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Print vs. Digital: Informational Mediums' Impact on Brand Sentiment and Recall

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Abstract

The classic quote from McLuhan, “the medium is the message”, emphasizes that the substrate in which information is conveyed is never neutral. Print and digital represent two different informational mediums: the first is tangible and enduring, the second intangible and ephemeral. In this research project the following question is addressed: “Does the medium (print vs. digital) in which information (a billing statement with associated message) is presented affect how that information is perceived (brand sentiment) and retained in memory (recall accuracy)?” The question is explored in an experiment using ‘digital natives’ as participants. Results suggest that information in print can lead to better brand sentiment and longer-term recall compared to digital.

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Background

Marshal McLuhan proposed in 1960's that the medium was the message (McLuhan & Fiore, 1967); emphasizing that the medium through which information is conveyed has greater impact on society than the specifics of the information itself. Since then there has been ongoing research on the impact that a medium has on how information is perceived (e.g. Worchel et al. 1975; Greenfield et al. 1986 and Schultz and Göritz, 2011).

Print and digital represent two different informational mediums: the first is tangible and enduring, the second intangible and ephemeral. Research in the area of learning, suggests that in term of reading comprehension, print consistently outperforms digital (e.g. Ackerman & Goldsmith, 2011; Eshet-Alkalai & Geri, 2007; Ben-Yehudah & Eshet-Alkalai, 2014).

Credit cards billing represent an interesting case in point. Here, important financial information is presented, often with associated messages (such as special offers, public service announcements and co-branding). Credit card statements exist in both print and digital format, with some companies urging consumers to go 'paperless'. However, there may be a downside to this: lower comprehension of the information presented. In this research project, the impact of print versus digital credit card statements on consumers' perception and memory is explored.

Research Question

The research question guiding this research project can be stated in a general (abstract) and a specific (operationalized) forms.

- General: "Does the medium in which information is presented affect how that information is perceived and retained in memory?"
- Specific: "Does the medium (print vs. digital) in which information (a billing statement with associated message) is presented affect how that information is perceived (brand sentiment) and retained in memory (recall accuracy)?"

To answer this research question the following research design was employed.

Research Design

An experimental design was used so as to maximize control over the variables and to assess causality between the independent and dependent variables. The downside is obvious artificial nature of the test: people typically don't read credit card statements in laboratories wearing eye-tracking gear.

The stimuli for the test was a credit card billing statement from a fictional retail sports store "Sports Zone". A 2 x 3, between-subjects design was employed:

- 2 mediums – Print (paper) and Digital (displayed on an iPad)
- 3 different types of associated message – Special Offer (Offer), Public Service Announcement (PSA) and Co-Brand (Co-Brand)

Between-subjects means that a person participating in the study only saw one of the 6 (2 x 3) types of stimuli. This has the advantage over a within-subject design as it eliminates memory or comparative effects.

Experimental stimuli comprised print or digital credit card statement with three different associated messages (Offer, PSA and Co-Brand). The dependent variables were brand sentiment, purchase intention and recall of brand and message. The credit card statements with three different associated messages are shown in Table 1.

Table 1: Credit card statements with three different associated messages

Special Offer

PSA

Co-Brand

Sports Zone Signature Card

Account Ending in 9801 Your CLUB Points

Balance Summary		Your CLUB Points	
Previous Balance	= \$0.00	(Points show in dollars)	
Payments/Credits	- \$0.00	Previous Points Balance	= \$509.31
Purchases/Cash Advance	+ \$169.77	Points Earned at Sports Zone	+ \$169.77
Interest/Fees	+ \$0.00	Points Earned at Other Stores	+ \$339.54
New Balance	\$169.77	Points Earned Elsewhere	+ \$0.00
		Other Points Added	+ \$0.00
		Points Redeemed	- \$0.00
Purchases This Year:	\$169.77	CLUB Points Available	\$509.31
Revolving Credit Limit:	\$0.00		
Available Credit:	\$830.23		
Days in Billing Cycle:	29		
Statement Date:	04/09/2018		

Payment Information

New Balance \$169.77
 Minimum Payment Due* \$33.95
 Payment Due Date 04/27/2018

Your Current Level: CLASSIC
 You are \$1,950 away from achieving SILVER status**

*Minimum Payment Due does not include any promotional balance or amount in dispute

**Subject to credit history.



Sports Zone Signature Card

Account Ending in 9801 Your CLUB Points

Balance Summary		Your CLUB Points	
Previous Balance	= \$0.00	(Points show in dollars)	
Payments/Credits	- \$0.00	Previous Points Balance	= \$509.31
Purchases/Cash Advance	+ \$169.77	Points Earned at Sports Zone	+ \$169.77
Interest/Fees	+ \$0.00	Points Earned at Other Stores	+ \$339.54
New Balance	\$169.77	Points Earned Elsewhere	+ \$0.00
		Other Points Added	+ \$0.00
		Points Redeemed	- \$0.00
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Payment Information

New Balance \$169.77
 Minimum Payment Due* \$33.95
 Payment Due Date 04/27/2018

Your Current Level: CLASSIC
 You are \$1,950 away from achieving SILVER status**

*Minimum Payment Due does not include any promotional balance or amount in dispute

**Subject to credit history.



YOUR ACCOUNT

Account Ending in: 9801
 Amount Due: \$169.77
 Minimum Payment Due: \$33.95
 Payment Due Date: 04/27/2018
 New Balance: \$169.77

AMOUNT ENCLOSED:

SEND REMITTANCE TO:

90000-DET200000
 John Smith
 5111 Main Street
 Alexandria, VA 22312-1212



Sports Zone
 P.O. BOX 1111
 Alexandria, VA 22312-1212

YOUR ACCOUNT

Account Ending in: 9801
 Amount Due: \$169.77
 Minimum Payment Due: \$33.95
 Payment Due Date: 04/27/2018
 New Balance: \$169.77

AMOUNT ENCLOSED:

SEND REMITTANCE TO:

90000-DET200000
 John Smith
 5111 Main Street
 Alexandria, VA 22312-1212



Sports Zone
 P.O. BOX 1111
 Alexandria, VA 22312-1212

YOUR ACCOUNT

Account Ending in: 9801
 Amount Due: \$169.77
 Minimum Payment Due: \$33.95
 Payment Due Date: 04/27/2018
 New Balance: \$169.77

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SEND REMITTANCE TO:

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Sample

In terms of participants, ‘digital natives’ (Prensky, 2001) who owned credit cards were targeted. The logic behind this choice was that people who grew up fully immersed in digital media would be the people *most* likely to go paperless and where the difference between digital and paper would likely be the *least*. Specifically, the sample comprised 180 Millennials (age 18-30): divided into groups of 30 people for each of the 6 scenarios. The sample breakdown is shown in Table 2:

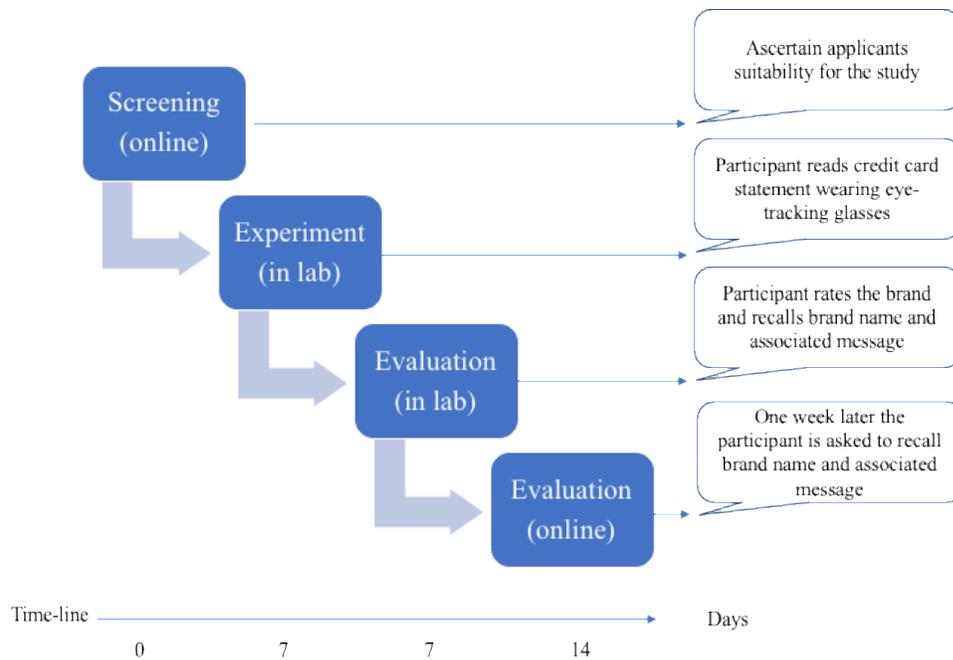
Table 2: Breakdown of the sample

Sports Zone Credit Card Statement with ↓	Print	Digital
Special Offer	30	30
Public Service Announcement	30	30
Co-Branded with a ‘good cause’	30	30

Process

The experimental process proceeded as follows. First, applicants were screened through an online portal to determine their suitability for inclusion in the study. Suitably in this instance was defined as familiarity with credit cards and reading credit card statements. Only applicants with current credit cards were included in the study. Second, participants on entering the lab were fitted with eye-tracking glasses, the glasses calibrated and they were presented with a credit card statement to read. Third, participants were escorted to a separate room where they were asked to recall the brand name and the associated message, and rate their perception of the brand. Finally, one week later, via the online portal participants were once again asked to recall the brand name and associated message. The process is summarized in Figure 1.

Figure 1: Experimental Process



For brand name recall, participants were presented with three different recall options, scored as follows: correct name scored 2 (Sports Zone), partially correct name scored 1 (Sporting World) and incorrect scored 0 (Leisure Life). The associated message recall was evaluated in a similar manner. So for example, in the case of the special offer, correct message scored 3 (Season Ender Sale 30% off Fishing Gear), partially correct 2 (30% off Sporting Goods) and incorrect 0 (Buy 1 Sale Item get 1 Free).

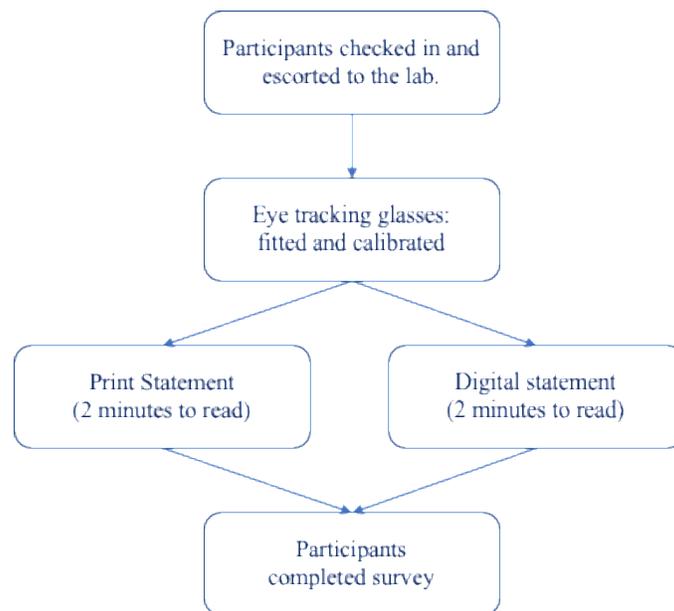
Drawing on the scales used in the marketing research literature (e.g. Schmitt & Rogers, 2008; Zarantonello, 2007) brand sentiment, a participant's perception of the brand, was measured in terms of trust and dependability. Trust was evaluated using the following 3 items: "I would trust this company", "I would rely on this company" and "This company is honest". Dependable was measured using the following 3 items: "This company is dependable", "This company gives me a feeling of confidence" and "This company makes me feel safe". Each was measured on a 7-point Likert scale anchored on "strongly disagree" and "strongly agree".

Brand purchase, a participant's likelihood of buying from a particular brand, was evaluated using the following 2 items: "I would feel confident buying from this company" and "I would buy from this company". Again, each was measured on a 7-point Likert scale anchored on "strongly disagree" and "strongly agree".

Experimental Protocol

On checking in, participants were escorted to the testing lab, where eye-tracking glasses were fitted to the participant's heads and calibrated to the participant's ocular specificity. Participants were then given either a printed credit card statement or a digital credit card statement displayed on a tablet screen. Participants were given two minutes (timed) to inspect the statement. To control for externalities (time of day, day of week, external events etc.), medium (print and digital) and message (offer, PSA, cobrand) were rotated in sequence. This ensured that externalities affected all types of stimuli equally, rather than differentially, as had would have been the case if digital, print etc. has been presented in block sequence. On completion, participants completed an online survey. The sequence is summarized in Figure 2.

Figure 2: Experimental protocol



To enhance the “physicality” of the printed statement over the “virtuality” of the digital statement, participants held the paper statement in their hands, whilst the digital was displayed on a tablet placed on a stand. This mimics the fact that when reading emails on a computer one does not interact with the screen, and even when reading on a tablet, the content is form invariant. That is, the form of the tablet does not change with the content displayed. In contrast, paper is form embodied: information on paper is always embodied in a particular type of paper, with differing characteristics.

Results

Of the 180 participants 173 (96%) produced complete or usable responses. The mean age was 21 years, with a range from 18 to 27 years. In terms of gender, 51% (88) of the sample identified themselves as female and 49% (85) male. All participants had a current credit card and were familiar with reading credit card statements. The data was analyzed for the four conditions show in Table 3.

Table 3: Analysis for four conditions

Sports Zone Credit Card Statement with ↓	Print vs Digital
Special Offer	1
Public Service Announcement	2
Co-Branded with a 'good cause'	3
Overall (combining 1, 2 and 3)	4

For each of the four conditions (Offer, PSA, Co-brand and Overall) an ANOVA, analysis of variance (e.g. Tabachnick & Fidell, 2007) was run to explore differences in group means (print vs. digital) for each dependent variables (brand sentiment and purchase intention, recall of brand and associated message). ANOVA allows us to see if the difference in groups means (print vs. digital) is statistically significant at a 95% confidence interval, and what percentage of the variance is explained by the different mediums.

For simplicity, the results are presented in spider charts. Each spoke or radii on the cart represent one of the dependent variables, i.e. the questions that composed brand sentiment, likelihood of purchase and recall. The mean scores for the print and digital statements are then plotted on each spoke, and connected via a blue line for print and a red line for digital. If the difference in means (between print and digital) are significant, the p value and variance explained (R^2) is appended adjacent to the relevant radii. If no p value appears next to a spoke the difference in means is not significant.

For clarity, the brand sentiment and purchase questions are show in the first spider plot, brand and message recall in the second. For the recall questions, the initial recall is labeled recall 1 and the one-week later recall is labeled recall 2.

Figure 3: Statement with Special Offer: Print vs. Digital Brand

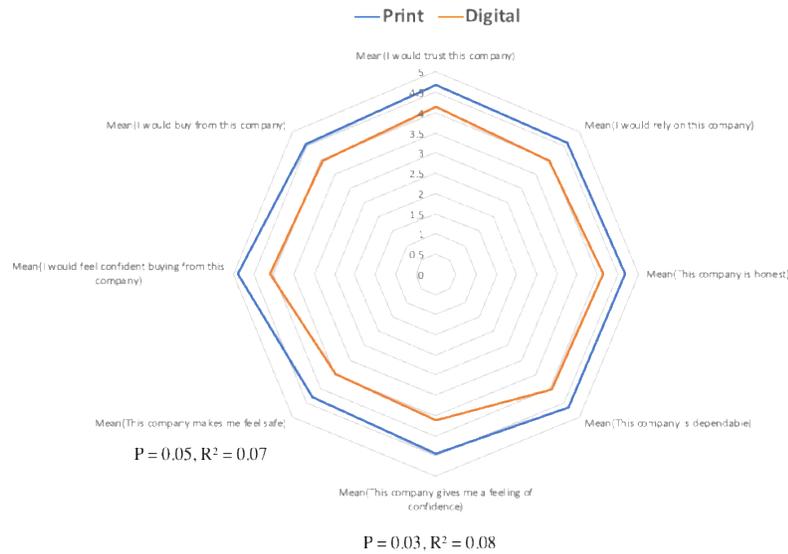
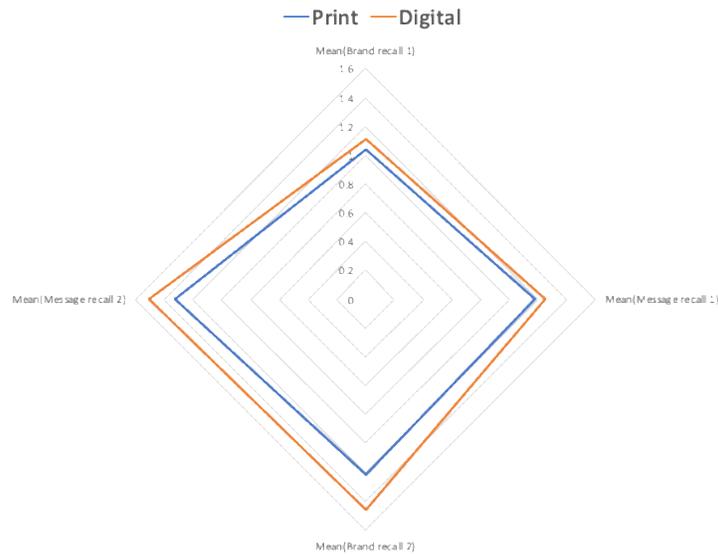


Figure 4: Statement with Special Offer: Print vs. Digital Recall



For the statement with special offer, from the first spider plot (Figure 3), it can be seen that print scientifically outperformed digital in terms of feelings of safety and confidence. Around 8% of the variance on these dimensions is explained by print vs. digital. From the second spider plot (Figure 4), it can be seen that there were no significant differences in recall between print and digital for both the initial and the one-week delayed recall.

Figure 5: Statement with PSA: Print vs. Digital Brand

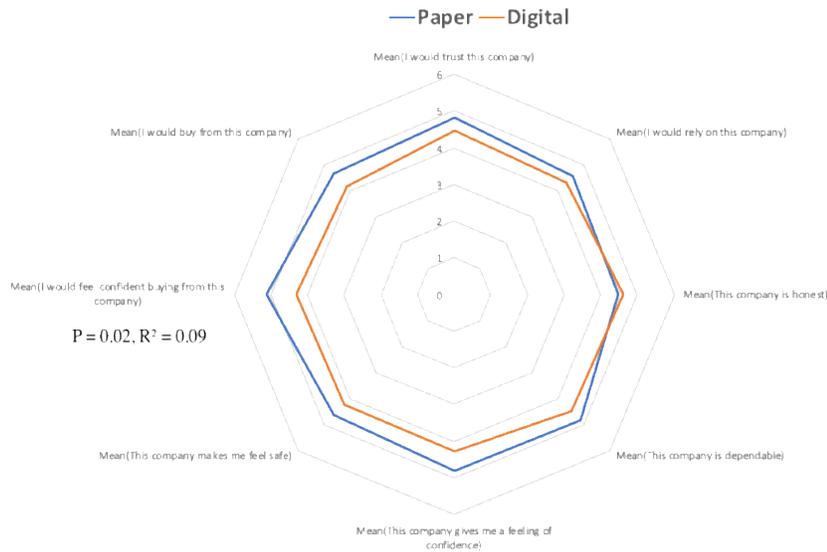
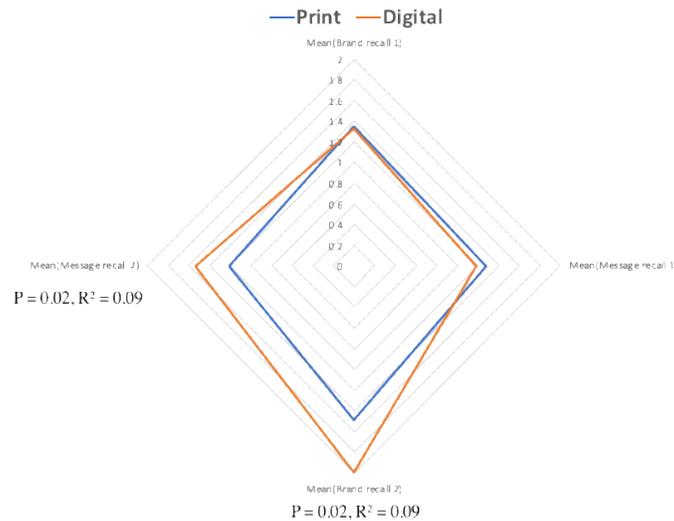


Figure 6: Statement with PSA: Print vs. Digital Recall



For the statement with the public service announcement, from the first spider plot (Figure 5), it is apparent that print scientifically outperformed digital in terms of confidence in buying. Approximately 9% of the variance on this dimension is explained by the medium. From the second plot, (Figure 6) shows no significant differences in initial recall. However, one week later, print significantly outperformed digital for both brand and message recall, with just under 10% of the variance explained.

Figure 7: Statement with Co-Brand: Print vs. Digital Brand

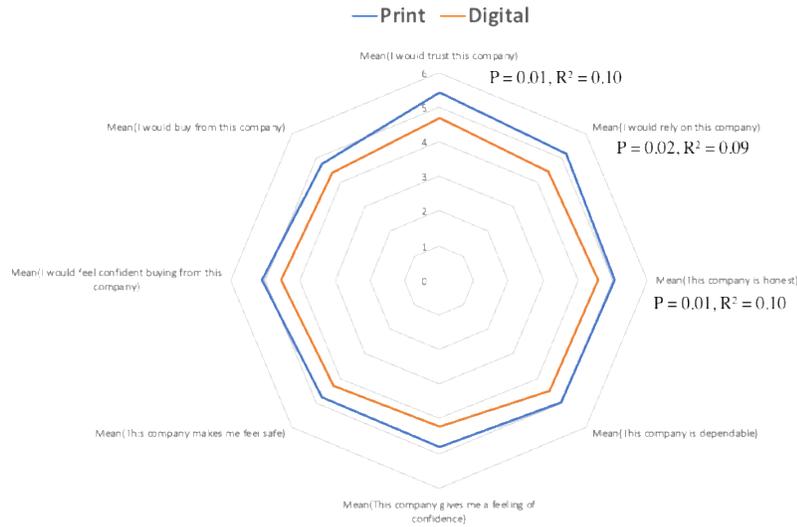
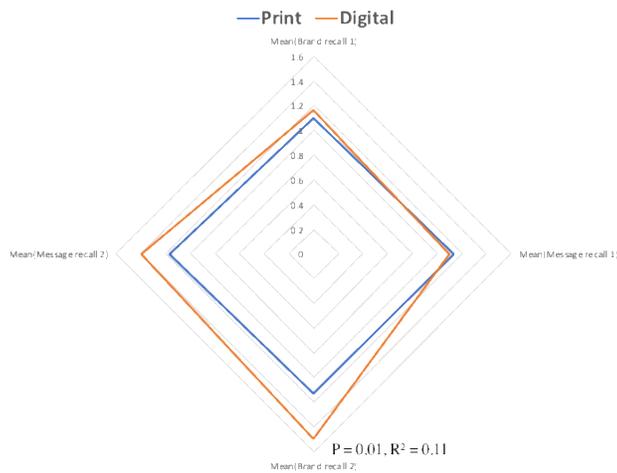


Figure 8: Statement with Co-Brand: Print vs. Digital Recall



For the statement with co-branding, the first spider plot (Figure 7) shows print scientifically outperforming digital in terms of trust, reliance and honesty. On average 10% of the variance on these dimensions is explained by medium. From the second spider plot (Figure 8), we can see that in terms of initial recall, there were no significant differences between print and digital. However, one week later print scientifically outperformed digital in term of both brand and message recall. The difference in medium explained just under 10% of the variance in recall.

Figure 9: Overall: Print vs. Digital Brand

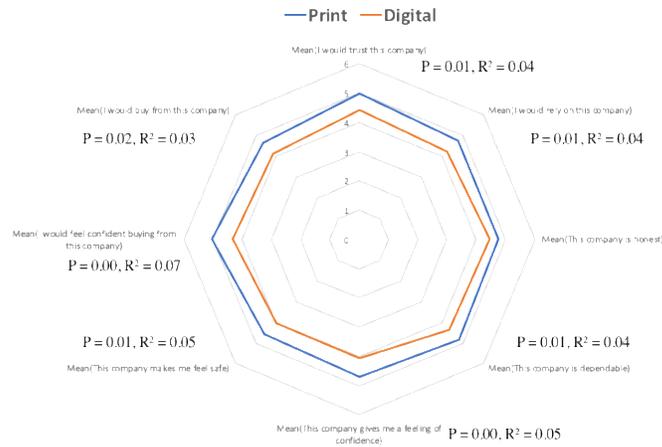
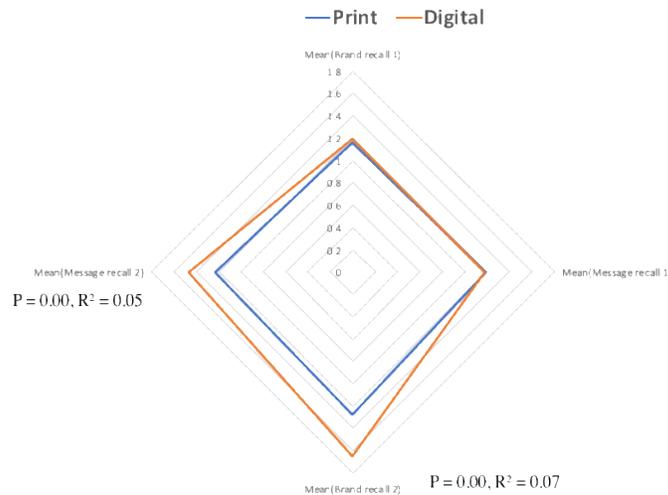


Figure 10: Overall: Print vs. Digital Recall



From the combined data set (special offer, PSA and cobrand), the first spider plot (Figure 9) indicated that print scientifically outperformed digital in terms of trust, reliance, dependability, confidence, safety and intention of purchase. On average 5% of the variance on these dimensions is explained by print vs. digital. The second spider plot (Figure 10) shows no significant differences between print and digital on initial recall. However, the for recall after two weeks print scientifically outperformed digital in term of both brand and message recall. The difference between print and digital explains around 6% of the variance in recall.

A summary of the results is presented in Table 4.

Table 4: Summary of Offer, PSA, Co-Brand & Overall: Print vs. Digital

	Special offer	PSA	Co-brand
Brand sentiment & purchase	P>D 8% lift in brand safety & confidence.	P>D 9% lift in consumer confidence in buying.	P>D 10% lift in brand trust, reliance & honesty.
Recall 1 (initial)	P≈D, Brand & Message	P≈D, Brand & Message	P≈D, Brand & Message
Recall 2 (one week later)	P≈D, Brand & Message	P>D 10% lift in Brand & Message	P>D 10% lift in Brand & Message
Key:	<i>P>D = print statistically outperforms digital</i>	<i>P≈D = no statistical difference between print and digital</i>	<i>X% = percentage of variance explained</i>

Insights from Eye-Tacking: Heatmaps

To gather insights into why print outperformed digital we now turn to the eye-tracking data. Participants held the paper at different distances and in some cases creased the paper so that the surface was not flat. This caused mapping issues so that the usable sample was reduced. Thus, in the following slides the print heatmaps appear less “busy” than the digital ones.

Heatmaps are interpreted by color. The color indicates the relative frequency any part of an image is looked at. The range is from green (less frequently viewed) through yellow to red (most frequently viewed). Technically this is known as a gaze heatmap.

The heatmaps for print and digital for each of the associated messages, special offer, co-brand and PSA, are shown and discussed in sequence below.

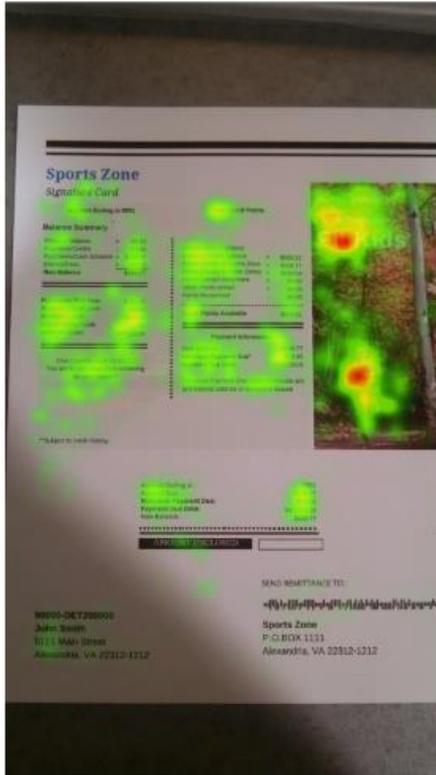
Figure 11: Heatmaps - Special Offer



Figure 11 shows the print and digital heatmaps for the statement with special offer. For the printed medium, the special-offer message/graphic in the credit card statement drew relatively more attention than the billing textual data. For the digital medium, the billing textual data in the statement drew relatively more attention than the special-offer message/graphic.

Figure 12: Heatmaps - Co-brand

Print



Digital

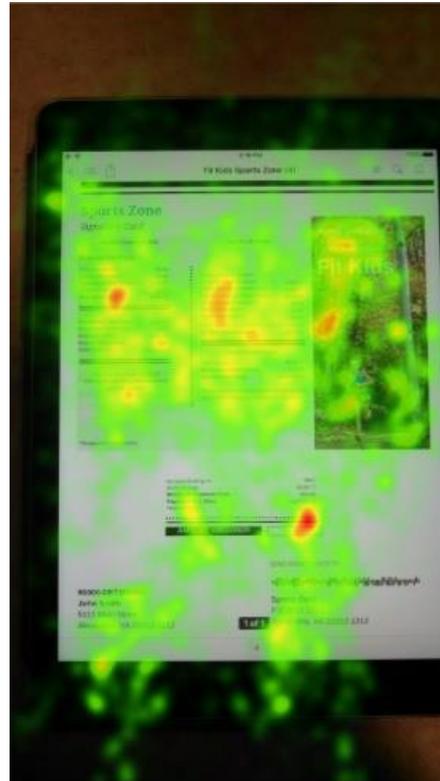


Figure 12 shows the print and digital heatmaps for the statement with co-branding. For the printed medium, the co-brand message/graphic in the credit card statement drew relatively more attention than the textual billing data. For the printed medium, the textual billing data in the statement drew relatively more attention than the co-brand message/graphic.

Figure 13: Heatmaps - PSA

Print



Digital

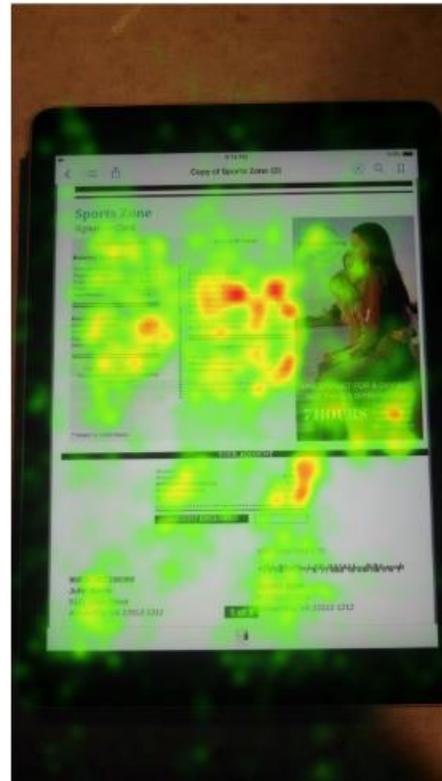


Figure 11 shows the print and digital heatmaps for the statement with the public service announcement. For the printed medium, attention was split between the PSA message/graphic and the textual bill data in the credit card statement. For the digital medium, the billing textual data in the statement drew relatively more attention than the PSA message/graphic.

Heatmaps Summary

Overall, for the printed medium the associate graphic message drew relatively more attention than the billing data. For the digital medium, the billing data drew relatively more attention than the associate graphic message.

Conclusions

Returning to our research question “Does the medium (print vs. digital) in which information (a billing/credit card statement with associated message) is presented affect how that information is perceived (brand sentiment) and retained in memory (recall accuracy)?”

The answer from this experiment is yes.

The overall effect is around 5% of the variance for brand sentiment and 6% for brand recall. Differences between print and are largely consistent across type of associated message.

So how can we explain these results? Two propositions are offered.

Proposition 1:

The differences between print and digital may be explained by consumers’ experience of the two mediums. Digital mediums are typically saturated with dynamic advertising whilst print mediums have fewer (and static) adverts. Thus, people have learned to interact with the mediums differently. People may be more focused in digital mediums (aggressively screening out associated information), whilst in print mediums they may be more open and inclusive of associated information. In summary, due to experience, people may process print and digital information differently.

Proposition 2:

The differences between print and digital may be due to the nature of message ‘embodiment’. The “physicality” of the printed statement contrasts with the “virtuality” of the digital statement. The characteristics of paper may unconsciously impact perceptions of the brand and memory.

Future Research Opportunities

These experiments raise a number of further research questions. First, and perhaps most importantly, can these laboratory results be translated into the real world? This might be accomplished by using actual, personal (cf. simulated, third-party) credit card statements. Second, can the positive effect of print (vs. digital) be turned off and on? This would address the question as what is it about print (vs digital) that produces a positive effect on brand and recall? Third, can the positive effect of print (vs. digital) be enhanced? So, once the mechanism underpinning the effect is uncovered, can the moderating variable be manipulated? Fourth, is there an interaction effect between message type and medium? That is, does print (/digital) favor certain types of associated message over others? Fifth, can one engineer an interaction effect between print and digital? For example, a credit card statement in print and email may outperform multiple emails. Finally, future research might turn the propositions 1 and 2 into hypotheses and test.

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