



# OFFICE OF **INSPECTOR GENERAL**

UNITED STATES POSTAL SERVICE

## Tuned In: The Brain's Response to Ad Sequencing

### RARC Report

Report Number  
RARC-WP-17-004

February 13, 2017





# OFFICE OF INSPECTOR GENERAL

## UNITED STATES POSTAL SERVICE

## Executive Summary

In 2015, the U.S. Postal Service Office of Inspector General (OIG) and Temple University's Center for Neural Decision Making conducted a neuromarketing study to understand the human response to digital and physical advertisements (ads). The study found that physical ads created stronger memories, sparked desirability, and led to higher subjective value for advertised products, while digital ads captured subjects' attention more quickly.

To follow up on these results, the OIG evaluated responses to physical and digital ad sequences in a lab study using functional magnetic resonance imaging (fMRI) brain scans, followed by field tests tracking consumer response to real-world ad campaigns. In the lab phase, ads were shown in physical-physical, physical-digital, digital-digital, and digital-physical sequences, and then participants were tested on their memory, desirability, and valuation of the products seen.

The neuromarketing analysis indicated that using a single-media sequence (physical-physical or digital-digital) was more effective than using mixed media, in terms of memory and subjective value. The results of the lab portion indicated that the physical-physical sequence was particularly effective at eliciting ad recognition, brand recall, and ad likability. Sequences were also tested for their influence on participants' purchase intent, willingness to pay, and product choice. Mixed-media sequences were more effective in some instances and single-media sequences in others.

### Highlights

**The OIG teamed with Temple University to examine the neurological response to sequenced ads.**

**Physical ads, shown twice, led to better memory and higher subjective value than any other tested sequence.**

**Single-media advertising sequences (physical-physical and digital-digital) had better results in most of the behavioral and fMRI results.**

The field study campaigns, although not statistically conclusive, showed a higher consumer response to a physical-digital ad sequence compared to a digital-digital sequence. These results merit further research to provide context for the differences between the field study and lab study. Other findings from the lab study have practical implications for marketers and the Postal Service: faces spurred higher recall rates than scenes or words, and the physical-physical sequence was best for brand-building messages. The latter finding suggests a growth opportunity for the Postal Service, as advertising mail has, historically, not been perceived as an effective tool for brand recognition campaigns.

# Table of Contents

Cover	
Executive Summary.....	1
OIG Synopsis .....	3
Methodology .....	4
Findings and Discussion .....	6
Conclusion.....	8
Detailed Analysis .....	9
Executive Summary .....	10
Introduction.....	12
Phase One: Lab Study .....	13
Results .....	18
Exploratory Field Study One .....	28
Exploratory Field Study Two.....	30
Discussion .....	33
Appendix A: Analyses and Key Measures.....	36
Appendix B: Results Tables.....	39
Appendix C: Physical and Digital Ad Environments .....	41
Appendix D: Research Environment .....	42
Appendix E: Pilot Study and Results.....	43
Appendix F: References.....	44
Appendix G: Management’s Comments.....	45
Contact Information .....	47

## Introduction

With more advertising channels available now than ever before and limited consumer attention spans, marketers must understand not only which channel is most effective, but if the sequence of their advertisements (ads) make a difference. For example, if a consumer first receives an ad in the mail and later sees the same ad via email, did the order in which she viewed the ads influence the ads' effectiveness? Would a reversed, digital-physical media sequence have resonated more powerfully with her? How about if she had seen two advertising mailpieces instead?

These questions are even more important as the amount of mixed-media advertising increases.<sup>1</sup> This type of marketing — employing multiple channels to communicate a single message — has implications for the number of channels marketers use and how they allocate resources. Examining how these channels interact and their effect on consumers is important for determining the right mix of media, which could have significant implications for the future of advertising mail.

To explore these topics, the U.S. Postal Service Office of Inspector General (OIG) partnered with the Center for Neural Decision Making at Temple University's Fox School of Business (CNDM) to perform a multi-methodological study. The research builds on previous findings from the first project completed by CNDM and the OIG, *Enhancing the Value of Mail: The Human Response* (EVOM), as well as the research of other posts.<sup>2</sup>

EVOM explored the effectiveness of physical advertising compared to digital advertising. The study used neuroscience techniques, biometrics, eye tracking, and surveys to assess participants' attention to, memory of, and subjective valuation of ads. The EVOM results were driven by the neuroscience findings. By analyzing the human response to advertising on a neurological level, researchers were able to assess effectiveness of ads on the subconscious — beyond the means of traditional self-reporting techniques, such as surveys.

EVOM was foundational, finding that physical ads were more quickly and confidently remembered. The brain scans also revealed heightened neural activity for physical ads, demonstrating stronger subjective value and desirability. Finally, EVOM found that participants processed digital ads faster, meaning that digital ads caught their attention more quickly.

From these findings, the OIG and CNDM hypothesized that physical and digital ads might complement each other when shown in sequence.<sup>3</sup> To test this hypothesis, the OIG conducted a follow-up study using neuroscience techniques, traditional surveys, and a field study to capture participants' conscious and subconscious responses to sequenced ads.<sup>4</sup> The goal of this research was to explore if viewing ads in certain sequences influenced participants' ad recall, preference, and perceived product value. Understanding sequencing effects is valuable for the Postal Service and advertising mailers because it can inform planning for mixed-media advertising campaigns and help marketers determine which media should be used to communicate specific messages.

1 Experian Marketing Service, *The 2016 Digital Marketer*, 2016, p. 79 and Steve Olenski, "Four Key Principles of Cross Channel Marketing," *Forbes*, May 12, 2016, <http://www.forbes.com/sites/steveolenski/2016/05/12/four-key-principles-of-cross-channel-marketing/#5fba6a0b74f8>.

2 U.S. Postal Service Office of Inspector General, *Enhancing the Value of Mail: The Human Response*, Report No. RARC-WP-15-012, June 15, 2015, <https://www.uspsoidg.gov/sites/default/files/document-library-files/2015/rarc-wp-15-012.pdf>. Royal Mail released studies in 2009 (*Case Study: Using Neuroscience to Understand the Role of Direct Mail*) and 2015 (*The Private Life of Mail*) examining how participants processed physical media relative to digital counterparts. The latter demonstrated the power of mail as an advertising medium compared to email and television, in terms of engagement, emotional intensity, and memory. Millward Brown, *Using Neuroscience to Understand the Role of Direct Mail*, 2009, [http://www.millwardbrown.com/docs/default-source/insight-documents/case-studies/MillwardBrown\\_CaseStudy\\_Neuroscience.pdf](http://www.millwardbrown.com/docs/default-source/insight-documents/case-studies/MillwardBrown_CaseStudy_Neuroscience.pdf) and Royal Mail, *The Private Life of Mail*, February 2015, <http://www.mailmen.co.uk/campaigns/the-private-life-of-mail>. In 2015 and 2016, Canada Post also examined the effectiveness of mail on a neurological level. The 2016 paper examined the sequence effects of mail with various digital media. Canada Post, *A Bias for Action*, July 31, 2015, [https://www.canadapost.ca/assets/pdf/blogs/CPC\\_Neuroscience\\_EN\\_150717.pdf](https://www.canadapost.ca/assets/pdf/blogs/CPC_Neuroscience_EN_150717.pdf) and Canada Post, *Connecting for Action*, September 2016, <https://www.canadapost.ca/web/en/pages/dm/whitepaper.page?ecid=murl|pdn|lb|31>.

3 OIG, *Enhancing the Value of Mail: The Human Response*, p. 1.

4 In EVOM, attention was measured through biometric and eye tracking data. Because of the difference in methodology, the OIG did not measure attention in the present study.

## Methodology

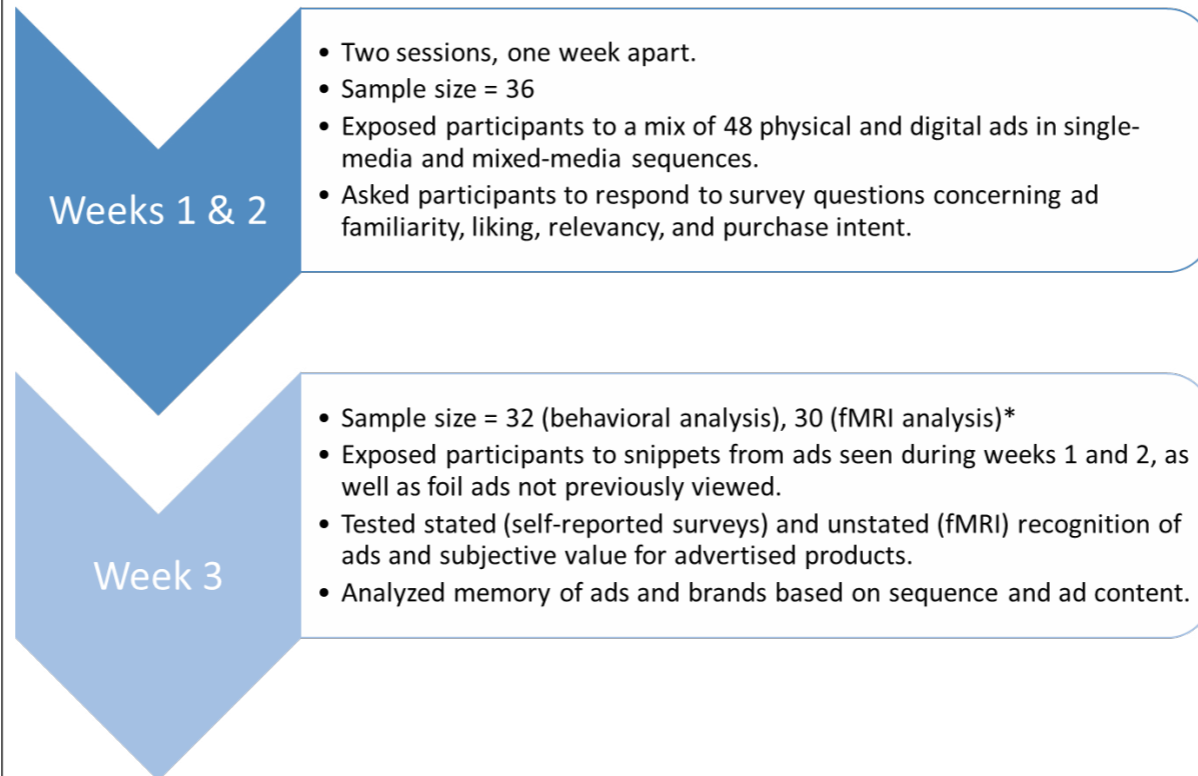
The study utilized three techniques: functional magnetic resonance imaging (fMRI) neuromarketing analysis, self-reported surveys, and field experiments. The fMRI analysis was meant to assess participants' subconscious memory and valuation of sequenced advertising. By measuring activation in key areas of the brain while participants viewed advertising media and answered questions, researchers were able to gather insight into subconscious processes. The surveys and field experiments were meant to reinforce and add context to the fMRI results.

Participants in the study attended three sessions, each about a week apart. The participants viewed each ad in one of four sequences: physical-physical, physical-digital, digital-digital, or digital-physical. Physical ads were seen as printed postcards, and digital ads were viewed on a computer monitor. In total, each participant viewed 48 ads each week, 24 of which were physical and 24 of which were digital. Of the 24 ads in a particular medium each week, 12 were from a mixed-media set and 12 were from a single-media set. See Table 1 for an overview of these sequences. During weeks 1 and 2, participants also responded to survey questions that asked them about the ads and products advertised. The ads in this study were specifically chosen to feature similar types of products, such as two brands of headphones or running shoes. A pre-test was conducted to ensure there was not an inherent bias for one product over another.

**Table 1: Ad Sequence Formats in Weeks One and Two**

Ad Sequencing Formats		Week 1	Week 2
<b>Mixed Media</b>	Digital-Physical	12 Digital Ads	12 Physical Ads
	Physical-Digital	12 Physical Ads	12 Digital Ads
<b>Single Media</b>	Physical-Physical	12 Physical Ads	12 Physical Ads
	Digital-Digital	12 Digital Ads	12 Digital Ads

### Figure 1: Summary of Lab Experiment



\*The usual sample size for an fMRI study is 25-30 participants.

When participants returned for the third week, they were placed inside an MRI scanner to view snippets from the ads that they had seen previously, as well as foil ads, which they had not seen previously. Snippets included words, faces, and scenes from the ads. After viewing the snippet, researchers asked participants if they had seen the ad before and if they could identify the brand associated with the snippet. The MRI scanner monitored participants' neural activity as they viewed the ads and answered questions.

In week 3, researchers also asked participants to choose between pairs of products advertised and to state their willingness to pay (WTP) for each advertised item.<sup>5</sup> Figure 1 summarizes the methodology for all three sessions of the lab experiment.

<sup>5</sup> In the WTP task, participants were asked to state what price, between \$1 and \$50, they would pay for advertised products. During this task, participants saw only the picture of the products, rather than the original ad or ad snippet.

As an additional research technique, the team collected data from actual advertising campaigns that sequenced mail and email ads to attempt to replicate the lab findings. The ads were sent by a major U.S. graduate school in two field campaigns. The campaigns contacted people who had scored well on a graduate school entrance exam and marked that they were interested in receiving information from universities.<sup>6</sup> The first advertising campaign sent three communications to potential students: a mailpiece, an email with the same information, and a follow-up, personalized email. The procedures for the first campaign are included in Table 2. The primary metric measured by the university was how many recipients went to the website listed on the ad, either by clicking through the email, typing it into a browser, or scanning a QR code.<sup>7</sup> CNDM also measured the number of responses to the personalized, final email.

**Table 2: Procedure for Campaign One**

	Physical-Digital Group (N=1,656)	Digital-Physical Group (N=1,649)
<b>Communication One</b>	Mail	Email
<b>Communication Two</b>	Email	Mail
<b>Communication Three</b>	Personalized Email	Personalized Email

The second campaign included two types of communication — a similarly designed email and mailpiece — inviting potential students to apply to graduate school. Recipients received either two emails, two mailpieces, or both a mailpiece and email, in either a digital-physical or physical-digital sequence. The procedures for the second campaign are included in Table 3. The metrics measured for this campaign were how many recipients went to the advertised website and how many applicants ultimately applied to the graduate school.<sup>8</sup>

**Table 3: Procedure for Campaign Two**

	Physical-Digital Group (N=1,656)	Digital-Physical Group (N=1,649)	Digital-Digital Group (N=1,649)	Physical-Physical Group (N=1,649)
<b>Communication One</b>	Mail	Email	Email	Mail
<b>Communication Two</b>	Email	Mail	Email	Mail

<sup>6</sup> This is significant, as the university was striving to contact a relatively small number of qualified, interested applicants, versus selling products at a large scale.

<sup>7</sup> A click through rate, referenced in this section, refers to how many people, after opening an email, clicked on links within the email to visit the corresponding website.

<sup>8</sup> Because the metrics measured in both campaigns relied on recipients going online to visit a website, the study had an inherent digital bias. It is easier for recipients to visit an advertised website when the advertising message is received online.

## Findings and Discussion

This study resulted in a number of key findings. Statistically significant results showing the strength of one type of sequence over another are shown in Tables 4 and 5.

The key findings from the neuromarketing portion of the study are the following.

- The fMRI data showed activation in the ventral striatum and ventromedial prefrontal cortex for ads seen in the physical-physical sequence. These areas of the brain are associated with subconscious value and desirability, indicating a greater purchase intent for products advertised in the physical-physical sequence.
- The fMRI data indicated the highest activation of the left anterior hippocampus for ads in the physical-physical sequence. This area of the brain is associated with creating memories, meaning the physical-physical sequence was more effective at creating memories than the other sequences.
- Faces, compared to scenes and words, created the strongest memories of ads in terms of both the ad itself and the brand associated with the ad.

**Table 4: fMRI Findings on Media Effectiveness in 2015 and 2016 OIG-CNDM Studies**

Variable	2015 OIG-CNDM Study		2016 OIG-CNDM Study			
	Physical	Digital	Physical-Physical	Digital-Digital	Physical-Digital	Digital-Physical
<b>Memory</b> Measured as activation in the left anterior hippocampus	X		X			
<b>Desirability and Subjective Value</b> Measured as activation in the ventral striatum and ventromedial prefrontal cortex	X		X			

The key findings from the self-reported surveys were the following.

- Participants remembered ads seen in the single-media sequences (only-physical or only-digital formats) better than ads from the mixed-media sequences.
- In addition to simply recalling ads, participants better identified companies or brands associated with ads from the single-media sequences compared with ads from the mixed-media sequences. Participants remembered the brands associated with ads in the physical-physical sequence particularly well.
- Participants reported having a higher attraction to and purchase intent for items shown in the physical-physical sequence. Interestingly, participants indicated they would pay more for items shown in a mixed-media sequence.

**Table 5: Key Findings on Media Effectiveness from Surveys**

Variable	Single Media		Mixed Media	
	Physical-Physical	Digital-Digital	Physical-Digital	Digital-Physical
<b>Ad Liking (Weeks 1 and 2)</b> <i>How much did you like this ad?</i>	X			
<b>Purchase Intent (Weeks 1 and 2)</b> <i>After seeing this ad, how likely are you to consider purchasing this product/service or eating at this restaurant?</i>	X			
<b>Ad Recognition (Week 3)</b> <i>Have you seen this ad before?</i>		X		
<b>Brand Recognition (Week 3)</b> <i>What brand is this ad for?</i>		X		
<b>Choice Task (Week 3)</b> <i>Which of the two similarly paired products do you prefer?</i>		X*	X*	
<b>Willingness to Pay (Week 3)</b> <i>What is the maximum amount you would be willing to pay for this product or service, or at this restaurant?</i>		X**	X**	

\* For the choice task, the digital-digital sequence was marginally higher ( $p < 0.10$ ), than the physical-physical sequence, and the physical-digital sequence was marginally higher than the digital-physical sequence. Single media and mixed media could not be compared in the choice test because the sequences had different ad sets, advertising different products. The choice test could only measure preference within each ad set.

\*\* WTP was significantly higher, statistically ( $p < 0.05$ ), for the digital-digital sequence (\$23.35) versus the physical-physical sequence (\$22.12), and significantly higher for mixed-media sequences (\$24.53) versus the single-media sequences (\$22.73).

The findings from the lab study are important because they corroborate the OIG’s prior results demonstrating the effectiveness of physical advertising in cementing memories and developing higher desirability and subjective value. These studies provide more evidence for the enduring value of mail as an advertising channel amidst increasing digital options.

The results of the field study are not statistically significant, but the nuanced results show that mail and email can affect each other when used in tandem. The first campaign saw a higher email open rate in the physical-digital sequence but a higher click through rate in the digital-physical sequence. QR codes were scanned more often when the physical piece arrived first, followed by an email. The final, personalized email saw high response rates, with both sequences garnering responses over 5 percent. The digital-physical sequence, however, received slightly more replies.

In the second campaign, the mixed-media sequences had the best results, compared to the single-media sequences. Recipients were more likely to open and click through the email ad if they had received a mail piece prior to the email. Over three times more people applied after receiving a mixed-media campaign than a single-media campaign.<sup>9</sup> This is important for the future of mail; as digital advertising has grown at a rapid rate, mail may see beneficial growth if it can complement digital campaigns, drawing higher consumer response.<sup>10</sup>

<sup>9</sup> For more information on the field studies, see CNDM’s attached paper, [p. 31](#).

<sup>10</sup> This was outlined as a potential future scenario for advertising mail in a 2016 OIG whitepaper. OIG, *Advertising Mail: Future Prospects in Five Scenarios*, Report No. RARC-WP-16-010, May 9, 2016, <https://www.uspsog.gov/sites/default/files/document-library-files/2016/RARC-WP-16-010.pdf>, pp. 5-6.



Prior to conducting this study, the OIG hypothesized that in a mixed-media campaign, digital ads would positively complement physical ads' ability to leave a lasting impression. In actuality, the lab experiment demonstrated that single-media sequences were more effective at creating memories, with the physical-physical sequence proving particularly powerful. The complex link between memory, purchase intentions, and WTP in neurophysiological, behavioral, and real-life field studies merits further research, as there was not total agreement between what participants said they liked most, at what price they valued items, and what the brain scans showed. The field study demonstrated that receiving information in the physical form first led to a higher response for follow-up, digital calls-to-action.

It is noteworthy that physical media are effective at creating not only recall of the ad itself, but also of the brand associated with the ad. A corporate brand represents the intangible value that customers associate with a particular company, apart from any specific product.<sup>11</sup> Creating and maintaining a strong brand is part of many companies' marketing strategies, and it is necessary for creating awareness and influencing perception of a product or company. Advertising mail is less frequently used for such activities and has instead been used to elicit a direct response or to up-sell existing customers.<sup>12</sup> This study's findings on the effectiveness of physical advertising for creating brand recall highlight the opportunity for the Postal Service to promote investments in mail for campaigns that develop brand awareness and identity.

## Conclusion

This project demonstrates the nuances of eliciting response and recall from sequenced media, but it also highlights when a certain sequence might be beneficial for specific marketing goals. The findings indicate that for brand-building ads, a purely physical campaign might be especially effective, since recall, desirability, and likability were higher for ads seen in the physical-physical sequence. The study also corroborates the fMRI findings in EVOM, showing mail's strength at cementing strong product memories with high desirability. Finally, the study demonstrates that the link between observed desirability, stated purchase intent and likability, and purchase decisions is complex; participants responded more positively to ads from physical-physical sequences but said they would pay more for products advertised in other sequences. Further research could provide context to the results found here, especially with regard to the differences in findings between the lab experiment and the field study.

---

11 OIG, *The Value of the U.S. Postal Service Brand*, Report No. RARC-WP-15-005, January 28, 2015, [https://www.uspsoid.gov/sites/default/files/document-library-files/2015/rarc-wp-15-005\\_0.pdf](https://www.uspsoid.gov/sites/default/files/document-library-files/2015/rarc-wp-15-005_0.pdf), p. 1.

12 "The 2014 Digital Marketer," *Experian Marketing Services*, March 2014, [http://www.experian.com/assets/marketing-services/2014\\_digital\\_marketer\\_benchmark\\_and\\_trend\\_report/index.html](http://www.experian.com/assets/marketing-services/2014_digital_marketer_benchmark_and_trend_report/index.html), p. 60 and Winterberry Group, "From Theory to Practice: A Roadmap to "Omnichannel" Activation," November 2016, <http://www.criteo.com/media/5911/winterberry-group-roadmap-to-omnichannel-activation-criteo-web-version-november-2016.pdf>, p. 5.

---

**TUNED IN: THE BRAIN'S RESPONSE  
TO AD SEQUENCING**

---

**DECEMBER 2016**

**CENTER FOR NEURAL DECISION MAKING  
Temple University**

## Executive Summary

Mixed media marketing campaigns — those that use multiple media channels to communicate a similar message — are complex to manage. Given this complexity, this study seeks to enhance our understanding of marketing strategies across media by identifying, testing, and prescribing when it is more effective to use physical media, digital media, or a combination of both in marketing campaigns and in what sequence. Using a combination of neurophysiological and traditional methods, this study explores: (1) when digital and/or physical advertising media are more effective in engaging consumers, (2) what is the complementary effect when both physical and digital media are used, and (3) whether a specific sequence of these two media has a stronger effect than the other.

The experimental study had two phases. During the lab study phase, we measured neurophysiological and traditional self-reported responses, including ad recognition, brand recall, memory, desirability, and willingness to pay (WTP) when participants interacted with various advertisements (ads).<sup>1</sup> For the field study phase, two mixed media marketing campaigns were conducted at a major university. Implications for using each medium (i.e., physical or digital) or a combination of both in marketing campaigns are discussed.

There were two parts in the lab study phase. In the first part, participants viewed sets of ads in physical and digital formats across two weeks and offered traditional, self-reported responses. In the second part of the lab study, participants' brain activity was recorded using functional magnetic resonance imaging (fMRI) when reviewing new and previously viewed ad snippets and images of their corresponding advertised products.

The main finding from the self-reported measures in the lab phase was that seeing ads in only the same format (physical or digital) twice was generally more effective than if the ads were seen in two different formats. Notably, participants who viewed the physical format twice demonstrated stronger *ad recognition* and *brand recall*. Counter to the other findings in the study,

---

<sup>1</sup> The terms “ad,” “advertisement,” and “stimulus” (pl. stimuli) are used interchangeably in this report. Each stimulus that participants see is an advertisement piece that was either created by various media agencies or by the experimenters conducting this study. Because some stimuli were created in-house by the experimenters, they were pre-tested for any unintentional effects that could affect overall study results.

self-reported WTP for the advertised products was significantly stronger for products advertised in the crossmodal sequence. Within just unimodal sequences, WTP was higher for products shown twice in the digital format. The WTP was not explicitly incentivized, in that participants were not given the opportunity to actually buy the products advertised, potentially weakening its reliability.

When using fMRI in the second part of the lab study, we found differential activation in brain regions associated with specialized processing of different types of snippets (faces, scenes, and words extracted from the ad), consistent with existing literature. Critically, face snippets activated the left anterior hippocampus more than scenes or words, consistent with greater memory recall for these stimuli. This was particularly true for stimuli that were exposed in physical format twice. Combining these findings with those from the first part of the study, there is evidence that the same format shown twice, particularly with the physical format, is associated with higher *memory* (especially for faces depicted in ads). Lastly, greater activation in the ventromedial prefrontal cortex (vmPFC) and ventral striatum (vSTR) was found for products advertised twice in the physical format, denoting greater engagement of these regions in the computations of the underlying subjective value and desirability.

These findings complement the findings from our previous study, entitled “Enhancing the Value of Mail: The Human Response,” (EVOM) which found that physical advertising was associated with stronger memory of ads, as well as higher desirability and subjective value. In this study, we find that exposing participants to ads shown in a unimodal sequence has a stronger memory recall compared to crossmodal sequences, particularly in the physical format.

Across two exploratory, independent field studies, we found that higher click through rates were observed when a digital stimuli follows a physical ad than when ads were presented in just the digital format. We discuss how this finding, coupled with findings from the lab study, create a complex relationship between purchase intent, observed desirability, and consumer action. In sum, this study examines when, how, and why physical media are a valuable complement in sequenced advertising campaigns.

## **Introduction**

Considering the complexity of managing marketing and advertising communications across physical and digital media (often referred to as mixed media marketing campaigns), this study seeks to understand how to increase the effectiveness of marketing strategies by identifying, testing, and prescribing when it is better to use only one medium, such as physical or digital (a “unimodal” sequence), or a combination of both media (a “crossmodal” sequence). This study builds upon the demonstrated value of neurophysiological tools to shed light into marketing phenomena, and explores (1) when digital advertising, such as email, or physical advertising, such as mail, is more effective at engaging consumers in terms of ad recognition, brand recall, memory, desirability, and willingness to pay (WTP), (2) what the complementary effect is if both media are used in sequence, and (3) if a certain sequence of these two media (physical and digital) has a stronger role in engaging consumers in mixed media marketing campaigns.

Extending our previous study, entitled “Enhancing the Value of Mail: The Human Response,” (EVOM), we sought to capture the neurophysiological measures in response to mixed media campaigns, when both physical and digital media are sequenced. Specifically, we sought to understand whether, when, why, and in which sequence direct mail should be combined with digital media as part of a marketing campaign, hoping to shed light on how to effectively integrate direct mail with email to engage customers. This is particularly important for small and medium-sized advertisers that often do not have the resources to track the effectiveness of multiple media and may not select the most effective mix of physical and digital communications to optimize their mixed media marketing campaigns.

We drew upon the findings of EVOM concerning the relative advantages of each medium to generate interest among consumers. Specifically, the functional magnetic resonance imaging (fMRI) results of EVOM indicated that digital advertising was associated with a higher cognitive attention to the advertised stimuli, while physical advertising was associated with higher memory, desirability, and valuation for the advertised product. Considering these findings, we sought to understand the effects of physical and digital media sequencing to determine if the advantages of digital media to draw consumer attention could complement the benefits of physical mail to increase memory recall and product desirability.

We used a multi-methodological framework, including traditional self-reports together with fMRI, to capture multiple cognitive and affective processes (these included familiarity, liking, memory/recall, choice, desirability, and WTP) associated with mixed media marketing campaigns. The use of multiple methods aims to provide a comprehensive understanding of how consumers perceive advertising messages when presented in a combination of physical and digital media.

This study included two phases. The first, lab study phase, involved fMRI along with traditional self-reports, while the second, field study phase, used two large-scale randomized field experiments. The lab study phase helped us to understand the underlying neurophysiological and behavioral differences in the effectiveness of mixed media advertising campaigns. The field study phase sought to understand the generalizability of the lab study phase to a real-world mixed media marketing campaign.

## **Phase One: Lab Study**

### **Methodology**

The lab study included three sessions that occurred over a period of three weeks, with each session approximately one week apart (6-8 days). During the first two sessions (Part One), researchers exposed participants to sets of advertisements (ads) in physical and digital formats and gathered self-reported data. In the third session (Part Two), researchers recorded and collected participants' self-reports and brain activity, using fMRI, when reviewing an arrangement of new and previously seen ad snippets and images of the advertised products.

### **Part One: Exposure and Interaction**

Participants were divided into four different groups and presented with a sequence of physical or digital ads over a two week period. The physical ads were printed on postcard-like materials, while the digital ads were viewed on a computer screen. There were four sequences of ads used throughout the study (Digital-Physical, "DP," Physical-Digital, "PD," Physical-Physical, "PP," and Digital-Digital, "DD"), which were evenly counter-balanced among all study participants (Table 1). For example, if a participant saw the DP sequence, he or she saw an ad in a digital view in session one, then he or she saw the same ad in a physical view the following week. Additionally, there were two type of formats - crossmodal (DP, PD) and unimodal (PP, DD). As mentioned above, crossmodal refers to physical and digital media used in conjunction for a

specific ad, while unimodal refers using only the physical or only the digital format. In total, each participant viewed 48 ads each week, 24 of which were physical and 24 of which were digital. Of the 24 ads in a particular medium each week, 12 were from the crossmodal set and 12 from the unimodal set. The ads were also paired to include similar products across formats and sequences. The ads were for real products, and were tested to ensure there was not a bias for one product over another that would impact the outcome of the surveys or fMRI scans.<sup>2</sup>

**Table 1: Experimental Set Up**

Sequence	Number of ads	Part One: Session One (Week 1)	Part One: Session Two (Week 2)	Part Two: Session Three (Week 3)
Digital-Physical (DP) (Crossmodal)	12	Digital Advertisement	Physical Advertisement	fMRI Study
Physical-Digital (PD) (Crossmodal)	12	Physical Advertisement	Digital Advertisement	fMRI Study
Physical-Physical (PP) (Unimodal)	12	Physical Advertisement	Physical Advertisement	fMRI Study
Digital-Digital (DD) (Unimodal)	12	Digital Advertisement	Digital Advertisement	fMRI Study

The visual content of the ads varied to include faces, scenes, and words (referred to henceforth as *conditions*). In both session one and session two, participants completed a short survey questionnaire after viewing each ad. Questions included product familiarity, ad familiarity, ad likeability, relevancy, and purchase intent in a seven point Likert-type scale, as shown in Appendix A.

#### **Part Two: Memory Retrieval and Action**

Approximately one week after session two, participants completed an fMRI session, where we measured their brain activity as they responded to questions about the ads. The participants were asked to assess how well they recognized the ads, their choice between similar products advertised, and how much they would be willing to pay for the products. Scans were conducted with a Siemens MAGNETOM Verio 3T MRI system scanner at the Temple University Hospital.

<sup>2</sup> See Appendix E: Pilot Study and Results, for more details on the test.

**Table 2: fMRI Methodology**

<b>Functional Magnetic Resonance Imaging (fMRI)</b>	Functional magnetic resonance imaging (fMRI) is a non-invasive method that localizes and tracks changes in blood oxygenation during cognitive tasks. The blood oxygenation level dependent (BOLD) contrast is based on the fact that hemoglobin has different magnetic properties depending on its oxygenation state. Since neural activity following a specific task utilizes oxygen within specific areas of the brain, the brain vasculature responds by increasing the flow of oxygen-rich blood into the region. This leads to a localized increase in BOLD signal intensity in that region of the brain, which is then measured using high-field magnetic resonance scanners. Accordingly, fMRI provides an indirect and correlative measure of local brain activity at good spatial resolution (about 4mm <sup>3</sup> ) and high temporal resolution (about 2-5 seconds). Using fMRI, we can capture neural activations from the whole brain that can be used as direct measures of perceptual self-reported measures, such as memory, desirability, affect, and arousal. For more information on fMRI, see Huettel, Song, & McCarthy (2008).
---	---

There were two main goals for this part of the study. The first goal was to assess memory and examine if and how well participants retrieved information from the ads they were exposed to in the weeks prior to the scan (Part One). Knowing whether or not consumers remembered an ad and its contents is important information for marketers as they assess advertising effectiveness. It was also important to know how the context of the ad (if the ad included scenes, faces, or words) or the sequence of the media (physical and/or digital) influenced how consumers formed their perceptions about the advertised products. The second goal was to assess how the unimodal or crossmodal sequences influenced consumer perceptions in the self-reported measures and their WTP for those products (products/services/restaurants) that were promoted in the ads to which the participants were exposed in Part One (before the fMRI study).

As mentioned above, during the fMRI scan participants performed three tasks. The first task tested recognition. Participants were shown a series of images, presented one-by-one, that were either snippets of faces, scenes, or words from the whole ads from Part One (n = 48) or snippets



of foil ads (n = 27).<sup>3</sup> Immediately after each snippet, participants were asked to recall whether or not they had seen the ad previously in the study. There was a four-point Likert-type scale, from which participants could answer that the presented ad snippet was *definitely old*, *probably old*, *probably new*, or *definitely new*. Additionally, if participants identified an ad as *old*, they were asked a follow-up question to identify the brand associated with the snippet and were given four choices: the correct brand, the brand of a competing product, and two incorrect brands. When participants incorrectly identified foils as ads that they had seen in Part One, they were still given four random brands to choose from in the second brand identification question.

In the choice task, participants were asked to choose which one of the competing products that they viewed in session one and two they preferred. The participants had to select among 24 pairs of products (48 products in total). They saw the two products on the screen for 4 seconds and were asked to choose their preferred product. The pairs were created in a way that if, for example, a product had been seen in the PD sequence, the paired, similar product would be seen in the DP sequence.

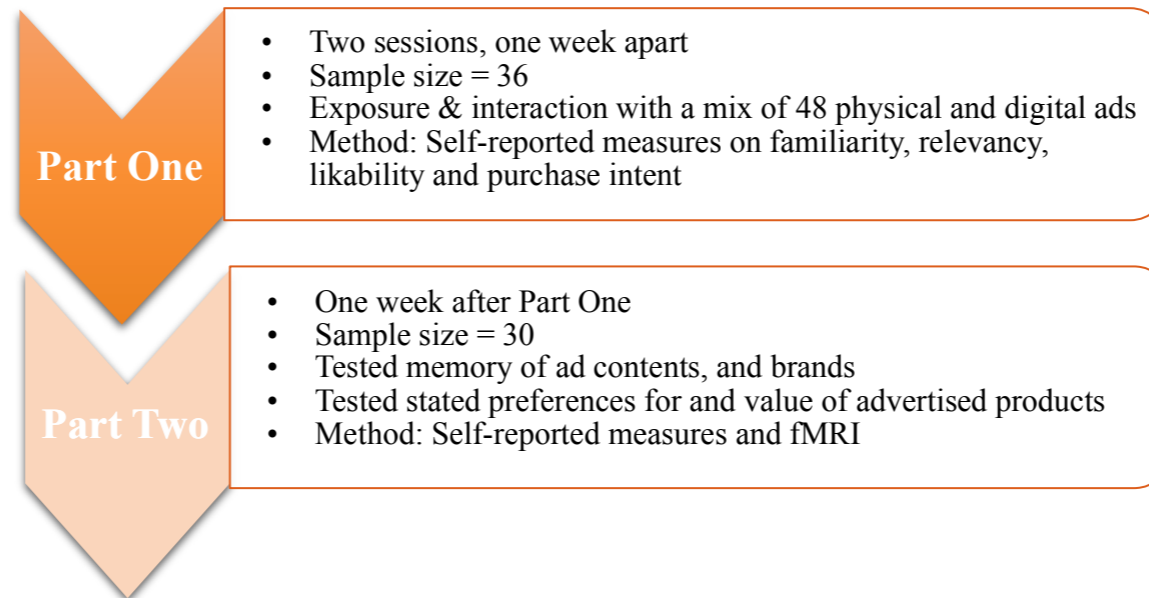
The third and final task included a WTP assignment, in which the participants were asked to provide how much they were willing to pay for the product (ranging from \$1 to \$50). During this task, participants saw only the picture of the products advertised, rather than the original ad or ad snippet. The fMRI captured the brain activity associated with these decision-making choices.

The protocol summary is graphically illustrated in Figure 1.

---

3 Foil ads are ads that participants were not exposed to during Part One. These foil snippets were chosen to either match the ones used during Part One or were completely different from any stimuli used in Part One and were meant to provide variability during the memory task.

**Figure 1: Protocol Summary**



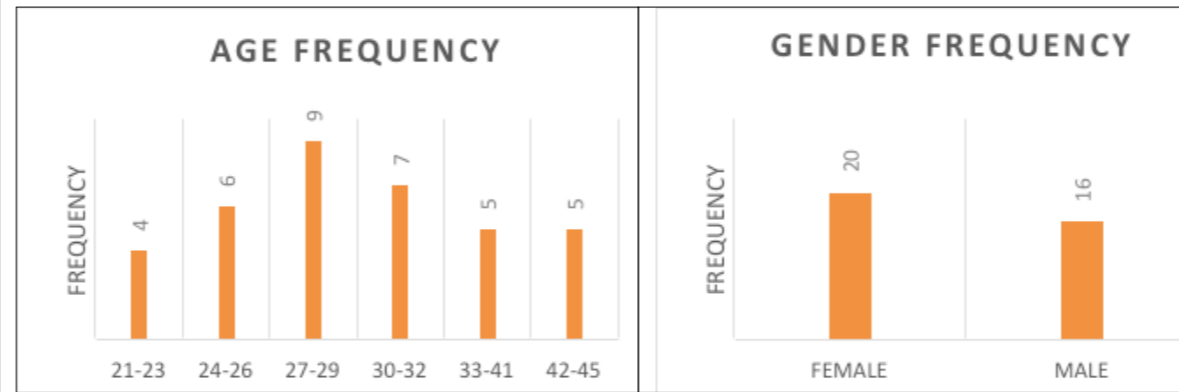
### **Population and Sample**

For this study, participants aged between 21 through 45 were recruited from the Philadelphia area.<sup>4</sup> Through several means of recruitment (including an in-house database), 36 were scheduled to participate (mean age = 31, median age = 29). Figure 2 illustrates gender and age distribution. In Part One, all 36 participants attended both sessions. A total of 32 participants completed both Part One and Part Two of the study (note that this attrition rate is very low compared to other longitudinal studies in the field). Of these 32, two participants did not complete the fMRI, but completed a simulated behavioral session via an online survey, and, hence, their behavioral recognition measures and choice preferences were still available. Therefore, the sample size for behavioral analysis is 32, and the sample size for whole brain analysis is 30. The sample size of 30 is higher than those used in most fMRI studies, thus providing adequate power for the statistical analysis.

---

<sup>4</sup> We selected participants from this age range to restrict variability in brain structure.

**Figure 2: Participant Demographics**



## Results

### Part One: Moment-to-Moment Exposure and Interaction with Ads

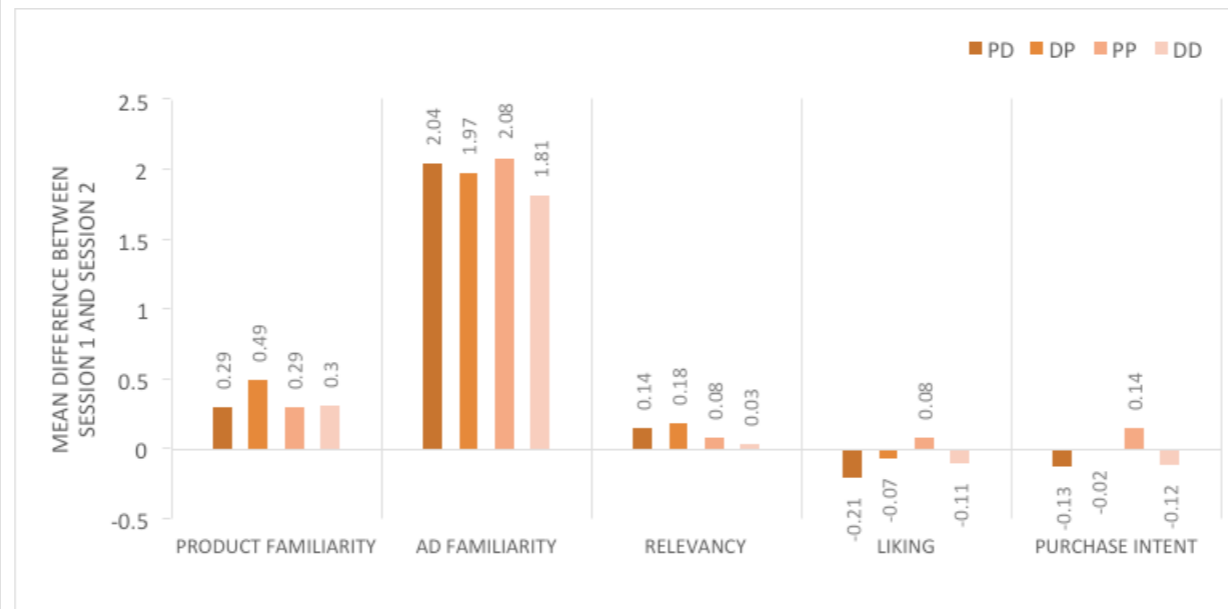
The first step in analyzing the different stages of the study was to look for trends and significant results between the means of the self-reported data that were collected in Part One. This was mainly done by conducting one-sample t-tests and repeated analysis of variance (ANOVA) tests on the different formats and conditions in the study.<sup>5</sup>

For the repeated measures ANOVA, factors included format (either PD/DP or PP/DD) and/or condition (face, scene, or words). For the first part of the analysis, PD was only compared to DP, and PP only with DD. This is due to the fact that the specific crossmodal and unimodal ad sets were different in terms of the exact products advertised. We then ran a separate test (Appendix E - Pilot Study and Results) to check if the ads used in the crossmodal and unimodal ad sets were qualitatively different in terms of the self-reported measures (self-reported measures are included in Appendix A), and we found no differences between these ads in terms of the self-reported measures. Hence, all four formats (PD, DP, PP, and DD) were subsequently compared to each other in terms of the self-reported measures, including directly comparing the crossmodal formats with the unimodal formats.<sup>6</sup>

<sup>5</sup> ANOVA is a way to determine whether there are statistically significant differences between the means of different groups.

<sup>6</sup> We cannot do a direct comparison of fMRI data between the crossmodal and unimodal formats for the choice question because the advertisement pairs were for unrelated products.

**Figure 3: Mean Differences in Self-Reported Measures between Sessions One and Two**



In Part One, the mean differences in the self-reported measures (on a seven-point Likert scale) between the participants' first and second session are noteworthy (Figure 3). Using one-sample t-tests, we saw that familiarity (of both the product and the ad) increased from session one to session two. While this was expected, it does show that the participants were paying attention and remembered the ads they saw in the previous session. However, there is no statistically significant difference between the sequences with regards to familiarity of the advertisement. While relevancy, liking, and purchase intentions showed a smaller change from the first session to the second session than familiarity, it is interesting to see that the PP sequence was the only positive change for liking and purchase intent. This may suggest that when participants see an ad in a physical format twice (PP), they are more likely to like the ad, as well as have marginally higher intentions to purchase the product advertised.

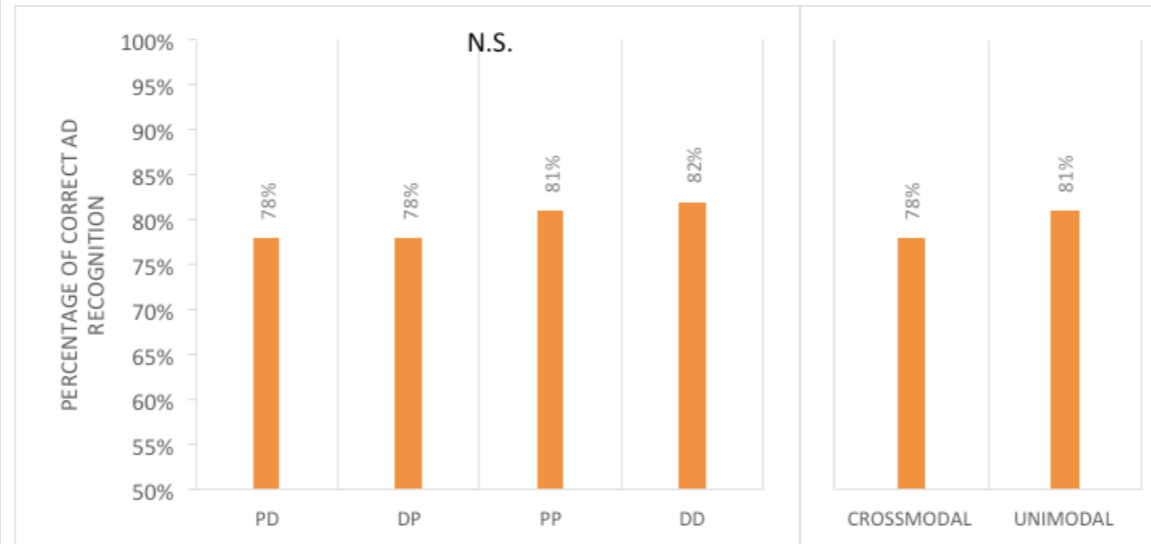
**Part Two: Memory Retrieval and Action (Behavioral Data from fMRI Session)**

In Part Two, each task completed during the fMRI session was analyzed separately (recognition, brand identification, choice, and WTP), separating the mean scores by sequence (PD, DP, PP, and DD), format (unimodal and crossmodal), and condition (face, scene, and word).

When analyzing the recognition task, the mean of each participant's correct answer to old ad snippets (saying definitely/probably old to an actual old snippet) were grouped both by sequence and by format (Figure 4). Context memory for old-new recognition and brand identification were

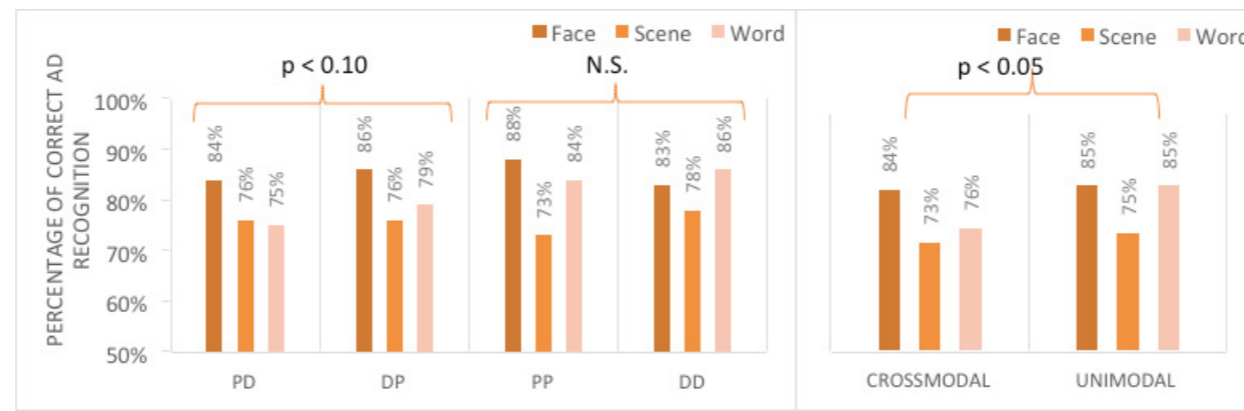
also assessed. Participants were able to correctly differentiate between old ads (mean correctness = 79.5%) and new ads (mean correctness = 81%), despite the difficulty of the recognition task (presenting only snippets of each ad), relative to the recognition task in EVOM (presenting the entire ad). Although there was not a separate sequence effect on memory, there was a marginal ( $p < 0.10$ ) format effect. Participants were more likely to remember ads they saw in unimodal formats (either PP or DD) than ads that were presented in crossmodal formats (PD or DP).

**Figure 4: Percentage of Correct Ad Recognition Scores**



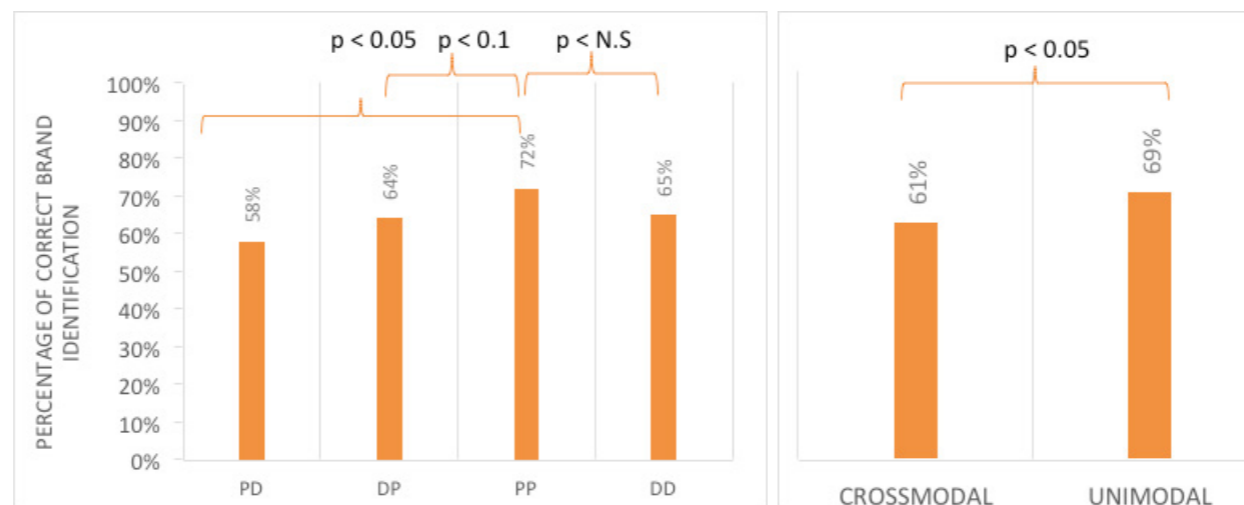
The analysis of the recognition task can be compared using three factors: sequence (PD, DP, PP, or DD), format (crossmodal or unimodal) and condition (face, scene, or word). First, we compared the effect of sequence and condition, and we found a main effect of condition ( $p < 0.05$ ), but no effect of sequence or interaction between format and conditions. Specifically, we found that faces were better remembered than scenes and words across all sequences. Subsequently, we also sought to understand the effect of format and condition. We found significant differences across formats ( $p = 0.058$ ) and conditions ( $p < 0.05$ ), but no interaction between the two. The recognition was overall greater for unimodal relative to crossmodal, and faces were remembered better than scenes and words, similar to the previous analysis. Together, these results suggest that faces lead to better memory, particularly in sequences where the stimuli are repeated in the same media format.

**Figure 5: Snippet Recognition Scores**



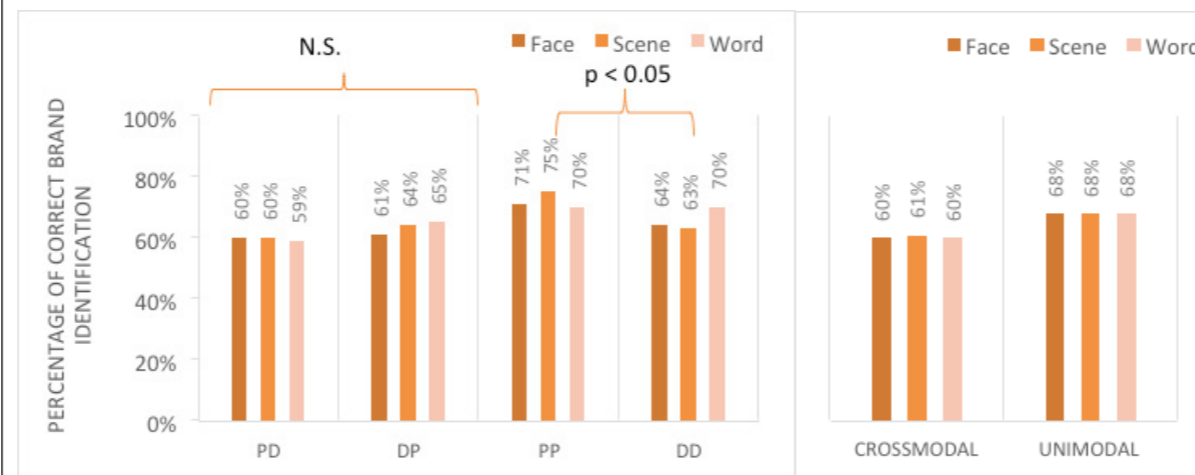
The second task completed in the fMRI study included a brand identification task, where participants were asked to identify the brand associated with each ad snippet. When the two formats were compared, the unimodal (PP, DD) format had a significantly higher ( $p < 0.05$ ) brand identification than the crossmodal format. Figure 6 shows that PP had the highest brand identification compared to all other sequences (PP was significantly better than PD ( $p < 0.05$ ), and marginally higher than DP ( $p < 0.1$ )). These findings suggest that when participants were exposed to ads in a unimodal format, especially in the PP sequence, they were more likely to identify the ad's brand. This finding is consistent with EVOM, where we found that physical stimuli led to better retrieval of the context of the ad. In this study, we show that participants were better at recognizing the brand of the ad when they were exposed to the ad twice in the PP format.

**Figure 6: Brand Identification Scores**



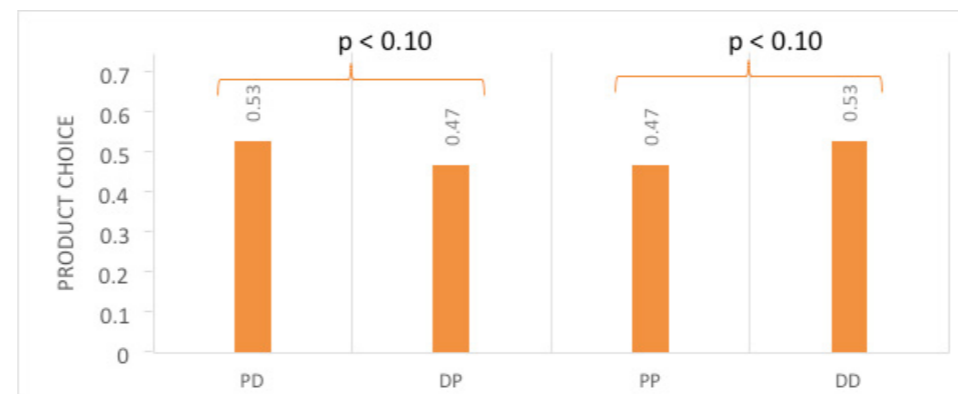
As with ad recognition, the brand identification data can also be broken down further by condition, and Figure 7 illustrates the results. Again, unimodal was associated with significantly better recognition than crossmodal across all conditions (significant effect of format, but no effect of condition or interaction). Within crossmodal ads, there was no effect of sequence (PD or DP), condition, or interaction between the two. Within unimodal ads, we found that scenes in the PP format were remembered significantly better than scenes in the DD format ( $p < 0.05$ ). These findings are consistent with EVOM, where we argued that physical stimuli were associated with greater activation of the parahippocampal region (a region associated strongly with scene processing) because it is associated with greater retrieval of context. In this study, we found that in addition to better brand recognition, PP format also led to specifically better recognition of snippets featuring scenes, relative to the DD format.

**Figure 7: Snippet Brand Identification Scores**



The next task asked participants to choose between two products in each trial. As described earlier, these products were paired in such a way that each pair was shown in different sequences (PD vs. DP or PP vs. DD). We found that participants showed marginally greater preferences for products that were previously exposed in the PD sequence, relative to the DP sequence ( $p < 0.10$ ). Strikingly, in the unimodal format, participants showed marginally greater interest in the DD products, relative to the PP products ( $p < 0.10$ ). Lastly, the proportion of choices for the PD and DD products were significantly different from chance (50%), indicating that participants were not merely choosing randomly.

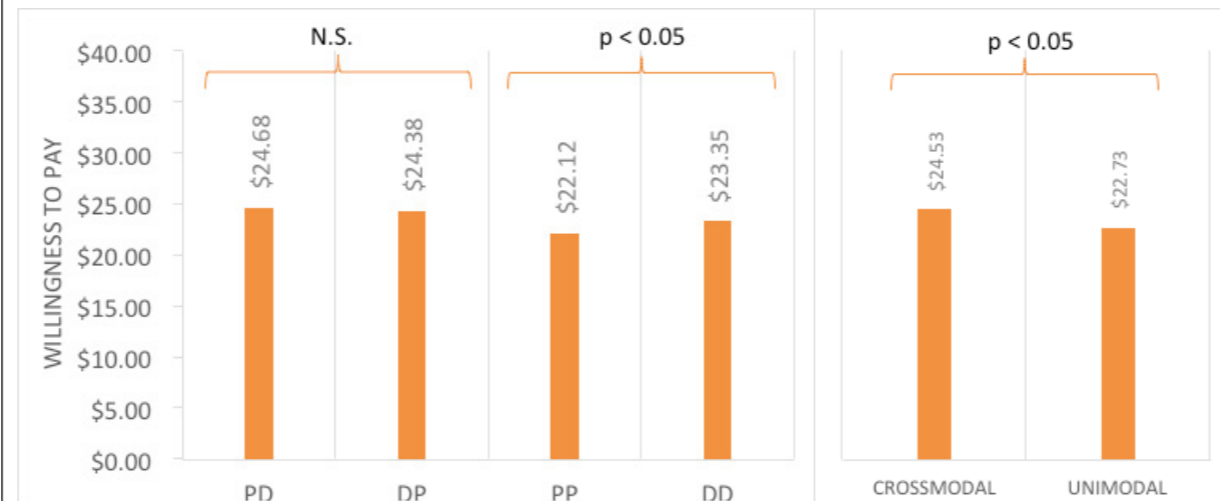
**Figure 8: Choice**



The last task included asking the participants to state their WTP for the products featured on the ads they saw throughout the study (ranging from \$1 - \$50). In our previous study (EVOM) there was no difference in WTP for physical and digital media. However, in this study, the WTP for items advertised in the DD sequence was significantly higher ( $p < 0.05$ ) than those advertised in the PP sequence. Notably, the WTP for crossmodal products was significantly higher than the WTP for unimodal products. This was surprising, given that unimodal, and especially the PP sequence, had higher ad and brand recognition. This might suggest that ads that are engaging may lead to increased attention, better memory and brand recognition, but not necessarily increased WTP, a variable that depends on whether the product advertised is of interest to the participants. This needs to be explored further in future studies.



**Figure 9: Willingness to Pay**



In summary, there is no unequivocal conclusion from the self-reported findings as to whether the unimodal or the crossmodal format is generally more effective. In the case of memory and recall, using the physical medium twice (PP) provided stronger ad recognition and brand recall. The findings also indicated that memory was stronger when faces were included in the ad. Yet, the DD sequence had a significantly higher WTP than the PP sequence, and the crossmodal format had a significantly ( $p < .05$ ) higher WTP than the unimodal format.

### **Part Two: Neural Differences in Context Memory & Preferences**

There is a large amount of evidence that shows that the hippocampus is necessary for the formation of mental associations, a key aspect of episodic memory (e.g., Backus et al., 2016; Small et al., 2001; Mitchell & Johnson, 2009). Therefore, measuring differences in brain activity in the hippocampal region was our main focus for the recognition task. In the previous study (EVOM), we found that physical media was associated with greater activation in the anterior hippocampus and parahippocampal regions, relative to digital media.

Consistent with prior studies, we found strong neural activations associated with viewing the ad snippets. The bilateral fusiform area showed strong activations when participants processed face snippets, the bilateral parahippocampal regions showed activations when participants processed scenes, and the bilateral middle temporal regions showed activations when participants processed words. None of these regions showed differences in neural activation when analyzed according to format or sequences.

However, we found that faces activated the left anterior hippocampus significantly more than scenes or words (Figure 10). This may indicate that faces lead to better recollection of the context surrounding the ads overall, consistent with faces being associated with the greatest memory accuracy among all snippets. Strikingly, the analysis indicated that the effect was primarily driven by the PP sequence.

**Figure 10: Measuring Recognition across Conditions and Snippets Using fMRI**

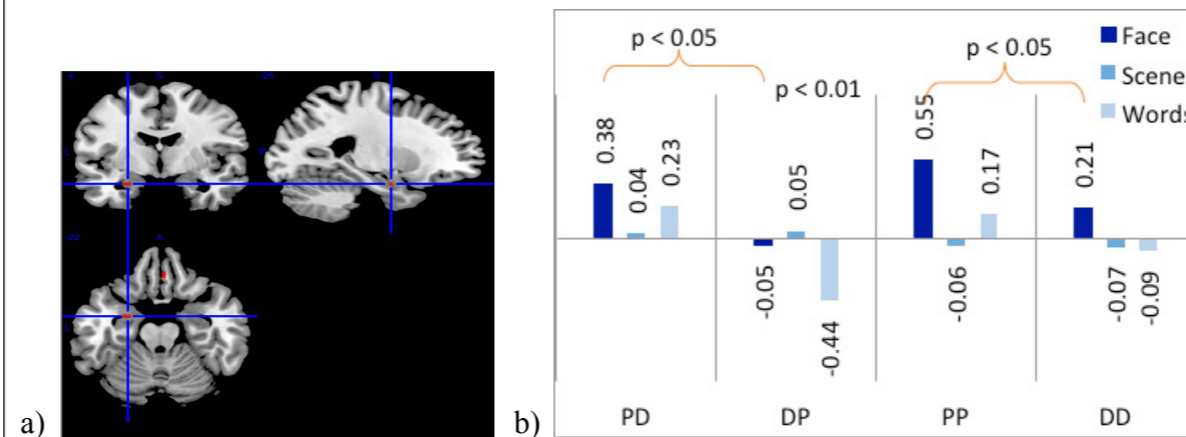


Figure 10: a) MRI contrast with PD\_Face > DP\_Face. The signal activation centered in the crosshairs is located at the functionally-defined left anterior hippocampus. Subject-meanned region of interest (ROI) analysis of the left anterior hippocampus for each condition sequence. PD\_Face vs DP\_Face has p-value < 0.05, PP\_Face vs DD\_Face has p-value < 0.05 and PD\_Words vs DP\_Words has p-value < 0.01.

To further explore whether physical or digital formats lead to differences in brain activations, we combined the unimodal and crossmodal formats in two different ways; recency and primacy. In the recency analysis, we grouped data in such a way that the media of the ads that participants saw most recently prior to the scanner session (during week 2) were the same: physical recent = DP + PP; and digital recent = PD + DD. The contrasts showed a larger difference in signal activation in the mid-hippocampus (Figure 11), but no difference in the anterior hippocampus. On the other hand, combining the data by primacy (physical first = PD and PP; and digital first = DP and DD) showed larger difference for physical relative to digital in the anterior hippocampus.

Interestingly, the differences in the mid-hippocampus based on primacy were not unique to faces, but also to scenes. Previous studies have shown a posterior to anterior functional gradient in the hippocampus, with the more posterior regions associated with retrieval processes and anterior regions associated with encoding processes (Lepage et al., 1998; Daselaar et al., 2006, Eldridge et

al., 2005). Critically, there is an interplay within these processes – the hippocampus may subserve the balance between new learning and old memories. Specifically, in the current task, the primacy related activation in the middle hippocampus may be related more to the retrieval of context from the first exposure to these stimuli; while the recency related activation in the anterior hippocampus may be related to the integration of the newer contexts and information during the retrieval process. This needs to be explored further in future studies.

**Figure 11: Physical-Digital Recent (Physical = DP + PP, Digital = PD + DD) Snippets Model**

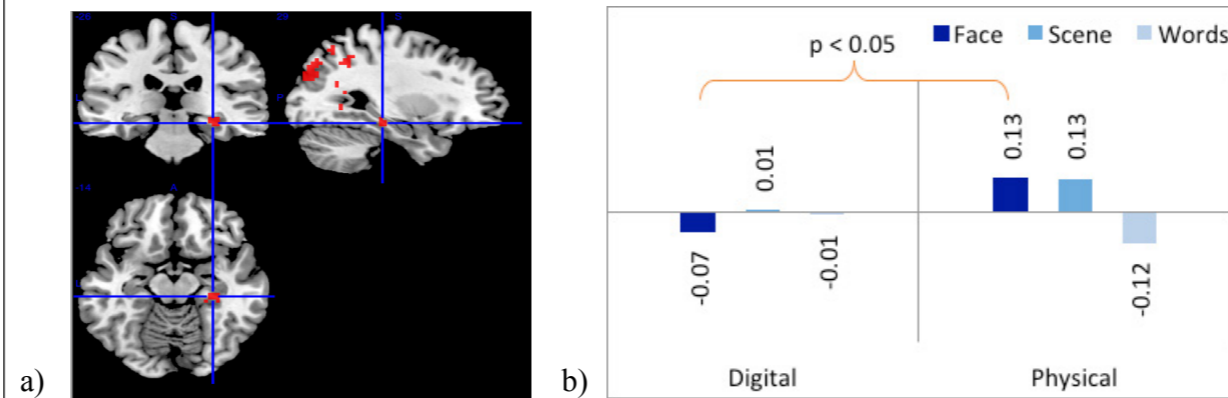


Figure 11: a) MRICron contrast at  $z = 3$  with  $\text{Physical\_Face} > \text{Digital\_Face}$ . The signal activation centered in the crosshairs is located at the functionally-defined mid-hippocampus (extracted from a separate conditions only model). b) Subject-meanned region-of-interest (ROI) analysis of the mid-hippocampus was conducted.  $\text{Physical\_Face}$  vs  $\text{Digital\_Face}$  has  $p$ -value  $< 0.05$ .

Looking at the participant preferences on WTP, there were no differences in the amount of time participants took to provide their bids inside the scanner. However, at the neural level, we found differences when participants were reflecting on their WTP for items in the unimodal format. Specifically, we found that activity in vmPFC/vSTR was modulated by WTP to a greater extent for items from the PP sequence relative to the DD sequence. No differences were observed in the crossmodal format. These findings are again consistent with increased striatal activity observed in the earlier study (EVOM) for items advertised using physical versus digital media, suggesting that products previously seen in physical ads may be associated with higher desirability for the participants. Yet, these findings are counter to the self-reported WTP, which was higher for crossmodal products and DD products compared to PP products. It is possible that flaws in the WTP test are to blame for this incongruence. Because WTP was not explicitly incentivized, in that participants were not given the opportunity to actually buy the products, the valuations may

be more random than in EVOM. This might explain the difference between self-reported WTP and activation in the vSTR. This needs to be tested further in future studies.

**Table 3. Results Summary**

<b>Variable</b>	<b>Key Finding</b>	<b>Results and Methodology</b>
Liking	When participants saw an ad in a physical media twice (PP sequence), they liked the ad more during the second viewing.	Part One, self-reported measures (differences between week 1 and 2)
Purchase Intent	When participants saw an ad in a physical media twice (PP sequence), they reported having marginally higher intentions to purchase the product advertised in the ad during the second viewing relative to the first. There were no differences in the other sequences.	Part One, self-reported measures (differences between week 1 and 2)
Ad Recognition	When participants saw an ad in a unimodal format (PP or DD), they were marginally more likely to remember the ad ( $p < 0.10$ ) than when they saw the ad in the crossmodal format (DP or PD).	Part Two, self-reported measures
Snippet Effect	Face snippets were generally better remembered across all sequences. In other words, participants were likely to recognize the ad better when face snippets from the ad were used, relative to words and scenes ( $p < 0.05$ ).	Part Two, self-reported measures
Brand Recognition	When participants were exposed to ads in the same medium twice (unimodal), they were more likely to remember the brand ( $p < 0.05$ ), an effect that was mostly driven by the physical (PP) sequence.	Part Two, self-reported measures
Willingness to Pay (WTP)	WTP was significantly higher for crossmodal than unimodal formats ( $p < 0.05$ ) and was higher for DD than the PP sequence ( $p < 0.05$ ).	Part Two, self-reported measures
Memory	Face snippets from the ads activated the left anterior hippocampus (denoting memory) significantly more than scenes or word snippets. This effect was strongest for stimuli from the PP sequence.	Part Two, fMRI

Desirability and Subjective Value	Activity in the vmPFC/vSTR (denoting subjective valuation and desirability) was modulated by self-reported WTP to a greater extent for products from the PP sequence, relative to DD sequence.	Part Two, fMRI
-----------------------------------	--	----------------

## Phase Two: Exploratory Field Studies

The second phase of this study, the field study phase, used two large-scale exploratory randomized field experiments. This phase provided real-life data into which type of mixed media marketing campaign could be successful.

### Exploratory Field Study One

In the first field study, we sent out 3,305 invitations both domestically and internationally to assess potential candidates' interests on a popular graduate program in a major U.S. university (Temple University). The participants' contact information was acquired from lists of people who expressed interest in graduate programs. The participants were split in two groups; the first group (Group One: N=1,656) received a mailed advertisement (physical view) and about one week later received the same advertisement in an email (digital view). Therefore, Group One followed the PD sequence. The second group (N=1,649) received the same advertisement by email first and about a week later they received the ad by direct mail (DP sequence). In the digital view, participants were asked to click on a designated link to receive additional information about the program. In the physical view, participants were asked to either type the given URL or scan the QR code. Two weeks later, after the second communication, participants in both groups received a personalized email from a university recruiter inviting them to contact her directly and receive more information about the graduate program.

**Table 4: Procedures followed for Field Study One**

	Group One: (N=1,656)	Group Two: (N=1,649)
	<b>Physical – Digital (PD)</b>	<b>Digital – Physical (DP)</b>
<b>Step 1</b>	mail	email
<b>Step 2</b>	email	mail
<b>Step 3</b>	Personal communication through email	Personal communication through email

### Field Study One Results

Table 5 shows the responses after the first two communications were received (Step 1 and Step 2). As seen from Table 5, participants in the PD sequence were more likely to open their emails (29.3%), relative to participants in the DP sequence (22.9%). We contend that the prior exposure using physical stimuli led to a greater likelihood of responding to the subsequent digital email, compared to the same message presented first digitally. Individuals in the PD sequence were also more likely to scan the QR code to access more information than individuals in the DP sequence. Therefore, in the first field study, PD sequence seems to be better overall in attracting individual's attention to the desired information. It is likely that this is driven by greater memory in the physical stimuli, as observed from our lab and fMRI studies.

**Table 5: Responses from Field Study One (Google Analytics)**

	<b>Group One (PD)</b>	<b>Group Two (DP)</b>
<b>Total Sent</b>	1,656	1,649
<b>Total Emails Received</b>	1,589	1,576
<b>Bounce Rate</b>	4.05%	4.43%
<b>Total Emails Opened</b>	485	377
<b>Email Open Rate</b>	29.29%	22.86%
<b>Email URL clicks</b>	52	63
<b>Email URL Click through rate</b>	3.14%	3.82%
<b>Direct Mail URL clicks</b>	9	9
<b>QR Code</b>	11	1

Table 6 shows the responses received after the follow up personalized email from a university recruiter. We found that individuals in the DP condition were slightly more likely (66.6%) to open these emails than those in the PD condition (63.6%). Crucially, these individuals were also more likely to respond as measured by the reply rate (6.48% in the DP condition relative to the 5.74% in the PD condition). These reply rates are considerably higher than industry standards.<sup>7</sup>

**Table 6: Responses from Field Study One (personalized email)**

	Group One (PD)	Group Two (DP)
<b>Total Emails Sent</b>	1,589	1,576
<b>Emails Opened</b>	1,011	1,050
<b>Email Open Rate</b>	63.62%	66.62%
<b>Replies to recruiter</b>	58	68
<b>Response Rate</b>	5.74%	6.48%

### Exploratory Field Study Two

Compared to Field Study One, we also included a unimodal (PP and DD) sequence in Field Study Two to see if repeating the ad in the same format twice was more effective, relative to the crossmodal designs used in the first field study. Therefore, following the outcomes of the lab studies, we created four groups following the combination of all different sequences (PD, DP, PP, and DD). The responses measured were all digitally-based (visiting a website), which was a limitation in measuring certain sequence responses. For example, recipients were less likely to visit a website if they had to use a computer to go online and type in the website from a mailed ad (PP), rather than if they just had to click a link to be directed to the website (PD, DP, and DD). Participants who expressed interest in receiving information regarding graduate studies were split into four groups with about 500 participants in each group. Depending on which group the participant was assigned he/she received either only physical (PP) (via mail), only digital (DD) (via email), or crossmodal communication (PD, DP). For example, if a participant belongs

<sup>7</sup> MailChimp Research, "Email Marketing Benchmarks," <https://mailchimp.com/resources/research/email-marketing-benchmarks/>.

to the PD group, she first received a letter presenting a popular graduate program from a major US university, and a week later she received an email with the same information about the program and an invitation to participate in a recruiting event. Similar to Field Study One, if participants received the communication in the digital format, they were invited to click on a link and get more information about the program (or complete an application). If they received the physical format (mailed materials), they were asked either to type the URL provided, scan the QR code, or mail back a form included in the mailed package (with pre-paid postage).

**Table 7: Procedures Followed in Field Study Two**

	Group One	Group Two	Group Three	Group Four
	<b>Physical - Digital</b>	<b>Digital - Physical</b>	<b>Physical - Physical</b>	<b>Digital - Digital</b>
<b>Step 1</b>	mail	email	mail	email
<b>Step 2</b>	email	mail	mail	email

**Field Study Two Results**

Table 8 shows the responses received after the first two communications were received. Based on the findings from Field Study One, we expected that individuals in the PD sequence would exhibit higher response rates.<sup>8</sup> However, we found that individuals in the DP sequence were slightly more likely to open their emails and click on the link (70.54% and 3.98%, respectively), relative to individuals in the PD sequence (69.82% and 2.31%, respectively) where participants received the email after they had already received the physical advertisement.

Critically in this study, we can also compare response rates to the second digital communication, based on whether the first exposure was digital (DD) or physical (PD). We see that the response (click through) rates, are higher in the PD (2.31%) relative to the DD (1.38%) condition. This is consistent with the finding that initial exposure to the physical stimulus can increase the subsequent likelihood of responding to the digital version (when the overall liking is controlled, as is the case here with both conditions having a prior exposure), presumably because of the higher memory from the physical format.

---

<sup>8</sup> It is important to note that higher click through rates are expected for email than physical mail given the convenience of responding to an email compared to a physical mail.



The last measurement by which to compare the campaigns is the application rate. We see that there was slightly greater number of applications from the crossmodal formats (PD and DP) relative to the unimodal formats (DD and PP) (Table 8). The overall response rates for this particular advertising campaign are higher than the industry standard for education.<sup>9</sup> Relating the results back to the lab studies, it seems consistent with the crossmodal products being associated with a significantly higher self-reported WTP than the unimodal products. It is also important to note that while the unimodal DD format had the highest click-through rate, the actual number of applicants in this format was the lowest (Table 8). Further research in this area is needed to test whether a similar campaign has similar results. The mechanisms underlying the differences between physical and digital media need to be explored further in future research.

**Table 8: Responses from Field Study Two**

CONDITION		Group One (PD)	Group Two (DP)	Group Three (PP)	Group Four (DD)
<b>Total Media Received</b>	week 1	478	499	482	491
	week 2	497	499	482	472
<b>Media Opened</b>	week 1	N/I <sup>1</sup>	352	N/I	338
	week 2	347	N/I	N/I	290
<b>Media Open Rate</b>	week 1	N/I	70.54%	N/I	68.84%
	week 2	69.82%	N/I	N/I	61.44%
<b>URL clicks</b>	week 1	1	14	3	11
	week 2	8	0	0	4
<b>Click through rate</b>	week 1	0.20%	3.98%	0.60%	3.25%
	week 2	2.31%	0.00%	0.00%	1.38%
<b>Applicants</b>		6	5	2	1

**N/I: No Information**  
**N/A: Not Applicable**

<sup>9</sup> MailChimp Research, “Email Marketing Benchmarks,” <https://mailchimp.com/resources/research/email-marketing-benchmarks/>.

## **Discussion**

### **Key Findings**

To guide the management of mixed media marketing campaigns across physical and digital media, this study examined when it is better to use each medium (physical or digital) and their sequence in the context of mixed media marketing campaigns. This study specifically examined when digital and physical media in sequence are more effective in engaging consumers in terms of ad recognition, brand recall, memory, desirability, and WTP using traditional behavioral lab studies, neurophysiological methods, and field studies. Key findings include that seeing ads in only the same format (physical or digital) twice in a sequence is generally more effective than if the ads were seen in two different formats in terms of self-reported brand recognition, self-reported brand recall, observed memory, and observed desirability. Out of the unimodal sequences, self-reports indicated that physical-physical exposure lead to the higher likability and purchase intent, yet self-reported WTP of the advertised products was significantly stronger when products were seen in crossmodal formats compared to unimodal formats. There was no significant difference between the crossmodal sequences, but DD did perform significantly better than PP in the unimodal format. This contrast between stated purchase intent and WTP is interesting and merits further research.

In terms of the fMRI findings, activation in the vmPFC and vSTR was modulated to a greater extent by ads shown twice in physical media, implying better subjective valuation and higher desirability. Faces depicted in ads activated the left anterior hippocampus more than scenes or words, implying higher memory recall. This was driven by faces in the PP condition.

Integrating the findings from the lab study (behavioral and fMRI data), our research suggests that using the same medium twice in sequence, particularly physical media, is associated with higher memory (notably for faces shown in ads) and higher desirability for the products featured in the ads. The value placed on items merits more research, as the subjective value in the fMRI scans showed higher activation for the physical only sequence, the stated purchase intent was highest for the physical only sequence, but the highest WTP was for crossmodal products. Given the potential problems with the WTP task, we place more trust in the fMRI measurement of subjective value, but it needs to be explored further.

The lab (behavioral and fMRI) study provides evidence for the effectiveness of the unimodal format, but is limited in that all outcomes were observed in controlled environments where participants are asked to process all presented ads without the distractions of a real-life environment. In contrast, in the field studies, participants did not necessarily process all ads. The field studies were limited in that the measured response was related to online interaction, which is easier to incentivize when the user is receiving the advertising message while already online.

In Field Study One, the open rates were higher in the PD condition (in which emails were sent after a mailpiece) relative to the DP condition (in which emails were sent first). This is juxtaposed by the response to the third email sent to all recipients, in which higher open rates were seen in the DP condition than the PD condition. Click through rates were higher in the DP condition than the PD condition in both the sequencing email and the personalized, final email.

In Field Study Two, digital stimuli were associated with higher click through rates when they were preceded by the physical stimuli, compared to when digital stimuli were preceded by digital stimuli. Together with the fact that physical stimuli are consistently associated with increased memory, particularly if shown twice in sequence, one possible explanation for the findings from Field Study Two is that the enhanced memory from having been exposed to the ads in the physical format initially led to increased interest and higher attention on the subsequent digital stimuli.

Taking into account all data measured in this project, it is interesting to note that better memory does not necessarily translate to higher WTP, as shown from the self-reported WTP data in Part Two of the lab study. Also, purchase intentions, likability, and WTP do not always correspond perfectly. Therefore, the complex link between memory, purchase intentions, and WTP in behavioral, neurophysiological, and real-life field studies need to be explored further in future studies.

The field and lab study findings in this research nicely complement the earlier EVOM results. We find that exposing participants to ads shown in a physical format, particularly twice in sequence, has a stronger memory recognition and brand recall compared to the digital formats, similar to EVOM. Moreover, ads presented in a digital format in the field studies were more likely to trigger a response, similar to the higher attention triggered by the digital format in EVOM. Integrating these findings, if a company has chosen to use mixed media marketing, they may

find the most success presenting the physical ad first to enhance memory and brand recognition, followed by the digital ad that is more likely to facilitate a direct response. However, these results should be interpreted with caution, given the relatively small sample sizes of the field studies, and the rather stark differences between the lab/fMRI setting, in which participants must review all materials, and the field setting, wherein participants can easily ignore advertising materials. Nonetheless, there are some useful implications for practice in terms of improving mixed media marketing campaigns by integrating physical and digital media.

### **Implications for Practice**

In this study, we seek to cautiously prescribe when, how, and why physical media can be a valuable complement in mixed media campaigns and when physical and digital media should be used in sequence. Extending the prescriptions from our previous study, EVOM, we seek to prescribe the sequence of physical and digital media in mixed media marketing for advertisers to engage their consumers. Our findings suggest that using the same medium twice, particularly physical media, can result in higher ad and brand recognition. Whether or not consumers remember an ad and its contents is important for marketers to enhance advertising effectiveness, even if in this lab/fMRI study we did not seek to test for long-term brand recognition that many marketers seek to develop over time. We also show that ads that contain faces are remembered more than those that contain scenes or words, particularly when the physical medium is used in sequence.

Moreover, Field Study Two suggested that the digital ads were associated with higher responses when they were preceded by the physical ads, as opposed to digital ads preceded by another digital ad. This project demonstrates the nuances of eliciting response and recall from sequenced media, but it also highlights when a certain sequence might be beneficial for specific marketing goals. This study indicates that for brand-building advertisements, a purely physical campaign might be more beneficial, since recall, desirability, and likability were higher in the PP sequence. While more research is needed, this study also demonstrated that when physical and digital media are both used in a sequence, PD might be better at eliciting a consumer response, given the higher open rates in the field studies and the higher self-reported WTP for crossmodal advertisements.

## Appendix A: Analyses and Key Measures

### Self-Reported Measures (Part One)

The following are the self-reported measures and their scales acquired during Part One (exposure):

Measure	Scale
<p><b>Item Familiarity:</b></p> <p>How familiar are you with the product/service/restaurant featured in this advertisement?</p>	<p>1= [Not at all familiar]            2= [ ]            3= [ ]            4= [Neutral]            5= [ ]            6= [ ]            7= [Very familiar]</p>
<p><b>Purchase Intent:</b></p> <p>After seeing this advertisement, how likely are you to consider purchasing this product/service or eating at this restaurant?</p>	<p>1= [Not at all likely]            2= [ ]            3= [ ]            4= [Neutral]            5= [ ]            6= [ ]            7= [Very likely]</p>
<p><b>Ad Relevancy:</b></p> <p>How relevant is this advertisement for you?</p>	<p>1= [Not at all relevant]            2= [ ]            3= [ ]            4= [Neutral]            5= [ ]            6= [ ]            7= [Very relevant]</p>
<p><b>Ad Familiarity:</b></p> <p>How familiar are you with this advertisement?</p>	<p>1= [Not at all familiar]            2= [ ]            3= [ ]            4= [Neutral]            5= [ ]            6= [ ]            7= [Very familiar]</p>
<p><b>Ad Likability:</b></p> <p>How much did you like this advertisement?</p>	<p>1= [Extremely Dislike it]            2= [ ]            3= [ ]            4= [Neutral]            5= [ ]            6= [ ]            7= [Extremely Like it]</p>

### Self-Reported Measures (Part Two)

The following are the self-reported measures and their scales acquired during Part Two (fMRI session)

Measure	Scale
<b>Recognition:</b> Have you seen this ad before?	[Definitely Old] [Probably Old] [Probably New] [Definitely New]
<b>Brand Recall:</b> What Brand Is This Ad For?	[brand1] [brand2] [brand3] [brand4]
<b>Choice:</b> Choose which one of the two products you prefer.	[product1] [product2]
<b>Willingness to pay:</b> Assuming you are looking to purchase these products or services (for yourself or someone else), please indicate what is the maximum amount you would be willing to pay for this product, service or restaurant.	[bid]

### Functional Magnetic Resonance Imaging (fMRI)

Functional magnetic resonance imaging, or fMRI, is a non-invasive method that localizes and tracks changes in blood oxygenation during ongoing cognitive tasks (Ogawa et al., 1990). The blood oxygenation level dependent (BOLD) contrast is based on the fact that hemoglobin has different magnetic properties depending on its oxygenation state: oxyhemoglobin is diamagnetic while deoxyhemoglobin is paramagnetic and that paramagnetic substances lead to greater distortion of the surrounding magnetic field. Since neural activity following a specific task utilizes oxygen within specific regions of the brain, the brain vasculature responds by increasing the flow of oxygen-rich blood into the region. This leads to a localized increase in BOLD signal intensity in that region of the brain, which is then measured using high-field magnetic resonance scanners (Huettel, Song, and McCarthy, 2004). Thus, the fMRI provides an indirect and correlative measure, at the macroscopic level, of local brain activity at a very high spatial resolution (about 1mm<sup>3</sup>) and good temporal resolution (about 2-6 seconds).

Using fMRI, we wanted to capture neural activities at time of memory retrieval, such as identifying if an ad was *new* or *old*, and whether an *old* ad was seen in the *physical* or *digital* format. Additionally, we were interested in capturing neural activities during moments when participants were evaluating their WTP to receive an item advertised in the stimuli.

For fMRI, there are two general ways to look at the neural activation. The first is a whole-brain analysis that looks at all parts of the brain and their correlation to the task at hand. The second is to look at targeted regions, called regions of interests (ROI), in which we have *a priori* beliefs on their involvement with the tasks we used based on prior literature. For the latter, we focus on the hippocampus, parahippocampal place area (PPA), and dorsolateral prefrontal cortex (dlPFC)

regions during memory retrieval. We focus on the ventromedial prefrontal cortex (vmPFC) and ventral striatum (vSTR) regions during the WTP task.

#### Functional MRI Regions of Interests (ROI)

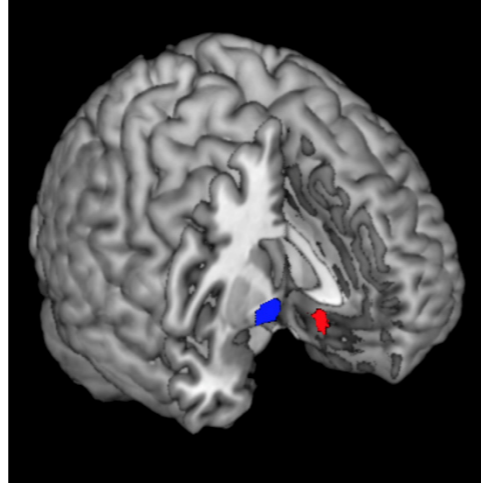


Figure A1. ROI of ventral striatum (blue) and ventromedial prefrontal cortex (red).

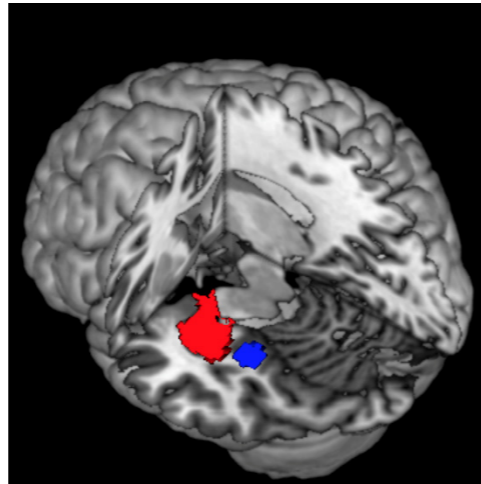


Figure A2. ROI of hippocampus (red) and parahippocampal place area (blue).

## Appendix B: Results Tables

### Mean Differences of Self-reported Measures (Part One) (on a 7-item Likert scale)

	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
PRODUCT FAMILIARITY	0.29	0.49	0.29	0.3	0.39	0.30
AD FAMILIARITY	2.04	1.97	2.08	1.81	2.01	1.95
AD RELEVANCY	0.14	0.18	0.08	0.03	0.16	0.06
AD LIKING	-0.21	-0.07	0.08	-0.11	-0.02	0.10
PURCHASE INTENT	-0.13	-0.02	0.14	-0.12	0.08	0.01

### Recognition (Part Two, Behavioral) (based on percentage of correct responses)

OVERALL	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.78	0.78	0.81	0.82	0.78	0.82
SD	0.17	0.20	0.17	0.14	0.16	0.13
P-VALUE	0.97 (N/S)		0.83 (N/S)		0.07 (P<.10)	

FACE SNIPPET	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.84	0.86	0.88	0.83	0.84	0.85
SD	0.22	0.21	0.22	0.25	0.20	0.19
P-VALUE	0.80 (N/S)		0.31 (N/S)		0.69 (N/S)	

SCENE SNIPPET	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.76	0.76	0.73	0.77	0.73	0.75
SD	0.25	0.28	0.25	0.24	0.20	0.18
P-VALUE	0.91 (N/S)		0.42 (N/S)		0.53 (N/S)	

WORD SNIPPET	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.75	0.80	0.84	0.86	0.76	0.85
SD	0.30	0.32	0.24	0.19	0.22	0.25
P-VALUE	0.63 (N/S)		0.53 (N/S)		0.03 (P<.05)	



**Brand Identification (Part Two, Behavioral)**

OVERALL	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.58	0.64	0.72	0.65	0.61	0.69
SD	0.21	0.15	0.20	0.20	0.13	0.14
P-VALUE	0.20 (N/S)		0.13 (P<.20)		0.01 (P<.05)	

FACE SNIPPET	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.60	0.61	0.71	0.64	0.60	0.68
SD	0.26	0.20	0.38	0.31	0.19	0.19
P-VALUE	0.76 (N/S)		0.60 (N/S)		0.17 (P<.20)	

SCENE SNIPPET	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.60	0.64	0.75	0.63	0.61	0.68
SD	0.27	0.24	0.25	0.29	0.19	0.25
P-VALUE	0.43 (N/S)		0.03 (P<.05)		0.16 (P<.20)	

WORD SNIPPET	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	0.59	0.65	0.70	0.70	0.60	0.68
SD	0.43	0.37	0.26	0.32	0.29	0.25
P-VALUE	0.40 (N/S)		1.00 (N/S)		0.11 (P<.20)	

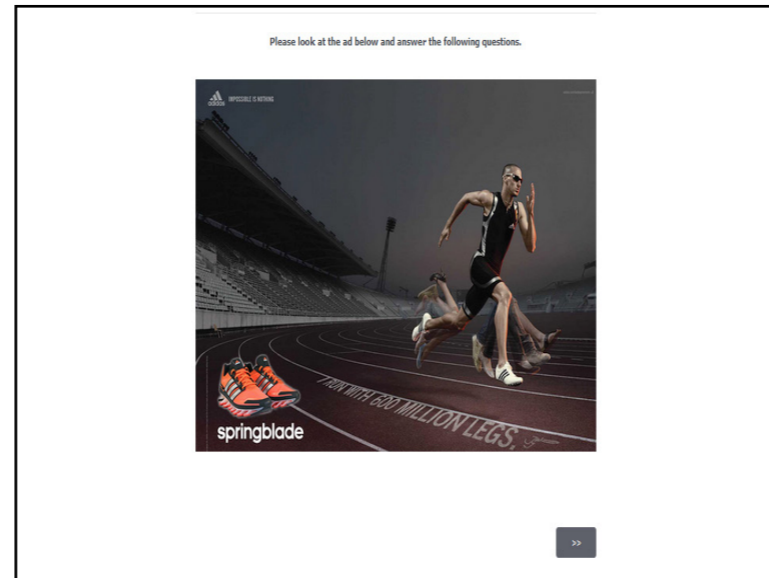
**Choice (Part Two, Behavioral)**

	PD	DP	PP	DD
MEAN	0.53	0.57	0.47	0.53
SD	0.82	0.82	0.92	0.92
P-VALUE	0.08 (P<.10)		0.08 (P<.10)	

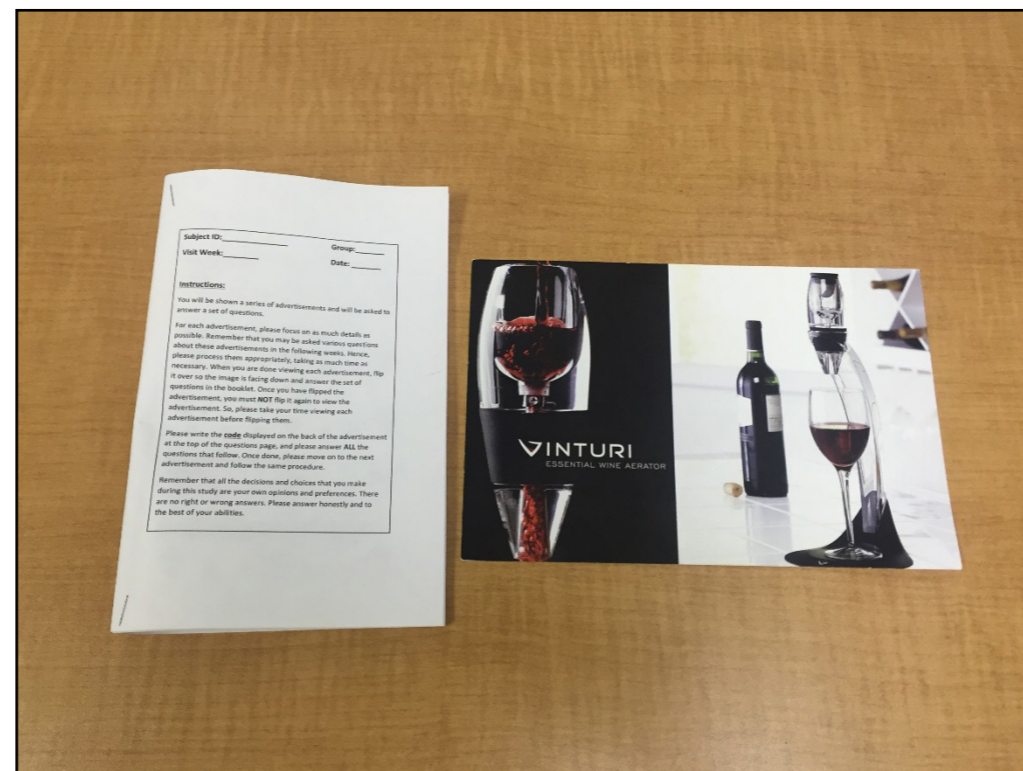
**Willingness to Pay (WTP) (Part Two, Behavioral)**

	PD	DP	PP	DD	CROSSMODAL	UNIMODAL
MEAN	\$24.68	\$24.38	\$22.12	\$23.35	\$24.53	\$22.73
SD	\$8.43	\$9.30	\$8.00	\$8.27	\$8.69	\$8.02
P-VALUE	0.64 (N/S)		0.02 (P<.05)		0.01 (P<.05)	

## Appendix C: Physical and Digital Ad Environments

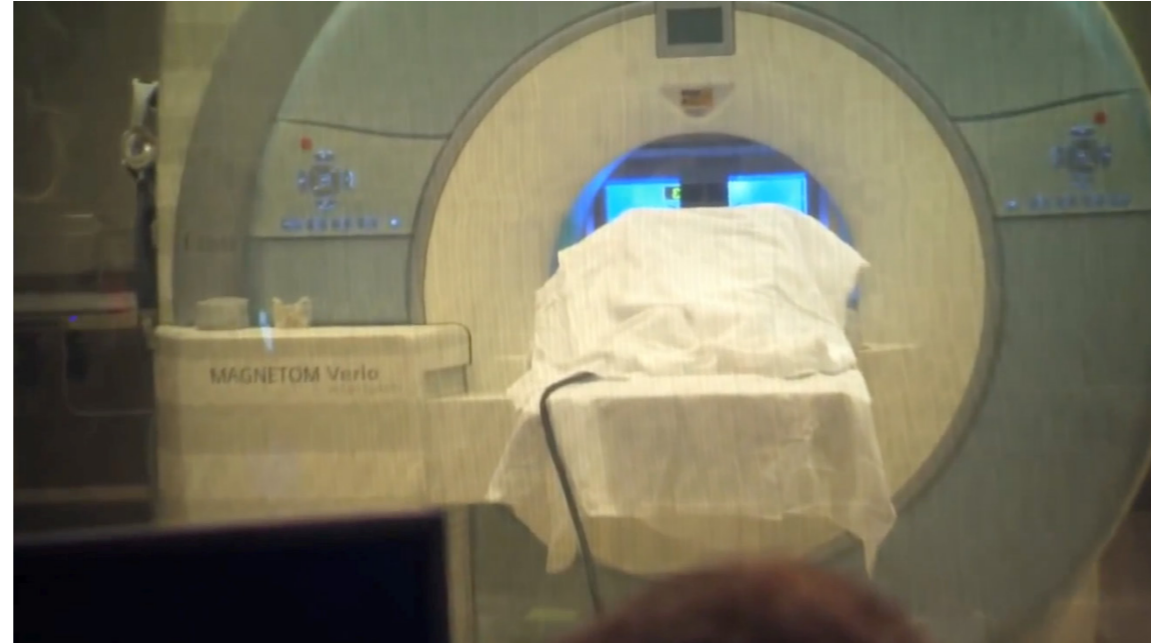


Digital Ad Environment



Physical Ad Environment

## Appendix D: Research Environment



**Part Two: fMRI**

## **Appendix E: Pilot Study and Results**

### **Pilot Methodology**

We conducted a pretest to measure the participants' predisposition to the brands and products in the ads. 65 undergraduate students participated in an online pretest in exchange for course credit. A total of 45 ads were shown to the participants, and the ad for one product had a counterpart in the survey (i.e. American Eagle Jeans and Levi Jeans). Due to fact that it might be exhausting for participants to examine all the ads at once, 32 participants were asked to rate 24 ads, which became Pilot A, and 33 were asked to rate the rest of the ads, which became Pilot B. The order of the ads was also counterbalanced. Participants went through the ads one by one and rated each ad on the familiarity with the product featured in the ads, relevancy with the ad, likability of the ad, and purchase intent (similar to the key measures in the actual study). Then after a small distraction task, participants partook in a recognition task where they indicated whether the snippet presented was from an ad they had seen in the previous section. Participants were then asked to choose between two products presented (i.e. Nike T-shirt versus Puma T-shirt), and the WTP for each product. At end of the survey, participants responded to basic demographic questions (gender, ethnicity, and age). Our pretest showed no significant differences in any of the keys measures captured (same measures as the main study), allowing us to randomly assign each ad to one of the 4 formats (DP, PD, PP, DD).

## Appendix F: References

- Backus, A. R., Schoffelen, J., Szebenyi, S., Hanslmayr, S., & Doeller, C.F. (2016). Hippocampal-prefrontal Theta Oscillations Support Memory Integration. *Current Biology*, 26(4), 450-457.
- Daselaar, S.M., Fleck, M.S., & Cabeza, R. (2006). Triple dissociation in the medial temporal lobes: Recollection, familiarity, and novelty. *Journal of Neurophysiology*, 96(4), 1902–1911.
- Eldridge, L.L., Engel, S.A., Zeineh, M.M., Bookheimer, S.Y., & Knowlton, B.J. (2005). A dissociation of encoding and retrieval processes in the human hippocampus. *The Journal of Neuroscience*, 25(13), 3280–3286.
- Huettel, Scott A., Allen W. Song, and Gregory McCarthy (2008). *Functional magnetic resonance imaging* (2nd ed.). Sunderland, Mass.: Sinauer Associates.
- Lepage, M., Habib, R., & Tulving, E. (1998). Hippocampal PET Activations of Memory and Retrieval: The HIPER Model. *Hippocampus*, 9, 313-322.
- Millward Brown (2009). *Using Neuroscience to Understand the Role of Direct Mail*. United Kingdom.
- Mitchell, K.J., & Johnson, M.K. (2009). Source monitoring 15 years later: What have we learned from fMRI about the neural mechanisms of source memory? *Psychological Bulletin*, 135(4), 638-677.
- Ogawa, S., Lee, T.M., Kay, A.R., & Tank, D.W. (1990). Brain magnetic resonance imaging with contrast dependent on blood oxygenation. *Proceedings of the National Academy of Sciences of the United States of America*, 87(24), 9868-9872.
- Royal Mail Market Research (2015). *The private life of mail: Mail in the home, heart, and head*. United Kingdom.
- Small, S.A., Nava, A.S., Perera, G.M., DeLaPaz, R., Mayeux, R., & Stern, Y. (2001). Circuit mechanisms underlying memory encoding and retrieval in the long axis of the hippocampal formation. *Nature Neuroscience*, 4(4), 442-9.
- U.S. Postal Service Office of Inspector General & Dimoka, A., Vo, K.D., Venkatraman, V., Pavlou, P.A. (2015). *Enhancing the Value of Mail: The Human Response*.

## Appendix G: Management's Comments



February 10, 2017

RENEE SHEEHY  
DIRECTOR, RARC CENTRAL

SUBJECT: Final Review Draft - Tuned In: The Brain's Response to Ad Sequencing (Project Number 2015RARC015)

Thank you for the opportunity to review the report entitled *Tuned In: The Brain's Response to Ad Sequencing*. The study seems to provide additional support for the previous study that pointed to the benefits of seeing advertising in physical formats. The Postal Service appreciates the OIG's efforts in researching this issue.

- The main finding from the self-reported measures in the lab phase was that seeing ads in only the same format (physical or digital) twice was generally more effective than if the ads were seen in two different formats. Notably, participants who viewed the physical format twice demonstrated stronger ad recognition and brand recall. Counter to the other findings in the study, self-reported WTP for the advertised products was significantly stronger for products advertised in the crossmodal sequence. The Postal Service believes this is good news for Direct Mail, and in a general sense; seems to reinforce the value of "physical" formats when it comes to recognition/brand recall.
- Willingness to Pay was higher for products shown twice in the digital format. This suggests repeated exposure (2x) to digital messaging results in a higher willingness to purchase. Additional information might be helpful to explore this "multi-touch" approach related to a higher conversion to see if this is in fact generational or tied to those that use digital more often than others. The Postal Service have seen physical experiences have a higher rate of recall so the digital may drive more impulse if relevant at the time thus related to this implied higher willingness to purchase
- These findings complement the findings from the OIG's previous study, entitled "Enhancing the Value of Mail: The Human Response," (EVOM) which found that physical advertising was associated with stronger memory of ads, as well as higher desirability and subjective value. In this study, Temple University find that exposing participants to ads shown in a unimodal sequence has a stronger memory recall compared to crossmodal sequences, particularly in the physical format. The Postal Service would like to note there was nothing brought out in this study that casts doubt over their initial findings – that physical ads are associated with stronger recall, higher desirability and subjective value.
- Key findings include that seeing ads in only the same format (physical or digital) twice in a sequence is generally more effective than if the ads were seen in two different formats in terms of self-reported brand recognition, self-reported brand recall, observed memory, and observed desirability. The Postal Service acknowledges that this could be accurate in that if a customer's preference is to see something in a particular and familiar channel,

that the same channel in a multi touch environment may have a higher propensity to work for the advertiser in certain cases.

- Therefore, the complex link between memory, purchase intentions, and WTP in behavioral, neurophysiological, and real-life field studies need to be explored further in future studies. The Postal Service believes more studies could be performed to help validate and discover helpful insights.
- The study finds that exposing participants to ads shown in a physical format, particularly twice in sequence, has a stronger memory recognition and brand recall compared to the digital formats, similar to Enhanced Value of Mail. The Postal Service finds this helpful in validating the initial study on the brains reaction to physical vs digital experiences.
- Our findings suggest that using the same medium twice, particularly physical media, can result in higher ad and brand recognition. The Postal Service finds this data helpful, especially in its position that mail can help with brand positioning.

The Postal Service does not believe any portion of this draft paper may be exempt from disclosure to the public under the Freedom of Information Act (FOIA).

Again, thank you for the opportunity to comment. Please let us know if you have any questions or concerns.



Heather Snead, for  
Christopher Karpenko  
Executive Director, Brand Marketing

cc: Ms. Stafford  
Ms. Haring  
Ms. Glass  
E-FOIA



OFFICE OF  
**INSPECTOR  
GENERAL**  
UNITED STATES POSTAL SERVICE

Contact us via our [Hotline](#) and [FOIA](#) forms.  
Follow us on social networks.  
Stay informed.

For media inquiries, contact Agapi Doulaveris  
Telephone: 703-248-2286  
[adoulaveris@uspsoig.gov](mailto:adoulaveris@uspsoig.gov)