture of the barcode and the invitation to snap it.

As noted above, the 2-D barcode itself was a mock-up and did not functionally activate an online link. To minimize frustration among respondents who chose to snap the barcode, but were not connected to a web site, the experimenter read the following instruction to those who snapped: “The study focuses only on the print portion of this ad and will not incorporate the web site. Therefore, please continue forward with the questions in your booklet.”

Participants evaluated the shoe on 1-7 scales labeled by bad/good, not excellent/excellent, negative/positive, unfavorable/favorable, dislike/like and inferior/superior. Without explicitly looking back to the ad, they then listed any elements of it that they remembered. Next, they were asked (yes, no) whether they had used their phone to snap the barcode on the ad page.

Finally, respondents provided several pieces of information related to their level of category usage for athletic shoes: They estimated how often in a typical week they wore athletic shoes, reported the number of athletic shoe purchases they had made in the last year, and they responded to three items assessing the perceived level of importance of athletic shoes (unimportant/important, irrelevant/relevant and insignificant/significant; 1-7 scales).

4.2 Predictions

For light users, it was expected that those in the “Barcode Present-Snapped” condition would report more positive attitudes toward the shoe than those in the Barcode Absent condition and also than those in the “Barcode Present-Not Snapped” condition, who chose not to snap on the barcode. It was also expected that light users in the Barcode Present-Not Snapped condition would have less positive attitudes than those in the Barcode Absent condition.

For heavy users, for whom a priori attitudes may be better established, no difference in attitude was expected as a function of snapping behavior.

4.3 Preliminary Analyses

Following Goldsmith and colleagues (Goldsmith et al.1994; Goldsmith and Litvin 1999),
respondents were classified as light or heavy users of athletic shoes. Frequencies were examined for how often athletic shoes were worn per week. Users were split into two groups. Those above the median (median usage = 3.1 times per week) were designated as heavy users of athletic shoes; those below the median were designated light users. Analysis of purchase frequency revealed that, as would be expected, light users reported significantly fewer purchases \((M = 1.30)\) of athletic shoes than heavy users \((M = 2.32; F(1, 92) = 30.46, p < .01, \eta^2 = .25)\).

As an additional check on the heavy-light distinction, we examined the three importance ratings, which formed a single factor that was reliable (Cronbach’s \(\alpha = .80\)). ANOVA on the combined scores indicated that light users \((M = 3.21)\) considered athletic shoes less important than heavy users \((M = 4.26, F(1, 92) = 30.59, p < .01, \eta^2 = .25)\). It was thus concluded that the spirit of heavy and light usage groups had been captured with the classification scheme.

A second independent variable was constructed by assigning respondents to barcode/snapping categories (Barcode Present-Snapped vs. Barcode Present-Not Snapped vs. Barcode Absent). Each respondent’s designation took into account not only which version of the ad they saw (barcode present or absent, randomly assigned) but also whether the participant snapped the barcode or not. This latter input, which was relevant only to those for whom the barcode was present, was derived from respondents’ self-reports and verified against video tape evidence.

### 4.4 Analyses of Attitudes

Attitudes were examined as a function of usage group and barcode/snapping condition. Attitude items loaded on a single factor that was reliable \((\alpha = .84)\). ANOVA on the combined scores revealed an interaction \((F(2, 88) = 6.47, p < .01, \eta^2 = .13)\). Means appear in the Table 1.
Table 1. Experiments 1 and 2 Attitudinal Results by Condition

<table>
<thead>
<tr>
<th>Experiment 1</th>
<th>Light Users</th>
<th>Heavy Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barcode Present-Snapped</td>
<td>Mean attitude</td>
<td>4.94</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>16</td>
</tr>
<tr>
<td>Barcode Present-Not Snapped</td>
<td>Mean attitude</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>16</td>
</tr>
<tr>
<td>Barcode Absent</td>
<td>Mean attitude</td>
<td>3.53</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>.74</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>15</td>
</tr>
<tr>
<td>Experiment 2</td>
<td>No Reward</td>
<td>Reward</td>
</tr>
<tr>
<td>Barcode Present-Snapped</td>
<td>Mean attitude</td>
<td>5.30</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>1.18</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>13</td>
</tr>
<tr>
<td>Barcode Present-Not Snapped</td>
<td>Mean attitude</td>
<td>2.81</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>.98</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>16</td>
</tr>
<tr>
<td>Barcode Absent</td>
<td>Mean attitude</td>
<td>3.53</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>.51</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>17</td>
</tr>
</tbody>
</table>

For light users, attitudes were more favorable in Barcode Present-Snapped condition than in the Barcode Absent condition ($F(1, 88) = 14.29, p < .01, \eta^2 = .14$) or the Barcode Present-Not Snapped condition ($F(1, 88) = 35.83, p < .01, \eta^2 = .29$). Moreover, ratings among light users in the Barcode Present-Not Snapped condition were less favorable than for light users in the Barcode Absent condition ($F(1, 88) = 4.47, p < .04, \eta^2 = .05$). These results met expectations that, among light users, attitudes would be enhanced by perceiving one’s self to have snapped a 2-D barcode, but would be undermined by a decision not to snap.

For heavy users, attitudes did not differ by barcode condition ($p > .05$). This finding is consistent with the prediction that heavy users would have well-formed attitudes that would
be relatively unaffected by perceptions of a snapping behavior for a 2-D barcode.

4.5 Analyses of Memory Data

Ad memory data were next examined to test an alternative account. It might be proposed that respondents who failed to snap a barcode somehow overlooked it. If this interpretation is inaccurate—that is, if the barcode was noticed by both respondents in the Barcode Present-Snapped and Barcode Present-Not Snapped conditions—memory for it should be high, regardless of whether it was snapped. It was thus predicted that memory of the barcode would not vary between the Barcode Present-Snapped and Barcode Present-Not Snapped conditions, and also that memory for the barcode would be generally greater among these respondents than in the Barcode Absent condition (where the logical expectation would be zero mentions).

Two trained coders, blind to study conditions, counted mentions of the barcode in memory protocols. Agreement was 96%; disagreements were resolved by discussion. Chi-square analysis of the frequency counts indicated that mentions of the barcode was related to barcode/snapping condition ($\chi^2 = 53.16, p < .01$), but not to user group ($p > .41$). For both heavy and light users, mentions of the barcode were more likely in the Barcode Present-Snapped (81% of respondents) and Barcode Present-Not Snapped (77%) conditions than in the Barcode Absent condition (0%). Thus, when featured, the barcode was a salient portion of the ad and was noticed by both those who snapped it and those who did not. This finding weakens the plausibility of differential awareness as an alternative account of our attitude data.

4.6 Discussion

As expected, use of 2-D barcodes was shown to enhance the attitudes of light users, presumably because the behavior of (not) snapping the barcode constituted a positive (negative) input into a relatively malleable attitude. Importantly, this occurred despite a uniformly strong memory of the barcode as an ad element among the light users in the Barcode Present conditions.

However, and also as anticipated, the attitudes of heavy users were unaffected by the existence of a barcode or the decision on whether to snap it. This may be because their greater prior interest in the category and their stronger understanding of it allowed them to already have an assessment of the Nike brand, which was reflected in their attitude ratings.

Experiment 2 had two goals. The first was to explore the robustness of the Experiment 1 findings to product context. The second was to gain additional evidence for the central theory, which is that when attitudes are influenced by snapping, it is because a consumer perceives him- or herself to have enacted (or not enacted) a pro-brand behavior. The logic applied was that if this perception truly drives the pattern of attitudes that has been observed, then it should be possible to moderate the effect by altering the consumer’s perception of the behavior.

Prior research on self-perception theory indicates that when a person believes there is an external rather than internal cause for his or her behavior, the behavior is not taken to be
indicative of an underlying attitude (e.g., Bem 1965, 1967). Thus, if a person who snaps a 2-D barcode believes that this occurred because of some external force—perhaps the offer of a reward—then his/her attitude should not improve. Essentially, the behavior may be written off as “I snapped to get the incentive” rather than “I snapped because I like this brand.” Similarly, a decision not to snap a barcode should not have a negative impact on attitudes, because an explanation can be made without concluding that the brand is not valued: “I didn’t snap because I didn’t want the incentive” rather than “I didn’t snap because I do not like this brand.”

In Experiment 2, these ideas are explored by varying a reward element within the experimental print ad. The expectation was that in the “No Reward” condition, the results of Experiment 1 would be replicated. However, in the “Reward” condition, differences in attitudes were expected to be mitigated.

5. Experiment 2

Seventy-four volunteers participated in Experiment 2. To economize the experimental design size, the investigation was confined to light category users, as these individuals were the ones for whom attitudes were impacted by barcode use in Experiment 1.

Procedures were identical to Experiment 1, with three exceptions. First, a different product was the focus. The ad described a (fictitious) fast food restaurant called Sub Mania. Copy emphasized two benefits: 1) use of fresh, organic ingredients, and 2) speedy service.

Second, a reward manipulation was added to the ad. To do so, the caption on the 2-D barcode was expanded for some respondents to read as follows: “Snap here for more information and to receive a prize.” For other respondents, the reward was not offered, and the caption simply read, “Snap here to see more information on this product.”

Therefore, the principal design for Experiment 2 was a 2 (Barcode Present-Snapped, Barcode Present-Not Snapped) x 2 (Reward, No Reward) fully crossed factorial. A supplemental Barcode Absent condition (in which the ad included no barcode or reward offer) was also yoked onto the 2 X 2 design, serving as a control condition. Assignment to Barcode Present vs. Absent and Reward vs. No Reward conditions was randomly determined.

Third, category usage measures were edited to align with sub sandwiches rather than athletic shoes. To better suit the shorter purchase cycle of the fast food category, the purchase frequency question was framed as purchases in the last month, rather than in the past year.

5.1 Preliminary Analyses

Allocation to barcode/snapping categories occurred as in Experiment 1. Category usage measures confirmed recruitment of relatively light users of the category. The mean number of purchases and consumption occasions per month was 1.30 and 1.45, respectively. The three importance ratings loaded on a single factor that was reliable (α = .85). Analysis of averaged scores supported the light user characterization, as importance was moderately low (M = 2.55). None of the checks on light usage varied by barcode/snapping or reward condition (p > .37).
5.2 Analyses of Attitudes

Attitude items loaded on a single factor that was reliable (α = .87). Scores were thus averaged (see Table).

ANOVA on the base 2 x 2 design revealed an interaction (F(1, 53) = 15.38, p < .01, η² = .23). Contrasts indicate that for the No Reward condition, attitudes were more favorable in Barcode Present-Snapped versus the Barcode Present-Not Snapped condition (F(1, 53) = 29.65, p < .01, η² = .36). Supplemental analysis of these cells versus the control revealed that ratings in the No Reward/Barcode Present-Snapped cell were more favorable than those in the control Barcode Absent condition (F(1, 69) = 22.84, p < .01, η² = .25). Also, those in the No Reward/Barcode Present-Not Snapped condition were less favorable than the Barcode Absent condition (F(1, 69) = 4.15, p < .04, η² = .06). These results echo findings of Experiment 1 for light users.

In the Reward condition, as anticipated, attitudes did not differ by barcode/snapping condition (p > .21). Mean attitudes in the Reward condition were similar in the Barcode Present-Snapped and Barcode Present-Not Snapped conditions. Supplemental analysis also indicated that these means were equivalent to those in the Barcode Absent condition. Thus, when a reward was offered, attitudes were unfazed by perceptions of a snapping behavior.

5.3 Analyses of Memory Data

Memory data were coded as in Experiment 1 (inter-rater agreement 94%). Chi-square analysis of the core 2 x 2 design indicates that, as expected, number of barcode mentions was not related to barcode/snapping condition or reward group (ps > .33). However, when the control condition was added to the analysis, a difference in mentions emerged for all other cells versus the Barcode Absent condition (80% vs. 0%; χ² = 34.90, p < .01). Differential awareness of the barcode thus again seems unlikely to unseat the preferred explanation for the pattern of attitudes.

5.4 Discussion

Using a different product, Experiment 2 duplicates the major findings for light users from Experiment 1. As before, light users’ attitudes were positively affected by a decision to snap an available 2-D barcode, but negatively impacted by a decision not to snap the barcode.

Importantly, these differences in attitudes also disappeared when a reward was offered for snapping. We suggest that the appearance of the reward provides an external explanation for the behavior and thus reduces the likelihood that the consumer will attribute it to real feelings about the brand. This lends credence to the proposition that it is the consumer’s self-perception of own behavior that has influenced attitudes in conjunction with snapping behavior.

6. Conclusion

Our studies demonstrate that the use of 2-D barcodes may influence individuals who do not already hold strong attitudes. For these consumers, who were represented by light users in our
experiments, the behavior of snapping a 2-D barcode is informative about one’s perspective on the advertised brand. Following the logic of self-perception theory, it can be deduced that the action reflects a person’s own underlying sentiment, and attitudes are molded accordingly.

On the other hand, choosing not to snap may have a deleterious impact on attitudes. Such a decision could arise from any number of constraints, including ability (e.g., too busy) and motivation (e.g., a sense of “laziness” disinclines action). Thus, a practical implication of the current work is to underscore the need for marketers to understand the consumer’s likely mindset when reading a print publication. For publications that readership surveys suggest are read in busy atmospheres, use of 2-D barcodes seems to be contraindicated.

At the same time, the enhancement and detraction effects of 2-D barcodes do not manifest universally. Although snapping behavior corresponded to variance in attitudes among light users, heavy users in Experiment 1 remained unaffected. As such, it appears that this emerging advertising element may best be characterized as one that helps attitudes that are loosely held, as when products and product categories are new or novel.

In addition, the effects of snapping a 2-D barcode were also moderated by the provision of a reward. When this offered a reasonable explanation for the decision to snap or not, attitudes in Experiment 2 did not vary by use of barcode. Ironically, although it may initially seem risky to invite snapping behavior without showing appreciation via an incentive, the current findings suggest that there may be unintended consequences to doing so. Such offers may remove a positive bump in attitudes that can result from allowing the consumer to snap without coaxing.

6.1 Contributions

Like many tactics that integrate technology with consumption, improving the impact of 2-D barcodes requires better understanding of its effects. The present research begins to address this gap by presenting a theoretical account of the influence of 2-D barcodes on consumers and offering evidence in support of the theory.

In a broad sense, our data add to marketers’ developing understanding of online advertising mechanisms. Given documentation of differential effects for distinct online promotional techniques (Breuer, Brettel and Engelen 2011), future research is encouraged to delve into the effects of varying post-snapping destinations.

Another contribution of this research is to bring self-perception and self-attributions into new marketing contexts. This classic theory has been applied to analyses of a broad array of marketing issues, ranging from donating behaviors to charitable organizations (Bendapudi, Singh and Bendapudi 1996) to organizational buyer attitudes (Brown 1995) to reactions to retail membership fees (Dick and Lord 1998). The present research meshes with efforts to stretch this theoretical approach into new areas of consumer psychology, such as, for example, the exploration of cross-cultural cognitions (Leigh and Choi 2007). Further exploration along these lines is warranted.
References


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