Impact of image personalization on response rate of direct mail advertising

Dandan Wang
Impact of Image Personalization on Response Rate of Direct Mail Advertising

by Dandan Wang

Thesis submitted in partial fulfillment of the requirements 
for the degree of Master of Science 
in the School of Print Media 
in College of Imaging Arts and Sciences 
of the Rochester Institute of Technology

May 2010

Primary Thesis Advisor: Professor Patricia Sorce 
Secondary Thesis Advisor: Professor Howard Vogl
Impact of Image Personalization on Response Rate of Direct Mail Advertising

This is to certify that the Master’s Thesis of

Dandan Wang

has been approved by the Thesis Committee as satisfactory
for the thesis requirement for the Master of Science degree
at the convocation of

May 2010

Thesis Committee:

________________________________________
Primary Thesis Advisor

________________________________________
Secondary Thesis Advisor

________________________________________
Graduate Thesis Coordinator

________________________________________
Chair, SPM
Acknowledgements

I would like to offer my sincerest gratitude to Professor Sorce for her inspiring and thoughtful guidance during this research.

I am heartily thankful to those who helped me in any respect during the completion of this project: Professor Howard Vogl, who provided me with careful review and insightful comments; Christine Heusner, who assisted me in designing and imaging process; Lisa Boice and Jesse Jedraszczak, who showed great support by providing valuable information and sources from Barnes & Noble bookstore at RIT; John Meyer, Christian Argentieri, and Scott K Boone from HUB printing facility, who helped me with the postcard printing production and mailing.

Lastly, I would like to thank my classmates and my parents for their support.
# Table of Contents

Acknowledgements........................................................................................................ iii

List of Tables .................................................................................................................. vi

List of Figures ................................................................................................................. vii

Abstract .......................................................................................................................... 1

Chapter One Introduction ............................................................................................... 3

  Statement of The Problem ............................................................................................. 3
  Reason for Interest ......................................................................................................... 4

Chapter Two Literature Review ..................................................................................... 5

  Variable data printing today........................................................................................ 6
  The addition of image personalization in one-to-one marketing................................. 8
  Consumers’ attitude towards Personalized Advertising............................................. 9
  Experimental results for effectiveness of direct mail personalization......................... 11
  Summary ......................................................................................................................... 15

Chapter Three Research Problem ............................................................................... 16

Chapter Four Methodology ......................................................................................... 17

  Experimental design ...................................................................................................... 17
List of Tables

Table 1: Response Rate of Three Levels Personalization Postcard………………………..26

Table 2: Cost Per Response of Three levels Personalization Postcard……………………..28
List of Figures

Figure 1: Personalized Images for Different Colleges .............................................20
Figure 2: Black-and-White Static Image .................................................................21
Figure 3: Full-Color Static Image .........................................................................21
Figure 4: Final Design of Black-and-White Name-Only Personalization Postcard ....22
Figure 5: Final Design of Full-Color Name-Only Personalization Postcard ..........22
Figure 6: Final Design of Full-Color Image Personalization Postcard for College of
Applied Science and Technology ........................................................................22
Figure 7: Received direct mail pieces from one target recipient ............................36
Abstract

With widespread adoption of full-color digital presses in the commercial printing industry, personalization has been enabled to create one-to-one marketing communication to enhance the effectiveness of print media advertising. Prior researches showed an increase in response rates with data-driven personalized direct mailings. However, the impact of image personalization on response rate of direct mail advertising is still unknown.

This research used an experimental design to test the impact of image personalization on response rate of direct mail advertising. A direct mail postcard campaign was created with three levels of personalization (black-and-white name-only personalization, full-color name-only personalization, full-color name and image personalization) to test the hypothesis that there are no statistically significant differences between the response rates of direct mail advertising with name-only personalization and with image personalization. The Cost Per Response (CPR) for three levels personalization was also observed.

The experimental results showed that the response rates for postcard with full-color name and image personalization was 2.6%, and 3.0% for full-color name-only personalization. There were no statistically significant differences between the two levels
personalization.

Black-and-white name-only personalization postcard turned out to be the most cost effective direct mail advertising with a CPR of $20.50 USD, lower than both full-color name-only personalization ($26.33 USD), and full-color name and image personalization ($30.07 USD) postcard in this case.

The reasons for observing these results include consumer behavior towards personalized direct mail, advertising objective, postcard design, product category, timing, and limitations of the experiment. Based on the results, commercial printing companies, especially those provide marketing services need to make a Return-On-Investment (ROI) analysis before recommending the direct mail advertising campaign involving image personalization.
Chapter One

Introduction

Statement of The Problem

Variable data printing as a present print technology is widely used to create personalized direct mail advertising. Currently, the most frequently used applications focus on adding personal information such as title, name, and address on direct mail ads using black-and-white text format. With the widespread adoption of full-color digital printing, the capability of adding variable color images on direct mail advertising is now enhanced. However, since color printing is more expensive than monochrome, an important question becomes whether the addition of color and image personalization will increase the impact of the personalize mailer. Prior research has found that personalized direct mail advertising has higher response rates compared to static direct mail by creating relevant data-driven printed promotional materials using customer database and digital printing technology (Sorce, 2006). Within the various personalized designs, the impact of image personalization on response rates has not been isolated.

This research project was designed to provide the printing industry with an empirical study of the ROI of using variable data printed direct mail postcard to generate a buying response from targeted customers. The following questions are of primary
1. Will name and image personalization significantly affect response rate of direct mail compared to name-only personalization mailings with static images?

2. Is there a difference in CPR among black-and-white name-only personalization, full-color name-only personalization, and full-color name and image personalization direct mail advertising?

**Reason for Interest**

According to *Advertising Age*, retail stores ranked No. 1 ($17,160.4 millions) in media spend in the study of 2008 U.S. Measured Advertising Spending By Category. And direct marketing including direct mail and telesales is still the preferred advertising media as marketers tried to reach their target consumer with one-to-one messaging as opposed to one-to-many. It is of interest to determine if the retail stores could take advantage of the image personalization to develop data-driven direct mail advertising campaigns and get higher response rates in their marketing activities.

Based on four years study in advertising major and current knowledge regarding the digital printing technology, I am personally interested in this topic about the print media advertising campaign in the digital era. If personalized images can create a higher response rate on advertising campaign, it will be a great opportunity for me to extend the media strategy in the future career in the advertising industry.
Chapter Two

Literature Review

According to Arora et al. (2008), “one-to-one marketing represents an extreme form of segmentation, with a target segment of size one.” Personalization is when the firm decides what marketing mix is suitable for the individual based on previously collected customer data. A good example is Amazon.com’s personalized book and music recommendations online, targeting each individual website visitor based on their prior searching history (Nunes and Kambil, 2001).

The primary investigation of the literature encompasses the following areas of research:

- The current marketplace for variable data printing with digital printing technology and new media integration
- The addition of image personalization in one-to-one marketing
- Consumers’ attitude towards personalized advertising
- Experimental results for effectiveness of direct mail personalization
Variable data printing today

Digital Printing Council Printing Industries of America (2004) analyzed the marketplace for transactional and personalized promotional communications in North America. According to its report *Opportunities in Color Variable Data Imaging*, jobs that incorporate color variable-data elements were relatively meager in the context of the entire $90 billion sales in the printing industry. “Factors that affect the overall health of the printing industry, such as the economy and competition for advertising dollars from alternative media also were dampening the growth of color variable-data printing (CVDP)”.

The study used a survey of the print providers to conclude that the profit margin and response rate on CVDP jobs was higher than profits on static jobs and on black-and-white personalization. It also mentioned that many providers believe that loyalty-marketing programs, which focus on customer relationships, are more appropriate for color variable data printing than customer acquisition campaigns, which aim to acquire new customers. According to this study, print buyers ranked “selling to existing customers” and “improving customer relationships” high among the benefits of CVDP, but “increasing order volume” were not at the top of the list. That is because “companies usually have more relevant data about existing customers they can leverage, whereas acquisition programs often target numbers of prospects and are thus better suited for mass-marketing techniques or versioning” (p. 39).

In the Internet age, the services that companies most frequently offer beyond variable data printing becomes a combination of personalized Web pages, email and SMS/mobile messaging. European publisher Hansaprint Company's Magazine 2.0
concept used targeted advertisements to guide the reader to a customized Web page containing content and advertisements that fit the reader's profile, as well as various additional services, questionnaires, and customer relations management content.

Magazines have a personalized portion, for example the covers, and a common part. The personalized part can be used for localized or receiver-driven content and specialized, personalized advertisements that drive the reader to the personalized Web pages. In the test publication, the covers were printed on a Kodak NexPress 2500 plus, whereas the rest of the magazine was printed by offset. Print Shop Mail and DirectSmile software were used for picture and test personalization. “In 2009, Hansaprint found that personalized magazines were effective through a test. In one issue, where 50% of the contents were personalized, 93% of responses came from people who had received magazines with personalized advertisements.” Personalized advertisements in magazines also had longer lasting effects than personalized mail, with responses coming in after five weeks of mailing, compared with two weeks for direct mail. “Personalization drew attention and interest, as 57% of readers noticed their own names first, 65% of the recipients described the personalized advertisements as surprising, and 60% as positively different.”

Another application for VDP is Promotional Transactional (Transpromotional) printing, which has become an attractive tool during this period of economic downturn when marketing budgets are reduced and consumer spending is tightened. As Pellow and Padula (2008) stated the major advantage of transpromotional marketing is that the marketing message reaches the intended recipient. Digital press technology is crucial to the development of transpromotional marketing with more sophisticated marketing
messages being produced as digital press technology develops. “Full-color digital printing is increasing at a massive rate with the move from personalizing pre-printed offset rolls to full color digital runs and there is huge opportunities in the market for commercial printers.” A survey conducted in 2007 by Zoomerang for InfoPrint Solutions supports this conclusion: 57% of the respondents agreed that mail remains the preferred method of delivery for statements and bills. In addition, 64% of the respondents would use personalized coupons printed on monthly bills and statements and nearly half said this would encourage brand loyalty (INTERQUEST, 2008).

**The addition of image personalization in one-to-one marketing**

When comes to print media marketing communication, the form of personalization is divided into two categories: text and graphic image. Landa (2004) found that, by the late 1980s, there was a realization that people were not that interested in reading ads. Images became more powerful to drive the advertising world, “where creating a visual style for a brand was more important than a specific ad claim about functional benefits, reason-why, or unique features.” The use of images in print advertising has received considerable attention with respect to their impact on attitude toward the ad, attitude toward the brand, information-processing strategies, and inferences. Some pictures have their ability to evoke an emotional response (Smith, 1991). As the result, advertising designers have started to explore the use of personalized images, which might have even stronger impact in today’s marketing strategies to attract the readers’ attention.

A successful example would be a direct mail campaign in early 2009, where R&R
Images, a marketing solutions provider based in Phoenix used image personalization software to produce an attractive four-color postcard for the Phoenix Suns. The basketball team’s marketing department initiated the promotion, as a way to thank all Phoenix Suns season ticket holders. More than 2,000 postcards were produced and mailed by R&R Images using DirectSmile image personalization software, putting the ticket holder's name and profile on a pro jersey, implying that “you're the sixth man on the team.” Although there was no call to action on the marketing piece, the Suns marketing department received an impressive response from ticket holders wanting to know how to get poster-sized images of the postcard (Liz, 2009).

For image personalization, the cost is a big concern since personalization is expensive. It requires data preparation and software for implementation. Whether personalized marketing communication gets higher response rate and “pays out ultimately depends on the accuracy of the personalization” and it may not always be the best choice (Arora et al., 2008).

**Consumers’ attitude towards Personalized Advertising**

There is another major concern about image personalization, which is invasion of privacy. Personalization thrives on data, driving companies to collect helpful information about their customers in any ways. As marketers continue to use personalization as a marketing strategy to build better relationship with the target consumers, how do the consumers feel, respond and behave to such tactics becomes a primary concern of advertisers.
Consumers sometimes behave positively towards the personalization marketing strategy that marketers use effective segmentation to take advantage of behavioral information by tailoring targeted offers to specific segments. Semba (2008) reported an increase of 500% response rate when marketing materials displayed tailored offer by using behavioral information to individual customers. Behavioral targeting has become one of the most effective methods to reach consumers in the digital age. “Behavioral tracking involves following an individual’s activities over time and the using the information to select which advertisements to display to that individual. Advertisers believe the practice helps them deliver their persuasive messages to audiences who are most likely to be interested. Tailoring of content involves the creation or alteration of media material to suit marketers’ perceived interests of an individual or individuals.” (Turow, King, Hoofnagle, Bleakley, & Hennessy, 2009)

However, with the concerns about invasion of privacy, some consumers today have presented a feeling of aversion towards the personalization with behavioral targeting. According to Joseph Turow (2009), the recent study found that 66% of adult Americans do not want marketers to tailor advertisements to their interests. Moreover, when Americans are informed of common ways that marketers gather data about people in order to tailor ads, between 73% and 86% say that they would not want such advertising. “The main reasons might be a general antagonism to being followed without knowing exactly how or with what effects and a fear that selective presentation of advertisements, discount offers, or news will put them at a monetary or social disadvantage: some people
might get more useful or interesting tailored content than others depending on the conclusions marketers draw about them.”

Therefore, in a real advertising campaign, it becomes uncertain to use personalized information to target consumer. It is questionable that if consumers’ rejecting feeling towards personalized advertising will affect the response rate of personalization advertising campaign and consumers’ buying behavior at certain circumstances. It is also unknown that if the additional image personalization would affect the consumers’ attitude towards personalized advertising.

**Experimental results for effectiveness of direct mail personalization**

In the prior studies, many practices have been done to test the effectiveness of direct mail advertising. With the development of printing and information technology, forms of direct mail advertising have changed a lot along with the measurement of effectiveness. From pure response rates to degree of recipients’ preference, to amount of order per mailing, to actual increase in sales, marketers and researchers built different experimental settings to test the direct marketing effectiveness based on their own objectives.

*The Rochester Institute of Technology (RIT) study:*

Professor Frank Romano and graduate student David Broudy (1999) conducted the first major study of response rates for digital variable-data printing at RIT. Approximately 144,000 pieces were mailed with 9 variables to test if those factors affect
the response rates, which were designed to elicit an order through a toll-free number or a postage-free reply card:

1. Black-and-white static promotion
2. Black-and-white name-only personalization
3. Full-color-static promotion
4. Full-color name-only personalization
5. Black-and-white dynamic promotion with database connection
   (purchasing history)
6. Full-color dynamic promotion with database connection
7. Version 1 above with a discount coupon
8. Version 5 with a discount coupon
9. Version 6 with a discount coupon, dynamic promotion with database connection

All mailings were sent out to two categories: business, consumer, with personalized approaches respectively. The mailings and response rates were tracked for five months.

The results reviewed name-only personalization and color increase response rates over static, black-and-white mailing. Additional applying dynamic database-resident information in constructing the offer and the piece increased response rates by over 500% over the static, black-and-white mailing (0.47% vs. 2.84%). A question remained in the
study that holding the full color and name constant, if the dynamic images relating to database information have an impact on response rates.

The Institute of Information Management (IIM) study:

In 2001, a survey conducted by the Institute of Information Management, Dortmund, Germany reported that the success rate for fully customized direct mailings was nearly three times higher than standard mailings.

Half of the 1,400 customers received a fully personalized brochure that incorporated the power-usage statistics of the prospect, and the specific savings they could expect to achieve. The other half received a conventional color brochure describing the same program with a covering letter that was personalized only with the recipient’s name and address. More than 15% of the prospects, who received the personalized brochure signed a contract, which was 2.9 times higher than the 5.4% who received the standard brochure and signed contracts. The result confirmed the value of personalized information in texts and numbers.

The Ford study:

A study conducted by Ford Motor Company in 2001 not only measured the impact of customized VDP brochures but their relative value when used to fulfill product inquiries generated through the website. Prospective customers completed a simple online questionnaire at Ford’s website. Ford generated a fully customized brochure based
on each prospect’s answers. Customer had the option of getting e-brochures or printed version delivered by mail. About 90% visitors elected to acquire printed brochure.

Later on, Ford sent more than 10,000 brochure recipients a questionnaire to measure the impact of the program and yielded a 12.6 % response rate. The survey tented to confirm that personalization helps increase interest and involvement but it is important not to overdo it. More than half (768 people) responses said the brochure made them want to visit a Ford dealer, and of that group, 67 committed to buy. It showed personalized mailing has great value of increasing customer preference towards direct mail advertising.

*Gilbert’s Study on CPR of personalization:*

Edwin Gilbert (2003) utilized an experimental research to test the CPR effectiveness of conventional direct mailing versus variable data, personalized printing. The study compared among an advertising campaign divided into three distinct mailings; a conventional printed piece without variable data, text only variable data, and full text and graphic variable data. Four different companies developed advertising campaigns with the three levels of variable data and randomly divided their mailing list so that each level of variable data had an equal distribution of recipients. Each level of variable data was designed, printed and mailed. Cost of design and production was recorded as well as the number of responses for each level of variable.

The study found out that a “higher degree of variable data produced a higher customer response rate”; “variable data CPR was lower than conventionally printed direct
mailing CPR”; and “variable data printing would provide a response rate benefit that exceeds the cost of product depending on how many responses were necessary to break even with the cost of production.”

Summary

Personalization has been widely used in one-to-one marketing with full-color variable data printing. Previous research encompassed the application and impact of personalization including name and data on direct mail advertising. The question remains whether personalized images beyond including the personal name would increase response rate?
Chapter Three
Research Problem

The research problems are:

1. Will name and image personalization significantly affect response rate of direct mail compared to name-only personalization mailings with static images?

2. Is there a difference in CPR among black-and-white name-only personalization, full-color name-only personalization, and full-color name and image personalization direct mail advertising?
Chapter Four

Methodology

Experimental design

This study used an experimental research design to conduct a direct mail advertising campaign for Barnes & Noble bookstore at RIT, targeting nearly 1000 RIT faculty members. After the researcher acquired the faculty list, which included the faculty names and home mailing addresses, all mailings contained variable text of name and address of recipient. The mailings were divided into three options. The researcher examined the relationship between the independent variables of static image versus personalized images, black-and-white versus full-color printing, and the dependent variables of response rate and cost per effective response. Image personalization was based on eight different colleges at RIT:

A. Black-and-white, name-only personalization
B. Full-color, name-only personalization
C. Full-color, name and image personalization

The researcher designed three versions of postcard with different levels of variable data and color specifications. The costs of printing and mailing for each level were
recorded. At the completion of the study, the researcher collected returned postcards, which resulted in actual purchase behavior at Barnes and Noble bookstore at RIT for each level. The total number of responded postcard for each level was applied to calculate the response rate. A Z-score test was used to statistically test response rate differences (see Appendix A).

Procedure

The impact of personalized images was the first thing that this research was designed to explore. Therefore, the researcher started the experiment design by creating the third level of direct mail postcard with name and image personalization. There are eight colleges at RIT. The researcher assumed that the faculty members are more inclined to purchase books that are relevant to their professional backgrounds. Therefore, the researcher designed a series of personalized postcards based on the particular recommendation of books that match the faculty members’ academic backgrounds and used special images (see Figure 1) varying from college to college (refer to Appendix B for RIT College overview, related book category, and personalized images suggestion).

For the first and second level postcard, the black-and-white and full-color name-only personalized postcard, the researcher used the same static image of Barnes & Noble bookstore building picture and traditional logo as postcard background (see Figure 2 and Figure 3).

In order to get an effective response, a special promotional offer was acquired from Barnes & Noble bookstore with 20% off discount on books purchase. The discount offer
was highlighted in text format and shown on the front page of all three levels of the direct mail postcard and applied to all three levels of postcard mailings (see Figure 4-6).
<table>
<thead>
<tr>
<th>College of Applied Science and Technology</th>
<th>College of Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Computing Science and Information</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>College of Imaging Arts and Sciences</td>
<td>NTID</td>
</tr>
<tr>
<td>College of Science</td>
<td>College of Liberal Arts</td>
</tr>
</tbody>
</table>

Figure 1: Personalized Images for Different Colleges
Figure 2: Black-and-White Static Image

Figure 3: Full-Color Static Image
Figure 4: Final Design of Black-and-White Name-Only Personalization Postcard

Figure 5: Final Design of Full-Color Name-Only Personalization Postcard

Figure 6: Final Design of Full-Color Image Personalization Postcard for College of Applied Science and Technology (Refer to Appendix B for designed version of other colleges)
After acquiring the faculty list from RIT Human Resource department, the researcher divided the contact list into three clusters based on the experimental design. The mailing list was randomly resorted by first name alphabetical order. More than half contacts were assigned to receive full-color postcards with name and image personalization. The remain 400 contacts were evenly divided into two equal parts with 200 receiving black-and-white name-only personalization postcard and the other 200 receiving the full-color name-only version. The postcards were made in Adobe InDesign CS4. Both the name-only and name and image personalization were integrated using XMPie uDirect software.

The postcards were printed at RIT HUB printing facility using Xerox iGen3 digital press and mailed out through US Postal Service (First Class Mail) within the HUB office. The commercial prices at HUB for printing and mailing were recorded for future analysis of cost-per-response value.

In order to get a better view of advertising effectiveness, the direct mail campaign was executed twice. Each round took one month for the target consumer to respond. In the first round, the postcards were printed on October 26th 2009 and mailed out on October 27th 2009. The discount offer was expired by November 30th 2009. In the second round, the researcher took out the faculty members who had already responded to the first campaign from the mailing list, so that they would not take advantage of the offer again. The mailing list was resorted and all recipients were reassigned to the three level personalization. The postcards were printed on November 26th and mailed out on November 30 with a discount offer ending by the end of December 24. Barnes & Noble
Bookstore collected the returned postcards for each round until the offer ended and the purchase information was recorded too.

After collecting the returned postcards, the researcher calculated the response rates for each level and conducted the hypothesis test. The CPR was also calculated with total cost of printing production and postage divided by number of responses.

**Limitations of The Study**

The personalization of images in this direct mail campaign was based on the college division of each recipient, which the researcher believed was related to each recipient’s professional background. However, the personalized images did not connect to further demographic information about the target consumer that may more persuasively affect their buying behavior, such as gender, age, lifestyle, and so on. For particular groups of target consumer, in this case, faculty members at RIT, even more relevant data might be used to specify the target consumers’ personal interests, such as the classes each teaches, the research area, or their regular reading habits and preferences.

The design of postcard is important to direct mail campaigns. From an aesthetic point of view, the use of font, color, character, and image quality has effects on the audience’s perception at different levels. A professional design with a creative idea, advertising copy, and personalized images may enhance the visual impact of the postcard. In this experiment, the design process did not employ a professional advertising designer. The direct mail postcard was photographed, designed and made by the researcher with the help of faculty members at School of Print Media.
Chapter Five

Results

In this chapter, the response rates from the three levels of postcards are first presented, followed by the hypothesis test. Then, there is a comparison of cost per response for black-and-white postcard and full-color postcard.
Research Problem 1: Will name and image personalization significantly affect response rate of direct mail compared to name-only personalization mailings with static images?

Table 1: Response Rate of Three Levels Personalization Postcard

<table>
<thead>
<tr>
<th>Three levels personalization</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black-and-white name-only personalization</td>
<td>Full-color name-only personalization</td>
<td>Full-color with image personalization</td>
<td></td>
</tr>
<tr>
<td>Mailing Number</td>
<td>200          200          200          200          585          557</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responded Number</td>
<td>6            6            6            6            16           14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Rate</td>
<td>0.03         0.03         0.03         0.03         0.027        0.025</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Mailing Number (n)</td>
<td>400          400          1142</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Responded Number (m)</td>
<td>12           12           30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Response Rate (p)</td>
<td>0.03         0.03         0.026</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis: There are no statistical differences between the response rates of direct mail advertising with name-only personalization (“B” in Table 1) and image personalization (“C” in Table 1).

Restating the null hypothesis in terms of formula:

\[ H_0: p_B = p_C \]
\[ H_A: p_B \neq p_C \]
At the Null boundary, \( p_B = p_C = p \), so we pool our estimates:

\[
\bar{p} = \frac{n_B \bar{p}_B + n_C \bar{p}_C}{n_B + n_C} = \frac{400 \times 0.03 + 1142 \times 0.026}{400 + 1142} = 0.027
\]

The \( \bar{p} \) is plugged into the sampling error for \( p_1 \) and \( p_2 \):

\[
\sigma_{\bar{p}_B - \bar{p}_C} = \sqrt{\bar{p}(1 - \bar{p}) \left( \frac{1}{n_B} + \frac{1}{n_C} \right)} = \sqrt{0.027 \times (1 - 0.027) \left( \frac{1}{400} + \frac{1}{1142} \right)} = 0.009
\]

Determine the test statistic:

\[
z = \frac{\bar{p}_B - \bar{p}_C}{\sigma_{\bar{p}_B - \bar{p}_C}} = \frac{0.03 - 0.026}{0.009} = 0.44
\]

Run the two-tail test:

\[
\alpha = 0.05 \Rightarrow z_{\alpha/2} = \Phi^{-1}(-0.025) = 2.81
\]

\[
z < z_{\alpha/2}
\]

We failed to reject the null at a 5% significance level. There was not sufficient statistical evidence to conclude that there was a difference between the response rate of direct mail advertising with name-only personalization and with name and image personalization.
Research Problem 2: Is there a difference in cost-per-response among black-and-white name-only personalization, full-color name-only personalization and full-color name and image personalization direct mail?

Table 2: Cost Per Response of Three Levels Personalization Postcard

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Three levels personalization</strong></td>
<td>Black-and-white name-only personalization</td>
<td>Full-color name-only personalization</td>
<td>Full-color with image personalization</td>
</tr>
<tr>
<td><strong>Total Mailing Number</strong></td>
<td>400</td>
<td>400</td>
<td>1142</td>
</tr>
<tr>
<td><strong>Responded Number</strong></td>
<td>12</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total Printing Price</strong></td>
<td>$70</td>
<td>$140</td>
<td>$399.7</td>
</tr>
<tr>
<td><em>(Estimated by HUB)</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Postage</strong></td>
<td>$176</td>
<td>$176</td>
<td>$502.48</td>
</tr>
<tr>
<td><strong>Total Cost Per Contact</strong></td>
<td>$0.62</td>
<td>$0.79</td>
<td>$0.79</td>
</tr>
<tr>
<td><strong>Cost Per Effective Response</strong></td>
<td>$20.5</td>
<td>$26.33</td>
<td>$30.07</td>
</tr>
</tbody>
</table>

For the second research problem, the researcher calculated the capital cost of gaining one effective response for each level of personalization. Considering the major difference in printing production, the black-and-white name-only personalization postcard has the lowest cost-per-contact. For black-and-white name-only personalization postcard, to reach a single recipient, it cost $0.615 US Dollar. For full-color name-only
personalization postcard, it cost $0.79 US Dollar, which was 28.5% higher than the black-and-white piece. The cost per effective response for black-and-white name-only personalization postcard was also 28.4% lower than full-color name-only personalization postcard.

Surprisingly, the cost-per-response for full-color name and image personalization direct mail was $30.07 US Dollar, which was 41% higher than black-and-white name-only personalization direct mail ($20.5) and 10% higher than full-color name-only personalization direct mail ($26.33). Consider the extra cost in data preparation, design and production for personalized direct mail, especially the data mining process, the actual cost-per-response for dynamic campaign with image personalization was much higher than static image campaign.
Summary of Findings

In this experiment, the three levels of personalized postcard were designed and the impact on response rate of direct mail was tested:

- Black-and-white name-only personalization: 3%
- Full-color name-only personalization: 3%
- Full-color name and image personalization: 2.6%

The experimental result showed that there were not statistically significant differences in response rate among all three levels. The name and image personalization did not yield higher response rate in this case. This was an unexpected result, since 10 years ago, Professor Frank Romano concluded in his research that: “Applying database information in constructing the offer could increase response rates by over 500% over the static, black-and-white mailing; Adding full color could increase response rates by 45% over the static, black-and-white.”
The cost-per-response for three levels of personalized direct mail were:

- Black-and-white name-only personalization: $20.5 USD
- Full-color name-only personalization: $26.33 USD
- Full-color dynamic image personalization: $30.07 USD

The black-and-white name-only personalization direct mail turned out to be the most cost effective advertising form in this case.

The previous research demonstrated that both personalization and full-color both increased the response rates of direct mail. However, in Romano and Broudy study, the personalization mainly focused on text and data. As for the findings in the current study, compared to the both full-color and black-and-white name-only personalization, name and image personalization, did not yield a higher response rate. Why were no differences found? The possible reasons are discussed below.

**Discussion**

*Image personalization is only one of several reasons that drive consumers’ response to direct mail advertising.*

There are various sociological and psychological factors that contribute to different patterns of consumer behavior, including external influences, internal influences, self-concept and lifestyle, situations, etc. (Best, Hawkins, & Mothersbaugh, 2009). The marketing activity, for example direct mail advertising, is only one reason that results in certain buying behaviors. In addition, the audience of advertisements could be motivated
to make response to an advertisement for many reasons. Prior research found that personalized direct mail campaign that involved with dynamic promotion with database connection yield a higher response rate than static campaign; the personalization contained variable text besides the recipient’s name and address (Gilbert, 2003). When personalized images along with the name and address were used to improve the level of personalization, it was expected to generate an intimate emotional feeling between the advertiser and the recipient, which may be more inclined to attract their attention, arouse preference, and lead to higher response rate to the advertisements.

The experiment results showed that the direct mail with name and image personalization did not yield a higher response rate than name-only personalization with static image. It indicated the possibility that image personalization might not be a major factor in determines the consumer response to the direct mail advertising.

There are many other reasons that could affect the consumer behavior towards the direct mail advertising effectiveness in this campaign:

- **Product category**

  According to the MindFire Inc Database (2009), personalization in print media advertising campaigns have been widely used in automobile, education, financial services, printing and publishing industry to gain both higher visit rate and higher response rate. Those industries all have relatively complete customer database so that more relevant information and data can be taken advantage of during the personalized campaign. Personalization might work better when the companies know what typically are their customer needs and wants, offering the
exactly right product by providing them with personalized convincing data, which are related to each recipient.

The need of purchasing particular books could cause the response to the direct mail in this study. It is much more diversified and hard to predict when there are little customer information collected within the bookstore database. The postcard with incentive offer from Barnes & Noble only provided the new consumer an opportunity to notice the ongoing promotion activity at the bookstore and satisfy their existed needs and wants. Therefore, the content of the postcard itself became unimportant, no matter that the postcard was using personalized images or static image. The image personalization may be less significant when consumer make buying decision.

• Advering objective

The objective of advertising campaign has great influence on the response rate of certain campaign. Different consumers have different lifestyles and buying habits. The advertising objective could be accomplished when it is in accordance with the consumers’ own lifestyle and buying pattern.

A study complied by Calson & Company (2008) showed, compared to other advertising campaign objectives, such as loyalty campaign (5.5%), lead generation (5.0%), and lead nurture (6.0%), direct sale advertising campaign, which mainly targets new customers has relatively lower response rate (3.0%). It applies to both static and personalized campaigns.
In this campaign, the advertising objective was to direct sales and to acquire new customers for Barnes & Nobel bookstore at RIT. The overall response rate for the personalized direct mail with static image was 3.0% and 2.6% for name and image personalization direct mail. The effectiveness of marketing approach basically met the industry standard. It shows that it was not easy to acquire a high response rate during the direct sale campaign, even with image personalization strategy.

- Discount offer

In the research done by Frank Romano (1999), both full-color personalized promotions with database connection and name-only personalized campaign with discount offer had 148.59% higher response rate than the one without discount offer. Price, which is usually considered as a realistic benefit to target consumer, could be a very important incitement to the recipient in direct mail advertising.

The 20% off discount offer provided by the Barnes and Noble bookstore could be an essential motivation for consumer to response to the direct mail advertising in this campaign. All three levels of postcard have the same offer. Since RIT faculty has already had “Faculty discount” within the bookstore, the additional offer, which increased the saving benefits may incent consumers’ purchasing decision no matter what kind of mailing they got. The impact of image personalization might be reduced at this point.
• Timing issue

The time of the advertising campaign may affect the advertising effectiveness. The two rounds of direct mail campaign started from November 1\textsuperscript{st} to December 24\textsuperscript{th}, which contained three important holidays, Halloween, Thanksgiving Day, and Christmas Eve. During this period, many companies enhanced their efforts to promote the products and services in order to increase their order volume or get attention from the consumers at the beginning of holiday shopping season every year. Therefore, the printed advertising materials are greatly increased. A single recipient may be distracted by too many direct mail advertisement pieces at one time. People may pay more attention to the company or product that they have already known about, or the things that they may need at that moment. The personalized mailing, even with image personalization, might not stand out among so many direct mail postcards (See Figure 7). Here raises another question that if personalized direct mail is more attractive as a single direct mail piece or among other non-image personalization direct mails.
The lack of personalized image restricts the application of image personalization. Although images are visualized to express advertising ideas through print media, as for personalization, it is difficult to perform the detailed personalized image related to

Figure 7: Received direct mail pieces from one target recipient
certain recipient. Besides the images of the recipients themselves and their certain possessions, there are few images that can be physically or emotionally attached to a single consumer and generate the personal identity. In addition, those personalized images are not easy to get access to. Therefore, to create a good image personalization campaign not only requires capable software, digital press, but also experts in data management, as well as creative graphic designer. A fully developed personalized image archive is essential to built a successful direct mail advertisement.

In this study, Barnes and Noble bookstore at RIT as a national chain retail store is mainly focusing on book selling. Expect for their internal membership program, which is able to collect members’ personal information based on subscription, there is little data about specific consumer that can be known by the bookstore. As for the image archive, they only have limited access to certain pictures of book covers and pages, which have few things to do with the customer information. It highly restricts the capability of image personalization in this campaign. Some of the personalized images used in this campaign were from outside image archive. Some of them were photographs taken by the researcher. The classification and amount were limited. It is possible that the college division might not be so strong and relevant to build the emotional attachment between the bookstore and the audience. It is also likely that the images used in the direct mail advertisement might not be “personal” enough to attract the attention of target consumers.

*Black-and-white may stand out for cost effective.*

Prior study found that, in static campaign, full-color direct mail increased the
response rate by 45.95% compared to black-and-white, and in dynamic personalized campaign, color contributed 166.74% higher response rate than black-and-white mail. It showed that color could have a positive effect on response rate (Romano & Broudy, 1999). Therefore, many companies in the marketplace have been using full-color print media advertising campaigns in order to attract consumers’ attention. However, the printing price for full-color direct mail piece is about twice as much as black-and-white piece. With more added features such as database connection or image personalization, the cost of full-color direct mail is getting even higher.

In this campaign, the static image designed for the black-and-white name-only personalized postcard was as same as the full-color version. The researcher used a picture of Barnes and Noble bookstore at RIT with advertising copy “Come and preview the latest titles in your field”. According to the experiment result, full-color direct mail, both name-only and image personalization postcards did not show increase in response rate as compared to black-and-white name-only personalization postcard. Considering the capital investment, the black-and-white name-only personalized postcard was the most cost effective direct mail piece compared to the full-color postcard.

Since most of the marketing materials are printed with full-color nowadays (See Figure 6), a black-and-white piece may stand out among a collection of colorful mailings because of its uniqueness. With creative idea and design, it also can make great visual impact on direct mail advertising. When black-and-white mailings have no difference or even better impact to attract consumers’ attention than full-color mailings, it is reasonable to consider the return on investment issue that company may use black-and-white direct
mail instead of full-color mailings sometimes to save the extra cost.

**Implication for marketing service providers**

*Evaluate the ROI before taking actions*

There are a lot of factors that might influence the response rate of direct mail advertising. Image personalization may be one of many approaches that can enhance the communication with target consumers. Companies should consider the ROI when they choose direct mail campaigns that involve image personalization. The current study shows usage of image personalization does not always deliver an increase in response rate as compared to name-only personalization. If the investment of data mining and complex image preparation can yield an expectable result, image personalization is still a good way to go. Otherwise, other low cost campaigns such as static or black-and-white direct mail might be considered to convey the information.

*Build image archive and increase content relevancy*

In order to get a higher response rate, many skill sets are needed during the whole production, especially the imaging workflow. Image personalization involves in higher level of digital asset management system that includes not only contents of data and texts, but also graphs and images. In order to generate fully personalized direct mail to each recipient, company needs to collect wide range of images related to company profiles, products and services, and most importantly, the geographic, demographic or psychological features of its target consumer. The more detailed images are used, the
more possibility it is to attract the consumer’s attention and build emotional connection between the recipient and the advertiser. For print providers, successful variable data print service providers need to integrate print expertise with database knowledge, graphic design skills, and print knowledge (Jordan, 2009). The skill of digital asset management is also a key element in the printing production workflow of image personalization direct mail.

*Cross-media campaign: print media + personalized URL (PURL)*

Nowadays, increasingly cross-media advertising campaigns have been used to produce a greater impact on advertising effectiveness. Image personalization can be also applied to other digital media such as Internet and mobile devices. When direct mail advertising with PURL generates a response of an online visit, more detailed information can be presented through the personalized web page, which redirects to other sites within the company’s portal. More interacting features may assist further online services. Online history can be also tracked to measure the advertising effectiveness.

**Recommendation for Further Research**

Through the review of literature, there is little research on impact of image personalization in the field of variable data printing. Many direct mail campaigns use fully personalized variable text with static image or partial personalized images to convey the marketing information. A campaign involves fully personalized images may need tremendous investment during the production. Because of the limitations of this study, it
leaves more questions to investigate the impact of full image personalization in direct mail advertising. For example, if the strength of image personalization is enhanced and every recipient will get a direct mail with exclusive image or unique image combination, which is tailored for a single target consumer, will the response rate show a prominent increase?

Besides the limitations, other facts also affected the experiment result, such as product category, time, and advertising objective. How do those facts influence the direct mail response rate? The future research can single condition experiment or cross-factor experiment to test the different levels of impact and may generate some optimized models for various kinds of direct mail campaigns.
Bibliography


Caslon & Company, Inc. Rochester, NY.

Arora, N., Dreze, X., Ghose, A., Hess, J., Iyengar, R., Jing, B., Joshi, Y., Kumar, V.,
Putting one-to-one marketing to work: Personalization, customization, and choice.

Campaigns. MindFire Inc.

visual and text features for direct marketing on multimedia messaging services domain.


Appendix A

Statistics Method for Hypothesis Test
A null hypothesis was proposed to test the difference of response rates between the two levels personalization: there are no statistically significant differences between the response rates of direct mail advertising with name-only personalization and with name and image personalization. The researcher calculated a Z-score test of proportion to compare the response rate of two levels of personalization:

\[ H_0 : p_1 = p_2 \]
\[ H_A : p_1 \neq p_2 \]

For \( H_0 : p_1 - p_2 = 0 \), we reject the null if:

\[
z = \frac{\bar{p}_1 - \bar{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} > z_{\alpha}\]

Response rate:

\[
p = \frac{\text{number of postcards returned to the bookstore}}{\text{number of total postcards}}
\]

Total number of postcard with name-only personalization: \( n_1 \)

Total number of postcard with image personalization: \( n_2 \)

Total number of returned postcard with name-only personalization: \( m_1 \)

Total number of returned postcard with image-personalization: \( m_2 \)

Response rate of postcard with name-only personalization: \( p_1 = \frac{m_1}{n_1} \)
Response rate of postcard with image personalization: $p_2 = \frac{m_2}{n_2}$

Point estimate of the difference in population proportions: $p_1 - p_2 = \bar{p}_1 - \bar{p}_2$

The sampling distribution is Normal with standard error:

$$\sigma_{\bar{p}_1 - \bar{p}_2} = \sqrt{\frac{p_1(1 - p_1)}{n_1} + \frac{p_2(1 - p_2)}{n_2}}$$

At the Null boundary, $p_1 = p_2 = p$, so we pool our estimates:

$$\bar{p} = \frac{n_1\bar{p}_1 + n_2\bar{p}_2}{n_1 + n_2}$$

The sampling error for $p_1$ and $p_2$:

$$\sigma_{\bar{p}_1 - \bar{p}_2} = \sqrt{\bar{p}(1 - \bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$$
Appendix B

RIT College overview, related book category, and personalized images suggestion
<table>
<thead>
<tr>
<th>Colleges</th>
<th>Book Category</th>
<th>Personalized Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Science</td>
<td>Science, Mathematics, Medical Reference, Gardening</td>
<td>Scientific equipment</td>
</tr>
<tr>
<td>Golisano College of Computing &amp; Information Sciences</td>
<td>Engineering, Computers</td>
<td>Computer, Matrix</td>
</tr>
<tr>
<td>College of Applied Science and Technology</td>
<td>Computers, Engineering, Science, US Travel, International Travel, Health &amp; Fitness, Military History</td>
<td>Telecom-system, traffics</td>
</tr>
<tr>
<td>Kate Gleason College of Engineering</td>
<td>Mathematics, Engineering, Computers</td>
<td>Mechanics, electronics</td>
</tr>
<tr>
<td>E. Philip Saunders College of Business</td>
<td>Current Affairs, Mathematics, Business, Law</td>
<td>Money, stocks</td>
</tr>
<tr>
<td>College of Liberal Arts</td>
<td>Graphic Arts, Art, Architecture &amp; Design, Film/TV/Radio, Antiques &amp; Collectibles, Fiction &amp; Literature, Anthologies, Mythology/Folklore, Poetry, Law, Psychology, Science Fiction/Fantasy Romance</td>
<td>Media, literati, artists, culture heritage</td>
</tr>
</tbody>
</table>
| College of Imaging Arts & Sciences | Mystery  
|                                  | True Crime  
|                                  | Philosophy  
|                                  | Religion  
|                                  | Essays  
|                                  | History  
|                                  | Culture Studies  
|                                  | Social Science  
|                                  | Africa America  
|                                  | US History  
|                                  | Military History  
|                                  | Current Affairs  
|                                  | Language  
|                                  | Dictionaries  
|                                  | Writing/Publishing  
| National Technical Institute for the Deaf | Theater Arts  
|                                  | Film/TV/Radio  
|                                  | Photography  
|                                  | Graphic Arts  
|                                  | Art  
|                                  | Architecture & Design  
|                                  | Photoshop  
|                                  | Digital Photography  
|                                  | Writing/Publishing  
|                                  | Art works, photography, modern design, movie posters  
|                                  | Education  
|                                  | American Sign Language  
|                                  | Sign language  

Appendix C

Full-Color Image Personalization Postcard for Other College
BARNES&NOBLE @ R·I·T
Dear Eugenic,

Barnes & Noble is the nation’s top bookseller brand and the leader in the specialty retail category for customer satisfaction. We sell over 500 million books and more than one million unique book titles every year.

Since the new academic year started, we would like to invite you to our bookstore to check out the thousands of titles within more than 20 categories including the latest titles in your field.

Also, enjoy saving money with the most exciting discount exclusively designed for you!

You get 20% off*

Double the RIT discount!

Come and preview the latest titles in your field!

* Cannot cancel books, only not including textbooks or other materials not returnable. Not to be used with any other discounts.
**Offer good until October 31, 2020

BARNES&NOBLE @ R·I·T
100 Park Point Drive Rochester, NY 14623

College of Business
Dear Eugenie,

Barnes & Noble is the nation’s top bookseller brand and the leader in the specialty retail category for customer satisfaction. We sell over 300 million books and more than one million unique book titles every year.

Since the new academic year started, we would like to invite you to our bookstore to check out the thousands of titles within more than 20 categories including the latest titles in your field.

Also, enjoy saving money with the most exciting discount exclusively designed for you!

You get 20% off*

Double the RIT discount!

*Bargain reading books only; not including textbooks or other courseware. For use in combination with any other discount. Offer good until October 31, 2009.

Come and preview the latest titles in your field!
Dear Eugenie,

Barnes & Noble is the nation’s top bookseller brand and the leader in the specialty retail category for customer satisfaction. We sell over 300 million books and more than one million unique book titles every year.

Since the new academic year started, we would like to invite you to our bookstore to check out the thousands of titles within more than 20 categories including the latest titles in your field.

Also, enjoy saving money with the most exciting discount exclusively designed for you!

You get 20% off*

Double the RIT discount!

*General reading books only; not including e-books or other non-book items. Not to be used with any other discount; 
**Offer good until October 31, 2009.

Come and preview the latest titles in your field!

College of Engineering
Dear Eugenie,

Barnes & Noble is the nation's top bookseller brand and the leader in the specialty retail category for customer satisfaction. We sell over 300 million books and more than one million unique book titles every year.

Since the new academic year started, we would like to invite you to our bookstore to check out the thousands of titles within more than 20 categories including the latest titles in your field.

Also, enjoy saving money with the most exciting discount exclusively designed for you!

You get 20% off*

Double the RIT discount!

*General reading books only, not including textbooks or other materials. Not to be used with any other discount.
**Offer good until October 31, 2009

BARNES&NOBLE @ R·I·T
100 Park Point Drive Rochester, NY 14623

Come and preview the latest titles in your field!

College of Imaging Arts and Sciences
BARNES & NOBLE @ R·I·T

Dear Eugenie,

Barnes & Noble is the nation’s top bookseller brand and the leader in the specialty retail category for customer satisfaction. We sell over 300 million books and more than one million unique book titles every year.

Since the new academic year started, we would like to invite you to our bookstore to check out the thousands of titles within more than 20 categories including the latest titles in your field.

Also, enjoy saving money with the most exciting discount exclusively designed for you!

You get 20% off*

Double the RIT discount!

*General reading books only, not including textbooks or other materials. Not to be used with any other discount.
**Offer good until October 31, 2023

Come and preview the latest titles in your field!

College of Liberal Arts
BARNES&NOBLE @ R·I·T

Dear Eugenie,

Barnes & Noble is the nation’s top bookseller brand and the leader in the specialty retail category for customer satisfaction. We sell over 300 million books and more than one million unique book titles every year.

Since the new academic year started, we would like to invite you to our bookstore to check out the thousands of titles within more than 20 categories including the latest titles in your field.

Also, enjoy saving money with the most exciting discount exclusively designed for you!

You get
20% off*

Double the RIT discount!

* General reading books only, not including textbooks or other e-books.

**Offer good until October 31, 2023

NTID
BARNES & NOBLE @ RIT

Dear Eugenie,

Barnes & Noble is the nation’s top bookseller brand and the leader in the specialty retail category for customer satisfaction. We sell over 300 million books and more than one million unique book titles every year.

Since the new academic year started, we would like to invite you to our bookstore to check out the thousands of titles within more than 20 categories including the latest titles in your field.

Also, enjoy saving money with the most exciting discount exclusively designed for you!

You get 20% off*

Double the RIT discount!

* General reading books only; not including textbooks or other materials. No use to be used with any other discounts.
**Offer good until October 31, 2023

Come and preview the latest titles in your field!

BARNES & NOBLE @ RIT
100 Park Point Drive Rochester, NY 14623

College of Science