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CONSUMER'S DEMOGRAPHICS AND COUPON PREFERENCE

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ABSTRACT

This study attempted to investigate whether customer's selection between mobile and paper coupons differs because of their difference in demographic profile. It also examined customer's coupons preferences out of different types of retail outlets. The data (n=1046) analysis of this study was done through standard linear regression. This study reveals that customer's coupon usage intention between mobile and paper coupons differ because of their difference in gender, age, income, and ethnicity, but not because of their level of education. Additionally, customer's product outlet selection for coupon usage differs because of their age, income, education, race, and ethnicity, but not because of their gender. The findings of this research will help managers identify the right coupon for the right customer. This study adds valuable knowledge to existing coupon literature by examining customer's perceptions of couponing in the light of differences in their demographic profiles.

Keywords: *Mobile coupon, paper coupon, age, gender, race, ethnicity, education, product outlets*

INTRODUCTION

Coupons are promotional codes or physical vouchers that allow customers to purchase a product at a reduced price. Marketers have been using this promotional tool to attract new customers, boost sales, and reward loyal customers. Couponing can have both positive and negative impacts on business, depending on how it is implemented. Some of the positive impacts of couponing include increased sales, customer loyalty, promoting new products, and clearing inventory, while some negative impacts include reducing profit margins, devaluating products and attracting deal-seekers. Thus, coupon implementation strategy may have some significant impact on company's profitability. The use of coupons has become increasingly popular among customers. Over two-thirds of all online shoppers find coupons important when shopping for groceries, (Valassis, 2022) and 97 percent of consumers search for deals when they shop, and 92 percent are always searching for deals (PRnewswire, 2022). Another research also confirms that 92 percent of shoppers searched for coupons or offers before buying online (Coupon Follow, 2022). Coupon statistics show that over two-thirds of all online shoppers find coupons important when shopping for groceries (Valassis, 2022) and 67 percent of consumers made an unplanned purchase solely because of a coupon or discount (Lake, 2023). Coupons have been issued by marketers through two channels: paper and mobile. Paper coupons were used for many decades before mobile technology was developed. Research shows that there is a substantial demand for

paper coupons. Recent research shows that 93 percent of consumers use paper coupons (Lake, 2023). In 2022, paper coupons accounted for 88 percent of all coupons distributed in the U.S (Inmar, 2022).

The advancement of mobile technology offered marketers a new opportunity to expand their promotional campaigns through mobile coupons. Mobile coupons offer some unique advantages over paper coupons including personalization, real-time tracking, eco-friendliness, cost-effectiveness, accurate target marketing, flexibility in modifications, and high engagement. With the increasing use of mobile devices, businesses that adopt this new marketing strategy are likely to enjoy increased customer engagement, customer loyalty and revenue. As a result, mobile coupon usage is increasing with a projected 145.3 million mobile users in the U.S. by 2022 (eMarketer) because research discloses that investing in mobile coupons earns businesses higher returns (Invesp, 2022). Recent research by Invesp (2022) revealed that the number of US companies that use mobile coupons is continually increasing, while over half of the consumers find coupons useful for building brand loyalty and awareness. It is estimated that the global mobile coupons industry will grow at more than 56 percent by 2025 (Orian Research, 2022). Digital coupon market worth over $4.67 billion in 2020 and it is expected to surpass $29.7 billion by 2031 (Meetanshi, 2023).

Treating the paper and mobile coupons equally and issuing both types of coupons to the same customers indiscriminately may not be effective because of customer's different needs and priorities. Due to the challenges and opportunities associated with each type of coupon, marketing communication strategy should be significantly different between paper and mobile coupons. Thus, companies cannot treat these two types of coupons the same way. A "one-size-fits-all" strategy may not work for both types of coupons. Marketers need to develop different strategies and tailor their strategies based on customer's need, expectation, and preferences, which is significantly dependent on their demographics. Thus, this study attempted to develop an improved understanding of customers' expectations and preferences about coupon usage based on their demographic attributes. Previous research revealed that coupon usage tends to vary by consumer's demographics. For example, Valassis (2022) revealed that millennials are more likely to use mobile coupons, while baby boomers are more likely to use paper coupons. This study only covered the age-based demand of coupons. In a gender-based coupon study, Harmon and Hill (2003) found that men use more online coupons than their women counterpart. These two coupon studies covered only two dimensions (age and gender) of demographic factors. Unfortunately, no single study has covered all the important demographic factors in coupon type selection. Despite the high usage of coupons and differences in the customer demand between the two types of coupons, no research has been undertaken to investigate the role of all demographic factors in coupon type selection. To fill up this research gap, this study attempts to identify the appropriate coupon type for the suitable customer segment constructed on their demographic makeups, including age, gender, income, education, and ethnicity. The purpose of this study is to investigate whether customer's selection between mobile and paper coupons differs because of their difference in gender, age, income, education, and ethnicity. It also examined customer's coupons preferences out of different types of retail outlets. This study aims to answer the following research question:

Does consumer's usage intention between mobile and paper coupons differ because of differences in their demographics?

LITERATURE REVIEW

Previous academic research on couponing has mainly focused on factors that influence the redemption of coupons. Among those few comparative studies between paper and mobile coupons, Danaher et al (2015) examined the determinants of customer's coupon redemption intentions between paper and mobile coupons where the found that the location and time of delivery of the mobile coupon has significant influence in the redemption of the mobile coupons and the expiry length plays significant role in redemption intention because redemption time of mobile (vs. paper) coupon is much shorter. In a study on consumers' perceptions of service coupon delivery between paper and online coupons, Ladik and Riggle (2013) found that consumer's economic benefits, enjoyment, and time costs vary significantly depending on their ways (online vs. direct mail) of accessing service coupons. Barat and Ye (2012) conducted a meta-analysis on the effects of paper vs. online coupons on consumer purchase behavior where they found the effects of attitude towards coupon and knowledge about coupon on the coupon usage and relationship between coupon perception and coupon usage behavior. In another study on paper and online coupons, Lu and Moorthy (2007) revealed that consumers perception between coupons and rebates is dependent of the uncertainty in redemption cost. To investigate the difference in consumer's reaction to information between print and online coupons, Suri et al. (2004) revealed that consumer's likelihood of processing information in a print vs. online coupon depends on their motivation levels where high motivated consumers process a print coupon's information more than online coupon, while low motivated consumers process online coupon's information more than print coupon. Kondo et al. (2007) also investigated the impact of direct mail (vs. mobile) coupon on customer's coupon usage during store visit where they found that a paper coupon sent on a post card positively affected the probability of customers' store visit, while a mobile coupon did not.

A very few studies investigated the socio-demographic, socio-economic, and psychographic factors. A relatively small number of studies examined demographic factors including age, gender, income and education. Banerjee et al (2011) examined the difference in gender regarding the impact of mobile coupon's design attributes and ad types. They found that men remember description appeals more than women, while women remember factual appeals more than men. Hill and Harmon (2009) explored the differences in coupon usage and perception towards coupon between male and female. Hill and Langley (2007) investigated the gender and ethnicity differences in responsiveness to coupons among college students. In this study, they discovered that coupon-related behaviors of Generation Y are more age dependent than gender or ethnicity based. In another gender-based study, Harmon and Hill (2003) found that women use fewer coupons than man. In an ethnic study, Green (1996) examined the relationship between consumer's race and motivation of coupons usage. This study discovered that motivation of the coupon usage significantly differs between Anglo-American and African American consumers. In another gender role study, Hill and Harmon (2007) examined the

influence of male gender role beliefs on coupon use and bargain hunting and found a strong relationship between a man's experience as the primary shopper and his belief that a variety of customer behaviors are gender neutral. Muk (2011) undertaken a cross-national study among young American, Korean, and Taiwanese customers and found a significant differences in their perceived economic value of coupon, perceived control and brand value that influence on their mobile usage intention. Appendix A summarizes some recent important coupon articles.

Current study differs from the previous studies in two key aspects. First, although previous studies analyzed the impact of individual characteristics of paper and mobile coupons on consumers' redemption intentions in various domains and functional areas, they have not compared these two types of coupons (paper vs. mobile) in the light of various demographic variables. Second, the few studies that examined the demographic factors only focused on only one or two demographic factors. None of those studies examined all the five demographic factors comprehensively in a single study.

HYPOTHESIS DEVELOPMENT

Gender

The impact of consumer's gender on their consumption behavior has been studied for many years and researchers have found difference in their product consumption and selection because of their differences in gender (Alshari & Lokhande, 2022; Wang, Wong, & Narayanan, 2020; Dastidar, 2016; Banerjee eta al., 2011; Hill & Harmon, 2007). Previous studies have confirmed that consumer's coupon consumption is significantly influenced by their gender differences (Dastidar, 2016; Banerjee eta al., 2011; Hill & Harmon, 2007; Kwon & Kwon, 2007; Harmon & Hill, 2003). For example, Banerjee eta al. (2011) found that consumers differ based on gender in gender with regard to the impact of mobile coupon's design attributes, where men remember description appeals more than women and women remember factual appeals more than men. Hill and Langley (2007) also discovered the differences in responsiveness to coupons among college students based on their gender. In another gender-based study, Harmon and Hill (2003) found that men use more online coupons compared to their women counterpart. They also found that 61 percent of the women usually used coupons when paying for food delivery services, while only 46 percent of men used coupon for the same services. With that spirit, this study proposes the following hypotheses:

H_{1a}: Consumer's usage intention between mobile and paper coupons differs because of difference in their gender.

H_{1b}: Consumer's product outlet selection for coupon usage differs because of difference in their gender.

Age

People's priority between mobile and paper coupons may differ depending on their perceptions about coupons, which could be related to the age group they belong to. Researchers differ in dividing the American population into number of groups based on age. The determining

age of each group of this study has been adopted from the proposed year range by the Pew Research Center (2019), which is one of the leading research organizations in the USA. According to the Pew Research Center (2019), American population has been divided into five age groups, namely silent Generation (born between 1928 &1945), Baby Boomer (born between 1946 &1964), Generation X (born between 1965 &1980), Generation Y/Millennials (born between 1981 &1996), and Generation Z (born between 1997 & 2012). Previous studies found that age plays a significant role in acceptance of coupons and promotions (Dastidar, 2016; Kwon & Kwon, 2007). Harmon and Hill (2003) revealed that younger men were more likely to use coupons than older men. Thus, this study proposes the following hypotheses regarding age:

H_{2a}: Consumer's usage intention between mobile and paper coupons differs because of difference in their age.

H_{2b}: Consumer's product outlet selection for coupon usage differs because of difference in their age.

Income

Coupon is one of the ways of saving money in product purchase, hence it is possible to have a relationship between consumer's income and coupon consumption. Prior research studies have also found significant relationships between consumer's income and coupon consumption (Hill & Harmon, 2007; Harmon & Hill, 2003). Many theories and methods exist to divide consumers based on their income. According to the United States Census Bureau (2021), the median household income in the United States is 67,521 dollars in 2020. Considering that 67,521 dollars as the median household income, this study divided the participants into three categories based on their annual household income: (1) people who earn up to 60,000 dollars per year are in the low-income category (2) people who earn between 60,001 dollars and 80,000 dollars per year are in the middle-income category, and (3) people who earn more than 80,000 dollars per year are in the high-income category. Consumers in the low-income category may rely on coupons to stretch their household budgets and make end meet, while the middle-income category may be interested about couponing to save money on larger purchases, and the high-income category may use coupons for high-end and luxury items. Therefore, the appeal of each type of coupon to three income categories may be different. This study argues that consumer's income plays a role in their coupon usage, thus proposes the following hypotheses:

H_{3a}: Consumer's usage intention between mobile and paper coupons differs because of difference in their level of income.

H_{3b}: Consumer's product outlet selection for coupon usage differs because of difference in their level of income.

Education

Consumers' level of education impacts their couponing behavior in many ways, such as their ability to understand and navigate the couponing process and their ability to perform the

cost-benefit analysis of coupon usage. Consumers with low-level of education may not be able to perform the complex cost-benefit analysis and critically compare the available product opportunities because of the lack of necessary knowledge, while consumers with higher-level of education will be able perform those tasks easily. Previous researchers have also confirmed that consumer's level of education impacts their decision making while selecting products and services (Dastidar, 2016; Hill & Harmon, 2007; Kwon & Kwon, 2007; Harmon & Hill, 2003). For example, Harmon and Hill (2003) found a link between consumer's differences in level of education and the frequency of coupon usage. Thus, this study proposes the following hypotheses regarding education:

H_{4a}: Consumer's usage intention between mobile and paper coupons differs because of difference in their level of education.

H_{4b}: Consumer's product outlet selection for coupon usage differs because of differences in their level of education.

Race and ethnicity

According to the United States Census Bureau (2024), ethnicity and race are two different concepts, where ethnicity is dividing people into two mutually exclusive categories: Hispanic or Latino and Not Hispanic or Latino, while race is a person's self-identification with Caucasian, African American, Asian, American Indian, Alaska Native, Native Hawaiian and other Pacific Islander. The United States is ethnically diverse country where people from all major race and ethnic groups live. Every ten years, the United States Census Bureau collects data on ethnicity through self-identification, allowing every individual to choose their own race and ethnical identity. Based on the United States Census Bureau's (2023) classification, five major race and ethnic groups, including Caucasian, African American, Hispanic or Latino, Asian – American, and Native American were selected in this study. Consumer's culture, race and ethnicity are contributing factors for consumer's decision-making. Numerous research studies have shown that ethnicity and culture impact consumer's perception about coupon usage (Muk, 2011; Hill & Langley, 2007; Green, 1996). In a study on college students, Hill and Langley (2007) found that 64 percent of Caucasians use store loyalty cards while 42 percent African-Americans use that cards. In a study on ethnicity, Green (1996) revealed that consumer's coupon usage significantly differs between Anglo-American and African American consumers. In another cross-national study, Muk (2011) found that consumer's perceived economic value of coupon differs significantly among American, Korean, and Taiwanese consumers. Several coupon-related ethnic studies have confirmed that African-American consumers are less likely to use coupons than Caucasians (Green, 1996; Nieto 1995; Kashani and Quelch, 1990; Yovovich, 1981). Yovovich (1981) discovered the low coupon redemption rate among African-Americans due to a negative image of coupon users. Green (1996) found African-American women use less coupons because they are less coupon prone, less value conscious, and more time conscious. Interestingly, two separate studies by Green (1995) and Kashani and Quelch (1990) found that African-Americans view coupon use negatively, perceiving coupon usage as a sign of an

inability to pay full price. This study argues that consumer's ethnicity plays a significant role in their coupon usage, thus proposes the following hypotheses:

H_{5a}: Consumer's usage intention between mobile and paper coupons differs because of difference in their race and ethnicity.

H_{5b}: Consumer's product outlet selection for coupon usage differs because of difference in their race and ethnicity.

METHODOLOGY

Research design

This study employed a self-administered web-based online survey and a cross-sectional research approach. The survey was developed in Qualtrics and that survey link was sent to the participants. A non-probability sampling technique was utilized in this study.

Measurement

The questionnaire has only three sections. The first section includes five questions on five demographic factors. In the ethnicity question, participants were asked to select their ethnicity based on their self-selected ethnic identity. The second section has two questions, the first one is about their preference between paper and mobile coupons and the second one is about their coupon redemption intention. For the coupon redemption intention question, a five-point Likert scale (where 1 = strongly disagree and 5 = strongly agree) was used. The third section is about participant's preference of retail outlets from which they would like to receive coupons. The questionnaire identified eight different retail outlets and asked participants to select their top four preferred outlets out of the listed eight options. These outlets include grocery stores, department stores, discount stores, electronic stores, fast food restaurants, family restaurants, online stores, and service providers. A participant may select a maximum of four outlets from the list. This study will examine customer's preference in outlet selection in the light of each of those five demographic factors.

Data collection

The data collection for this study was done in two phases. The first phase of data ($n=546$) was collected from students of three universities in southern California and the second phase of the data ($n=500$) was collected through crowdsourcing via Amazon Mechanical Turk (MTurk). After rejecting surveys with missing data, outlier cases and non-engaged errors, a total of 1011 completed surveys were collected for the final data analysis. All the participants of this study are adults who live in the USA and own mobile phones, and there were no other exclusion criteria applied during data collection. Data were collected indiscriminately from different professions, age groups, genders, educational levels, income levels, and ethnic groups within the USA.

Data Analysis

In the data analysis phase, data screening, reliability and validity testing, demographic analysis, and standard linear regression analysis were performed. After completing the data collection, data were screened to identify the missing data, outlier, normality, linearity, and multicollinearity. Then the demographic analysis was performed to assess the distribution of the data based on participants' five demographic variables. In the last phase of the data analysis, the standard linear regression was performed to test the hypotheses. Participants of this study were almost equally divided between the two genders. Percent of female respondents (51%) was slightly higher than of male respondents (49%). The largest group (31%) was generation Y (Millennials), followed by generation X (29%) and generation Z (25%). The smallest group was the silent generation (3%). Low-income people made up the largest group (46%) among the three groups based on income. The smallest was the high-come people (13%). More than one-third (36%) of the participants had bachelor's degree. The second largest group had master's degree (26%), while the smaller group had doctoral degree. Caucasians (32%) formed the largest group among all ethnic groups, followed by African-Americans (26%) and Asian-Americans (23%). The smallest was the Native-American participants (3%). The demographic distribution of this study is shown in Appendix B. The main and interaction effects of the five demographic factors were measured using analysis of variance (ANOVA) in SPSS (version 21). After measuring the interactions effects, the summary of preferences of eight outlets were calculated for all five demographic factors.

RESULTS

Gender

A standard linear regression was performed to measure the main effect of coupon type on usage intention. A significant ($F = 27.24, p = .000$) regression equation was found. This signifies that people's coupon usage intention changes because of the change of coupon type between paper and mobile. Male participants have higher intention to use mobile coupons than paper coupons and this priority flips for female (Figure 1). The interaction effect of gender (Figure 2) is also significant ($F = 12.13, p = .000$), which indicates that consumer's usage intention between mobile and paper coupons differs because of difference in their gender (Table 1). Thus, hypothesis H_{1a} is accepted. In case of product outlet selection for coupon usage, no significant difference was found between male and female (Figure 3). For both male and female participants, top priorities are department stores, discount stores, grocery stores, and online stores (Table 2). Both prefer the service coupons the least. Thus, hypothesis H_{1b} is not accepted.

Table 1: Usage intention based on gender

Coupon Type	Gender	
	Male	Female
Paper	3.32	3.88
Mobile	3.82	3.51

Table 2: Outlet distribution based on gender

Outlets	Gender			
	Male		Female	
	Count	%	Count	%
Grocery stores	84	17%	91	18%
Dept. stores	92	19%	97	19%
Discount stores	74	15%	98	19%
Electronic stores	56	11%	53	10%
Fast food restaurants	52	11%	47	9%
Family restaurants	41	8%	38	7%
Online stores	81	16%	87	17%
Service providers	15	3%	5	1%
Total	495	100%	516	100%

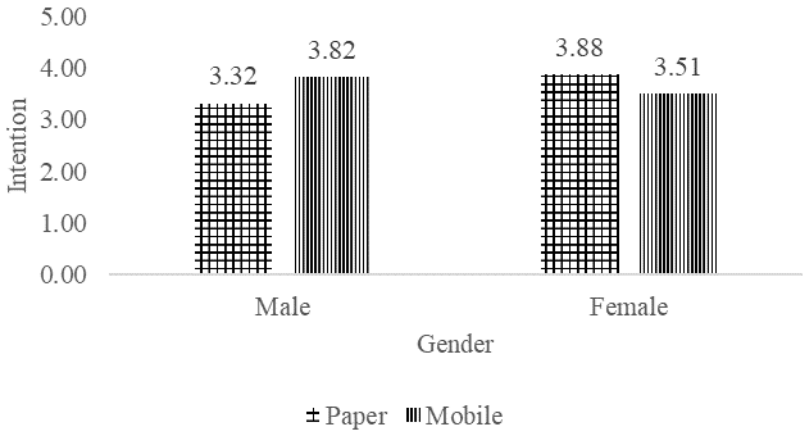

Figure 1: Comparison based on gender

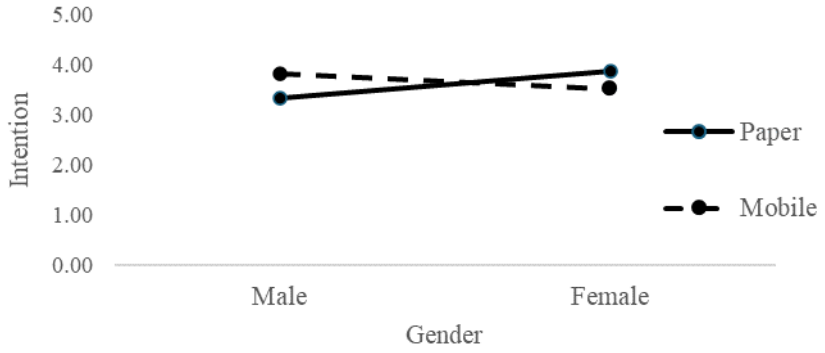

Figure 2: Interaction effect of gender

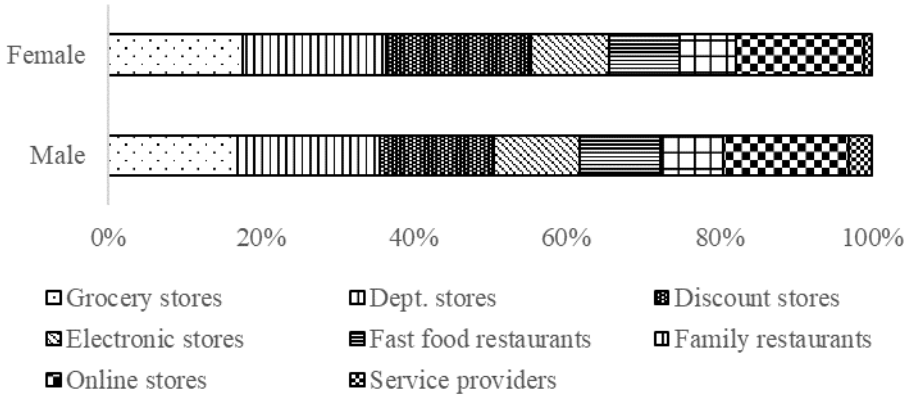

Figure 3: Outlet selection by gender

Age

There is a significant ($F = 14.25, p = .000$) difference in consumer's usage intention between paper and mobile coupons for all five age-groups. This difference is considerably high for silent generation, baby boomer and generation Z compared to generation X and Y (Table 3). There is a notable downward trend in intention for mobile coupons and upward trend for paper coupons with the increase of people's age (Figure 5). The interaction effect of age is significant ($F = 8.09, p = .000$), which means that consumer's usage intention between mobile and paper coupons differs because of difference in their age (Figure 4). Thus, hypothesis H_{2a} is accepted. A significant difference was found among different age-groups for outlet selection (Table 4). Consumer's product outlet selection in coupon usage differs because of difference in their age (Figure 6). Thus, hypothesis H_{2b} is accepted. The top three stores of the older generations are not on the priority list of the younger generations.

Table 3: Usage intention based on age

Coupon Type	Age				
	Silent	BB	X	Y	Z
Paper	3.78	3.59	3.42	3.23	1.32
Mobile	1.23	2.32	3.77	3.87	3.93

Table 4: Outlet distribution based on age

Outlets	Age									
	Silent		Boomer		Gen X		Gen Y		Gen Z	
	Count	%	Count	%	Count	%	Count	%	Count	%
Grocery stores	6	20%	27	22%	45	15%	32	10%	24	9%
Dept. stores	5	17%	18	15%	44	15%	42	13%	39	15%
Discount stores	4	13%	9	7%	39	13%	50	16%	43	17%
Electronic stores	3	10%	15	12%	53	18%	58	18%	51	20%
Fast food restaurants	1	3%	7	6%	18	6%	53	17%	24	9%
Family restaurants	7	23%	30	25%	55	19%	20	6%	15	6%
Online stores	3	10%	11	9%	35	12%	56	18%	55	22%
Service providers	1	3%	4	3%	4	1%	3	1%	2	1%
Total	30	100%	121	100%	293	100%	314	100%	253	100%

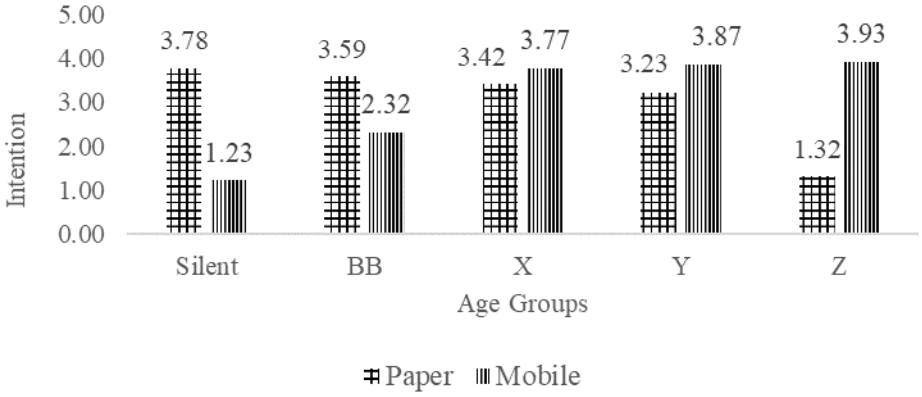

Figure 4: Comparison based on age

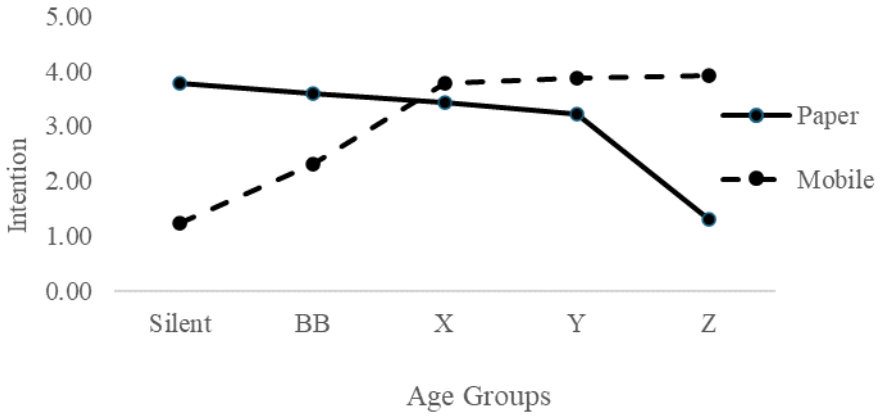

Figure 5: Interaction effect of age

Figure 6: Outlet selection by age

Income

The difference between consumer's usage intention of paper and mobile coupons among the three income groups is significant ($F = 13.52$, $p = .000$). Thus, hypothesis H_{3a} is accepted. People's intention to use paper coupons decreases when their income drops (Table 5). High-income people have the lowest intention to use paper coupons while it is the highest for low-income group (Figure 7). Mobile coupon usage intention is the highest for middle-income group and lowest for low-income group (Figure 8). A significant ($F = 8.21$, $p = .000$) difference was found among different income groups for outlet selection. Consumer's product outlet selection in coupon usage differs because of difference in their income (Table 6). Thus, hypothesis H_{3b} is accepted. Grocery stores, discount stores, fast food restaurants, and electronic stores are top choices for both low and middle-income people, while online stores, family restaurants, and electronic stores are favored by the high-income group (Figure 9).

Table 5: Usage intention based on income

Coupon Type	Income		
	Low	Med	High
Paper	3.78	3.63	3.16
Mobile	3.42	3.81	3.57

Table 6: Outlet distribution based on income

Outlets	Income					
	Low Income		Med Income		High Income	
	Count	%	Count	%	Count	%
Grocery stores	85	18%	79	19%	15	11%
Dept. stores	70	15%	67	16%	7	5%
Discount stores	82	18%	65	16%	6	5%
Electronic stores	76	16%	72	17%	21	16%
Fast food restaurants	81	17%	68	16%	8	6%
Family restaurants	5	1%	10	2%	34	26%
Online stores	59	13%	46	11%	35	27%
Service providers	7	2%	8	2%	5	4%
Total	465	100%	415	100%	131	100%

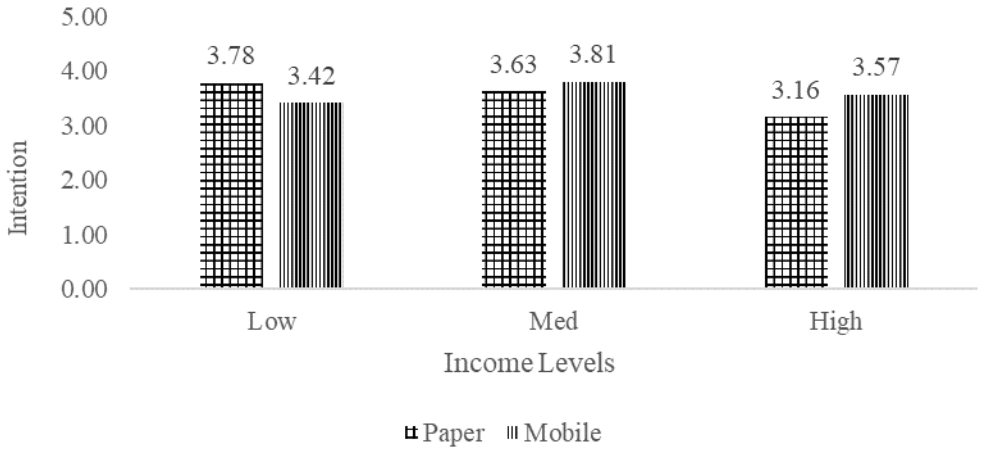

Figure 7: Comparison based on income

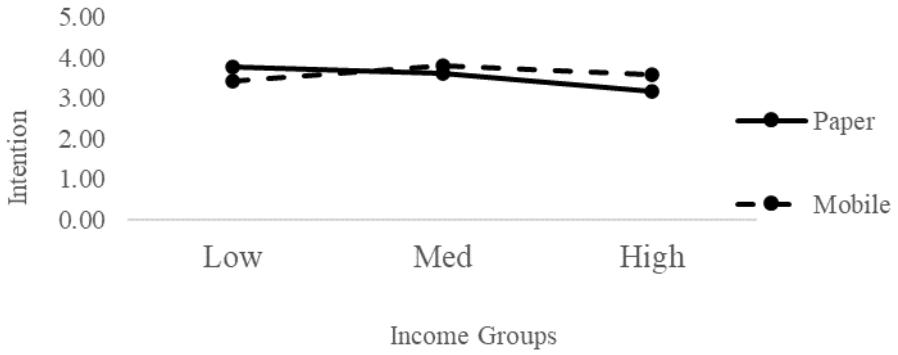

Figure 8: Interaction effect of income

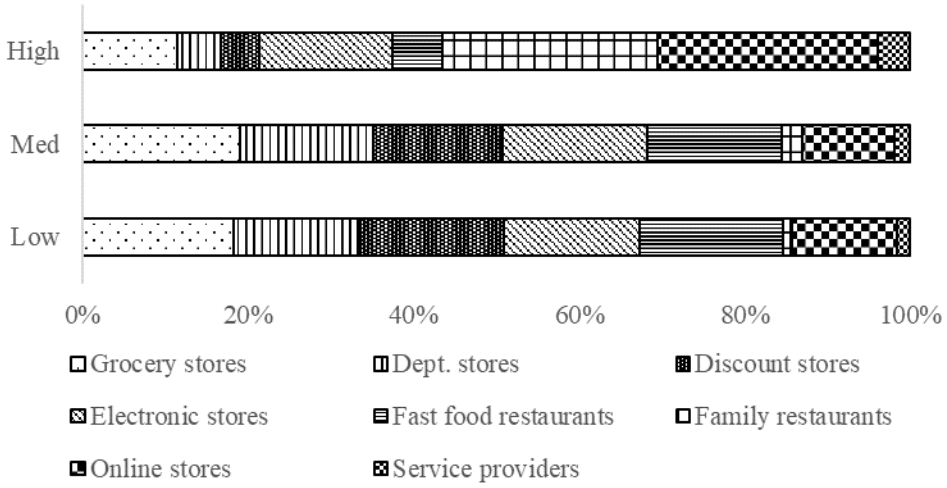

Figure 9: Outlet selection by income

Education

Unlike age, gender and income, the interaction effect of education is not significant ($F = 2.29, p > .10$). The result of data analysis (Table 7) reveals that consumer's usage intention between mobile and paper coupons does not differ because of difference in their level of education (Figure 10). Thus, hypothesis H_{4a} is not supported. Even though due to people's change in the level of education, no significant difference was found in their coupon usage intention (Figure 11), their outlet selection differs significantly (Table 8). People with bachelor's and master's degrees prefer grocery stores, department stores, and discount stores, while people with high school degrees have different priorities. They prefer fast food restaurants the most, followed by discount stores, and online stores. Doctorate degree holders prefer the family

restaurants and electronic stores most (Figure 12). A significant ($F = 7.54, p = .000$) difference was found among their level of education for outlet selection. This reveals that consumer's outlet selection for coupon usage differs because of differences in their level of education. Thus, hypothesis H_{4b} is accepted.

Table 7: Usage intention based on education

	Education				
Coupon Type	HS	AA	BS	MS	DOC
Paper	3.14	3.46	3.71	3.57	3.12
Mobile	3.55	3.62	3.88	3.68	3.05

Table 8: Outlet distribution based on education

Outlets	Education									
	HS		AA		BS		MS		DOC	
	Count	%	Count	%	Count	%	Count	%	Count	%
Grocery stores	11	9%	39	18%	64	18%	44	17%	7	14%
Dept. stores	9	7%	36	17%	62	17%	41	16%	8	16%
Discount stores	27	22%	30	14%	60	16%	39	15%	8	16%
Electronic stores	21	17%	32	15%	55	15%	36	14%	9	18%
Fast food restaurants	29	24%	39	18%	41	11%	21	8%	2	4%
Family restaurants	2	2%	5	2%	23	6%	32	12%	9	18%
Online stores	21	17%	28	13%	48	13%	35	13%	6	12%
Service providers	1	1%	3	1%	11	3%	15	6%	2	4%
Total	121	100%	212	100%	364	100%	263	100%	51	100%

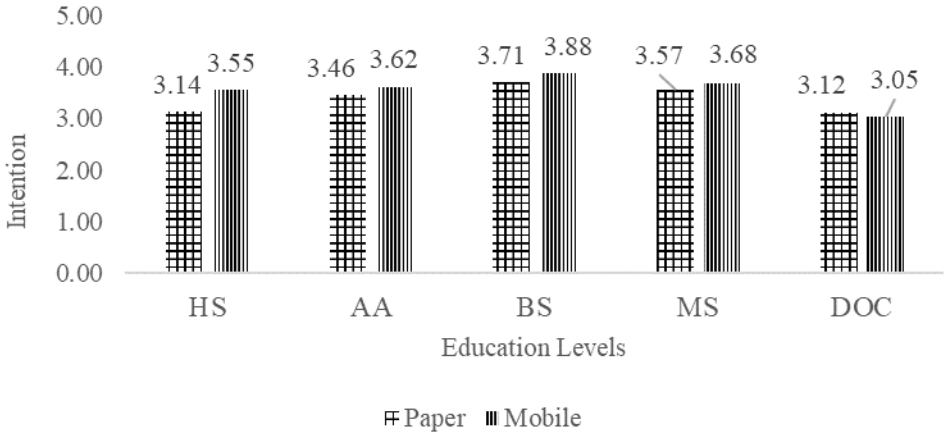

Figure 10: Comparison based on education

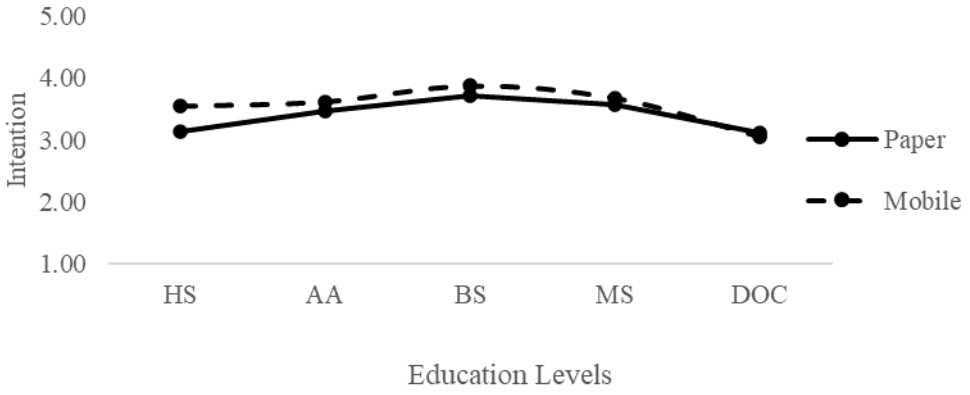

Figure 11: Interaction effect of education

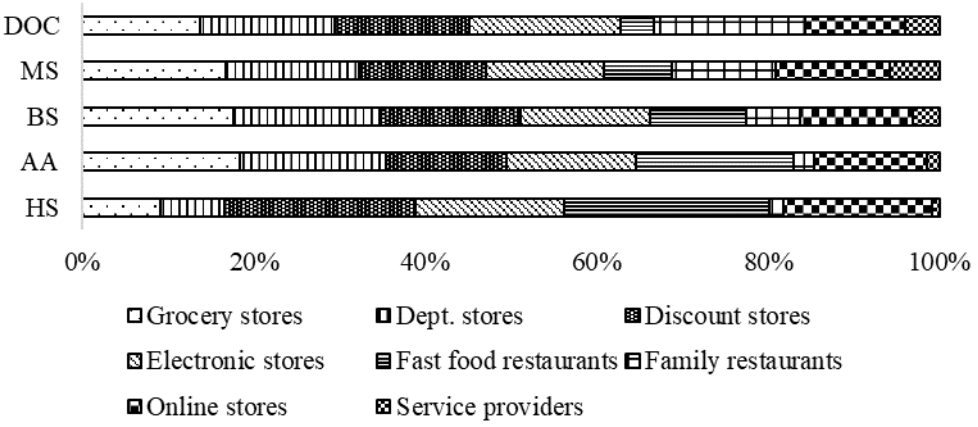

Figure 12: Outlet selection by education

Race and ethnicity

The interaction effect of ethnicity is significant ($F = 10.34$, $p = .000$), which signals that consumer's usage intention between mobile and paper coupons differs because of difference in their ethnicity (Table 9). Thus, hypothesis H_{5a} is accepted. Asians have the highest intention to use mobile coupons and Caucasians have the highest intention to use paper coupons (Figure 14). Native Americans have the lowest intention for both mobile and paper coupons. It shows that Native Americans do not like any types of coupons. Consumer's ethnicity plays a significant role in outlet selection for coupon usage because a significant ($F = 12.32$, $p = .000$) difference was found among different ethnic groups for outlet selection. Grocery stores are liked the most by Caucasians, African-Americans, and Native-Americans, while Hispanics and Asian-Americans do not like the grocery stores much (Table 10). Fast food restaurant is the top priority for

Hispanics (26%), while Asian-Americans do not like fast food restaurants much but they equally like online stores (18%), discount stores (18%), and electronic stores (18%) (Figure 15). It demonstrates that their outlet selection for coupon usage differs because of differences in their ethnicity. Thus, hypothesis H_{5b} is accepted. Table 11 Summarizes the results of all hypotheses testing.

Table 9: Usage intention based on race and ethnicity

Coupon Type	Race and Ethnicity				
	Cauc	Hisp	Asian	African	Native
Paper	3.46	2.89	3.13	3.05	2.28
Mobile	3.82	2.51	3.97	3.12	2.21

Table 10: Outlet distribution based on race and ethnicity

Outlets	Race and Ethnicity									
	Caucasian		Hispanic		Asian		African		Native	
	Count	%	Count	%	Count	%	Count	%	Count	%
Grocery stores	53	16%	11	7%	36	15%	63	24%	7	23%
Dept. stores	49	15%	22	14%	40	17%	28	11%	3	10%
Discount stores	44	14%	41	25%	41	18%	46	18%	3	10%
Electronic stores	43	13%	18	11%	41	18%	23	9%	4	13%
Fast food restaurants	41	13%	42	26%	22	9%	51	19%	7	23%
Family restaurants	46	14%	14	9%	8	3%	14	5%	2	7%
Online stores	44	14%	12	7%	42	18%	31	12%	3	10%
Service providers	4	1%	2	1%	3	1%	6	2%	1	3%
Total	324	100%	162	100%	233	100%	262	100%	30	100%

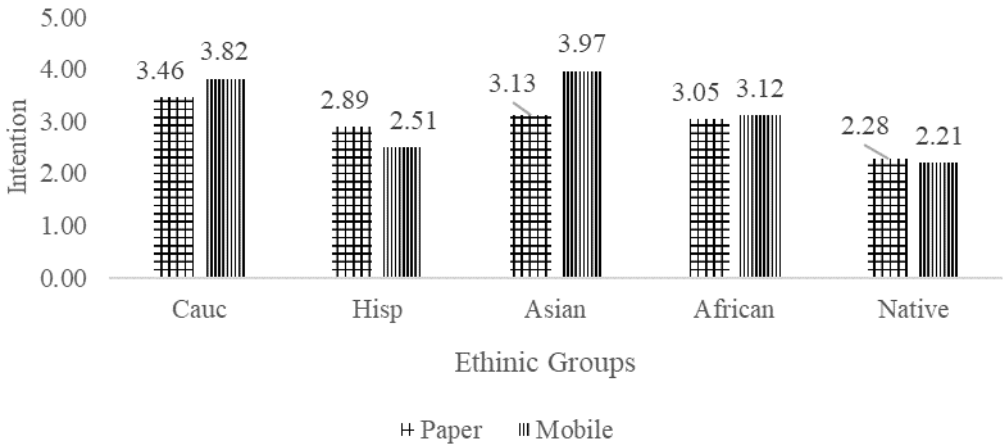

Figure 13: Comparison based on race and ethnicity

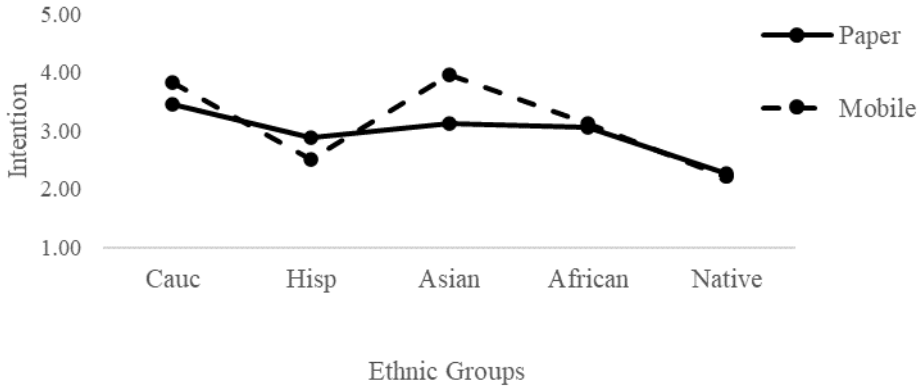

Figure 14: Interaction effect of race and ethnicity

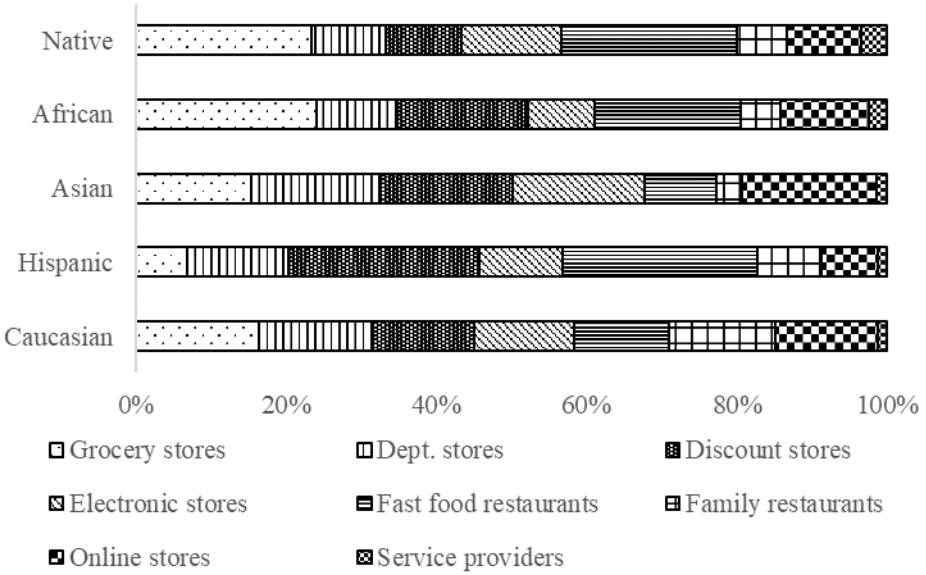

Figure 15: Outlet selection by race and ethnicity

Table 11: Summary of results of hypotheses testing

No.	Hypothesis	Summary Result
H_{1a}	Consumer's usage intention between mobile and paper coupons differs because of difference in their gender.	Supported
H_{1b}	Consumer's product outlet selection for coupon usage differs because of difference in their gender.	Not Supported
H_{2a}	Consumer's usage intention between mobile and paper coupons differs because of difference in their age.	Supported
H_{2b}	Consumer's product outlet selection for coupon usage differs because of difference in their age.	Supported
H_{3a}	Consumer's usage intention between mobile and paper coupons differs because of difference in their level of income.	Supported
H_{3b}	Consumer's product outlet selection for coupon usage differs because of difference in their income.	Supported
H_{4a}	Consumer's usage intention between mobile and paper coupons differs because of difference in their level of education.	Not Supported
H_{4b}	Consumer's product outlet selection for coupon usage differs because of difference in their education.	Supported
H_{5a}	Consumer's usage intention between mobile and paper coupons differs because of difference in their race and ethnicity.	Supported
H_{5b}	Consumer's product outlet selection for coupon usage differs because of difference in their race and ethnicity.	Supported

DISCUSSION

Gender differences in coupon selection

Male prefers mobile and female prefers paper coupons

Between the two genders, female prefers paper coupons, while male prefers mobile coupons. Within male participants, mobile coupons are noticeably preferred over paper coupons, but among female, paper coupons are slightly preferred over mobile coupons. There is a crossover interaction between male and female in coupon selection. This implies that intention goes up for male when it switches from paper to mobile coupon. Conversely, intention goes down for female for the same switch of coupon type. This finding has been supported by several previous studies, such as Kwon and Kwon (2007) reported that women use more coupons than man do. Harmon and Hill (2003) also found similar findings for coupons for food delivery services. For outlet selection, male and female do not differ significantly. Overall, their priorities are the same for both groups. For female, department stores (19%), discount stores (19%), grocery stores (18%), and online stores (17%) are the most preferred coupons, while for male, department stores (19%), grocery stores (17%), online stores (16%), and discount stores (15%) are the favorite ones. Therefore, consumer's gender cannot be used as a valid basis of segmentation for outlet selection for couponing.

Age differences in coupon selection

Older generations prefer paper coupons and younger generations prefer mobile coupons

Among the four age groups, silent generation's intention to use the paper coupons is the highest, followed by baby boomer, generation X, Y and Z. Generation Z has the lowest intention to use paper coupons. For mobile coupons, this situation is completely opposite. Generation Z has the highest intention to use the mobile coupon, while silent generation has the lowest intention. Interaction effects exist for all five age groups in coupon selection. When coupon type is changed from paper to mobile, intention drops for silent generation and baby boomer, while it jumps for X, Y, and Z generations. The highest shift in intention takes place in silent generation and generation Z but in opposite directions. It clearly demonstrates that the younger generations such as X, Y, and Z prefer mobile coupons, while older generations such as silent generation and baby boomer prefer paper coupons. Silent generation likes paper coupons very much but dislikes mobile coupons the most, while generation Z likes the paper coupons most and does not like the mobile coupons. The finding of this study is not surprising because the younger generations are more likely to have technology exposure than the older generations. Especially, generation Z grew up with mobile phones thus it is expected that they would prefer mobile coupons over paper coupons. Accordingly, silent generation and baby boomer feel more comfortable with the traditional and old-school couponing option, that's why they prefer paper coupons over mobile. A noticeable difference was found between the older and the younger generations when it comes to the selection of product outlets. Older generations including silent, boomer and generation X prefer family restaurants, department stores, and grocery stores, while younger generations (Y and Z) would like to receive coupons from online retailers, electronic stores, and fast-food restaurants. Interestingly, family restaurants, grocery stores, and department stores are not on their priority list. Accordingly, the top three outlets of generation Y and Z are not on the priority list of older generations.

Differences in income group in coupon selection

Low-income people prefer paper coupons, middle and high-income people like mobile coupons

Among the three income groups, middle-income people expressed their intention to use mobile coupons the most, while low-income people preferred the paper coupons the most. However, the difference in intention to use between mobile and paper coupons in all three income groups is not substantially high. Interaction effect exists for these three income groups. When the coupon type is changed from paper to mobile, intention goes up for middle and high-income people, while it drops for low-income people. With the increase of people's level of income, the intention to use mobile coupons increases while that decreases for paper coupons. It indicates that people's level of income has an impact on their coupon preferences, even though that impact is not considerably high. Couponing is one of the ways to save some money in people's purchase so it is expected that low-income people would like to use more coupons than other income groups. Surprisingly, the finding of this study does not support conventional

wisdom. It reveals that middle-income people would like to use more coupons than low-income people. Additionally, high-income people also expressed their interest in using coupons.

Like age, consumer's income also plays a significant role in selecting product outlets for coupon usage. Low-income consumers prefer discount stores (18%), grocery stores (18%), fast food restaurants (17%), and electronic stores (16%), while high-income consumers prefer online stores (27%), family restaurants (26%), and electronic stores the most (16%). Medium-income consumers also prefer grocery stores (19%), electronic stores (17%), fast food restaurants (16%), department stores (16%), and discount stores (16%). There are similarities between low-income and medium-income consumers in outlet selection, however high-income consumers have completely different preferences. This indicates that consumer's outlet selection for coupon usage differs because of difference in their level of income.

Differences in education level in coupon selection

People with bachelor's degree have the highest level of intention to use both types of coupons.

Bachelor's degree holders have the highest intention to use both paper and mobile coupons and doctorate degrees holders have the lowest intention to use those coupons. Since no interaction effect was observed in this case, consumer's intention does not switch because of the change of coupon type. For all groups with different education levels except doctorate degree holders, intention increases with the change of coupon type from paper to mobile. Interestingly, the terminal degree holders have the opposite trend in intention when the coupon type changes from paper to mobile. Their intention slightly drops when coupon type is changed to mobile. Overall, participants of all levels of education have reasonably high intention to use both mobile and paper coupons. Thus, people's level of education does not have any impact on their usage intention between mobile and paper coupons. This study reveals that people's level of education does not have much impact on their coupon type selection. The trend of people's intention to use both types of coupons is same. The intention to use mobile coupons is higher than that of paper coupons for all four groups except doctorate degree holders. However, the difference between paper and mobile coupon usage intentions for doctorate degree holders is very insignificant (3.05 vs. 3.12). This implies that people's preference between mobile and paper coupons does not change because of the differences in their level of education.

Interestingly, consumer's outlet selection varies significantly because of the difference in their level of education. Consumers with high school degrees prefer fast food restaurants (24%), discount stores (22%), and online stores (17%). These preferences are significantly different for consumers with doctorate degrees. They prefer family restaurants (18%), electronic stores (18%), department stores (16%), and discount stores (16%). Store priorities between these two groups are significantly different. There are some similarities among customers with associate degrees, bachelor's degrees, and master's degrees. Grocery stores and department stores are the top two choices for all these three groups. The top three store preferences of customers with bachelor's and master's degrees are the same. However, customers with associate degrees prefer fast food restaurants, which is not in the priority list of customers with bachelor's and master's degrees.

Race and ethnicity differences in coupon selection

Asian-Americans like mobile coupons and Caucasians like paper coupons

The highest level of intention to use the mobile coupons was demonstrated by Asians, while that of the paper coupons was expressed by Caucasians. Native Americans are least interested in using both type of coupons. When coupon type was changed from paper to mobile, the usage intention goes up for Asian, Caucasian, and African-American, while it goes down for Hispanic and Native American. That indicates all three ethnic groups prefer mobile coupons over paper coupons except Hispanic and Native American.

Interestingly, this study reveals that people's ethnicity plays a significant role in selecting their products for coupon usage. This study found some similarities and differences among the five major ethnicities in outlet selection for coupon usage. Grocery stores, department stores, discount stores are in the priority list of all five ethnic groups. Family restaurants are preferred by only the Caucasians and Fast food restaurants are selected only by Hispanic, Africans, and Native-Americans. It establishes that people differ in their product outlet selection for coupon usage because of their differences in their racial and ethnic origin.

MANAGERIAL IMPLICATIONS

The knowledge acquired from the finding of this study can help marketers in numerous ways. This study recommends marketers implement a differentiated strategy for each type of coupon grounded on customer's demographics profiles. The recommended differentiated strategy will help marketers decrease costs by eliminating waste and avoiding redundant promotions, find appropriate products and promotions for the target customers, and effectively allocate their marketing resources. These are possible through effective segmentation, targeting, and positioning strategies, communication strategies, distribution strategies, and product selection strategies.

Segmentation-Targeting-Positioning (STP) strategies

The major contribution of this study is helping marketers with their STP strategies. Marketers will be able to accurately segment the market based on the findings related to each of these five demographic factors and identify their target customers accordingly. After precisely detecting their target market, marketers will be able develop an efficient positioning strategy for their products and services. This positioning strategy will help them identify the right product for the right customers that meet their expectations. It will also help them include the right product features and benefits for their target customers.

Communication strategies

This study will also help marketing practitioners in improving their communication strategies. Marketers may use these five demographic factors and customize their communication

messages according to customer's preferences. A generalized communication message may not be equally attractive to all groups of people as it was found that their preferences differ based on their gender, age, income, and ethnicity.

Distribution strategies

This study suggests that distinct distribution strategies should be developed based on their gender, age, income, and ethnicity. This study reveals that younger customers, such as generation X, Y, and Z prefer mobile coupons, thus marketers should distribute the mobile coupons to those customers and send paper coupons to older customers, including silent generation and baby boomers.

Product selection strategies

Another significant contribution of this study is the identification of retail outlets for couponing. This study discloses that not all retail outlets are equally preferred by all customers. Their preferences of outlets vary depending on their age, income, education, and ethnicity. For example, Asian-Americans do not like to receive coupons from grocery stores, while Caucasians and African-Americans prefer that coupon the most. Similarly, silent generation and baby boomers would like to receive coupons from family restaurants, although generation Y and Z do not like that coupon at all. Likewise, high-income people would love to receive coupons from online stores and family restaurants, in contrast low- and middle-income people would prefer coupons from grocery and electronics stores. Fast food restaurants should send their coupons to the customers who have less educational attainment, whereas grocery stores, department stores, and discount stores should target people who have higher levels of education. Retailers from various outlets can utilize this knowledge to identify the appropriate target customers for their potential coupon candidates.

ACADEMIC IMPLICATIONS

The present study provides evidence for a direct relationship between consumer's coupon usage intention and their demographic factors. It expands the body of the theoretical knowledge by uncovering the influence of consumer's demographic factors on their preferences between mobile and paper coupons. This study reveals that consumer's coupon usage preferences differ because of their differences in age, gender, income, and ethnicity. This study adds valuable knowledge to existing coupon literature by examining a new unexplored area of consumer coupon usage with the light of differences in their demographic make-up. Additionally, it also examined different types of outlets from which consumers would prefer to receive coupons. Several surprising preferences of outlets were discovered in this study. This study revealed that coupons for all retail outlets are not equally suitable for all customers. People differ in their coupon preferences, and they have their priorities while selecting retail outlets. This difference is influenced by their age, income, education, and ethnicity. This study discovers something new that had never been discovered before. All the five factors of consumer's demographic make-up

have not been examined in one study in the light of consumer's coupon usage behavior. To the best of the author's knowledge, this is the first study that investigated the impact of consumer's demographic factors on their coupon preferences. This study will help future researchers expand their understanding of consumer coupon usage behavior. It discovers how consumer's demographic factors influence their product selection and it will also develop a better understanding of the impact of promotional tools on consumer behavior.

LIMITATIONS AND OPPORTUNITIES FOR FUTURE RESEARCH

This study was designed as a cross-sectional study that examines a particular phenomenon at a given time. A longitudinal study could be an opportunity for future researchers to confirm the findings of this study in an extended time. This study also suffers from some limitations related to selection of participants in the first phase. Data in that phase were collected from university students thus, the possibility of sampling biases may exist in this study. Data in the second phase were collected through the crowdsourcing of Amazon Mechanical Turk (MTurk), where the researcher did not have any control over the participant selection. Convenient sampling was utilized in data collection of this study. Future studies with probability sampling may overcome this limitation. Only five demographic factors were used in this study. It did not use some other demographic factors such as employment status, marital status, occupation, location, religion, family size, etc. Future researchers may include those demographic factors to examine how consumer's coupon behavior changes because of these new factors. This study included eight retail outlets. Adding more outlets from different product types and industries could lead to additional findings as well. This study did not perform any comparative analysis among multiple cultures or countries thus, a cross-cultural or cross-country research study could be an opportunity for the future researchers. Despite the limitations mentioned above, this study does not contain any fundamental flaws since it strictly followed the proper research methodology.

REFERENCES

Achadinha, N.M.-J., Jama, L. & Nel, P. (2014). The drivers of consumers' intention to redeem a push mobile coupon, *Behaviour & Information Technology*, 33(12), 1306-1316. DOI: 10.1080/0144929X.2014.883641

Alshari, H. A., & Lokhande, M. A. (2022). The impact of demographic factors of clients' attitudes and their intentions to use FinTech services on the banking sector in the least developed countries. *Cogent Business & Management*, 9(1), 2114305.

Coupon Follow, (2022). Coupon Statistics: Usage Behavior Shifts 2020 to 2021, Retrieved from https://couponfollow.com/research/coupon-statistics, Accessed October 2022

Danaher, P. J., Smith, M. S., Ranasinghe, K. & Danaher, T. S. (2015), Where, When, and How Long: Factors That Influence the Redemption of Mobile Phone Coupons, *Journal of Marketing Research*, Vol. LII (October), 710–725, http://dx.doi.org/10.1509/jmr.13.0341

Dastidar, S. G. (2016). Consumer's Deal Proneness: A Demographic Approach, *The IUP Journal of Marketing Management,* XV(2), 7-36

Duan, Y., Liu, T., & Mao, Z., (2022). How online reviews and coupons affect sales and pricing: An empirical study based on e-commerce platform, *Journal of Retailing and Consumer Services*, 65, 102846

Gabel, S. & Guhl, D. (2022). Comparing the effectiveness of rewards and individually targeted coupons in loyalty programs, *Journal of Retailing*, 98, 395-411, https://doi.org/10.1016/j.jretai.2021.08.001

Gonzalez, E. (2016). Exploring the Effect of Coupon Proneness and Redemption Efforts on Mobile Coupon Intention to Uses, *International Journal of Marketing Studies*; 8(6), http://dx.doi.org/10.5539/ijms.v8n6p1.

Ha, Y. & Im, H. (2014). Determinants of mobile coupon service adoption: assessment of gender difference, *International Journal of Retail & Distribution Management*, Vol. 42 Iss 5 pp. 441 – 459, http://dx.doi.org/10.1108/IJRDM-08-2012-0074.

Hill, C. and Harmon, S. (2007). Male gender role beliefs, coupon use and bargain hunting, *Academy of Marketing Studies Journal*, 11(2), 107-119

Harmon, S. K., & Jeanne Hill, C. (2003). Gender and coupon use. *Journal of Product & Brand Managemen*t, 12(3), 166-179.

Hill, J. C., View, P., & Langley, B. S. (2007). Gender and ethnic differences in responsiveness to coupons: the student market. *Southwestern Business Administration Journal*, 8(2), 109-127.

Im, H. & Ha, Y. (2013). Enablers and inhibitors of permission-based marketing: A case of mobile coupons, *Journal of Retailing and Consumer Services*, 20, 495-503

Im, H. & Ha, Y. (2015). Is this mobile coupon worth my private information? Consumer evaluation of acquisition and transaction utility in a mobile coupon shopping context. *Journal of Research in Interactive Marketing*, 9(2), DOI: 10.1108/JRIM-04-2014-0021

Invesp, (2022). Digital Coupon Marketing – Statistics and Trends, Retrieved from https://www.invespcro.com/blog/digital-coupon-marketing/, Accessed October 2022

Jiang, Y., Liu, F., & Lim, A (2021). Digital coupon promotion and platform selection in the presence of delivery effort, *Journal of Retailing and Consumer Services*, 62, 102612

Kashani, K., & Quelch, J. A. (1990). Can sales promotion go global? *Business Horizons*, 33(3), 37-43.

Khajehzadeh, S., Oppewal, H. & Tojib, D. (2015). Mobile coupons: what to offer, to whom, and where?, *European Journal of Marketing*, 49(5/6), 851-873, doi: 10.1108/EJM-04-2014-0252

Kim, J., Yoon, S., & Zemke, D. M. (2017). Factors affecting customers' intention to use of location-based services (LBS) in the lodging industry, *Journal of Hospitality and Tourism Technology,* 8(3), 337-356. DOI: 10.1108/JHTT-03-2017-0023

Kondo, F. N, & Nakahara, M. (2007). Differences in customers' responsiveness to mobile direct mail coupon promotions, *International Journal of Mobile Marketing*, 2(2), 68-76

Kwon, K. N., & Kwon, Y. J. (2013). Heterogeneity of deal proneness: Value-mining, price-mining, and encounters. *Journal of Retailing and Consumer Services*, 20(2), 182-188.

Kondo, F. N., Uwadaira, M., and Nakahara, M. (2007). Stimulating customer response to promotions: The case of mobile phone coupons. *Journal of Targeting, Measurement and Analysis for Marketing*, 16(1), 57-67

Ladhari, R., Hudon, T., Massa, E., & Souiden, N. (2022). The determinants of Women's redemption of geo-targeted m-coupons, *Journal of Retailing and Consumer Services*, 66, 102891

Lake, R (2023). Coupon statistics, Retrieved from https://www.creditdonkey.com/coupon-statistics.html, Accessed May 2023

Liu, F., Liu, S., & Jiang, G. (2022). Consumers' decision-making process in redeeming and sharing behaviors toward app-based mobile coupons in social commerce, *International Journal of Information Management*, 67, 102550

Liu, F., Zhao, X., Chau, P.K, & Tang, Q. (2015). Roles of perceived value and individual differences in the acceptance of mobile coupon applications, *Internet Research*, Vol. 25 Iss 3 pp. 471 - 495, http://dx.doi.org/10.1108/IntR-02-2014-0053

Li, Z., Guan, X., & Mei, W. (2023). Coupon promotion and its cross-channel effect in omnichannel retailing industry: A time-sensitive strategy, *International Journal of Production Economics*, 258(108778), https://doi.org/10.1016/j.ijpe.2023.108778

Li, Z., Yang, W., Jin, H. S., & Wang, D. (2021). Omnichannel retailing operations with coupon promotions, *Journal of Retailing and Consumer Services*, 58, 102324

Luo, M., Li, G., & Chen, X. (2021). Competitive location-based mobile coupon targeting strategy, *Journal of Retailing and Consumer Services*, 58, 102313, https://doi.org/10.1016/j.jretconser.2020.102313

Meetanshi (2023). 10 coupon statistics you need to know, Retrieved from https://meetanshi.com/blog/coupon-statistics/, Accessed May 2023

Mills, P., & Zamudio, C. (2018). Scanning for discounts: Examining the redemption of competing mobile coupons. *Journal of the Academy of Marketing Science*, 46, 964-982.

Nayal, P., Pandey, N., & Paul, J. (2021). Examining m-coupon redemption intention among consumers: A moderated moderated-mediation and conditional model, *International Journal of Information Management*, 57, 102288

Nieto, S. (1995). Ethnic: african-american buying power. *Marketing to Women*, 8(5), 5.

Orian Research, (2022). Report explores the mobile coupons market, Retrieved from https://www.whatech.com/og/markets-research/industrial/archive/441910-report-explores-the-mobile-coupons-market, Accessed November, 2022

Pew Research Center (2019). Defining generations: Where Millennials end and Generation Z begins, Retrieved from https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/, Accessed November, 2022

PRnewswire, (2022). Hawk Incentives Research: Deal Seeking on the Rise; Shoppers Report These Behaviors Make Them Feel Smarter, Retrieved from https://www.prnewswire.com/news-releases/hawk-incentives-research-deal-seeking-on-the-rise-shoppers-report-these-behaviors-make-them-feel-smarter-300530557.html, Accessed November 2022

Suryani, A., Rahayu, A, & Dirgantari, P. (2023). Measuring the Impact of Hedonic Motivation, Smart Shopper Perception, Location-Based Coupon Attitude on Intention of Use Location-Based Coupon. Dinasti *International Journal of Management Science*, 4(3), 413-419. https://doi.org/10.31933/dijms.v4i3.1610

United States Census Bureau, (2021). Income and Poverty in the United States: 2020, Retrieved from https://www.census.gov/library/publications/2021/demo/p60-273.html, Accessed November, 2022

United States Census Bureau (2023). Measuring Racial and Ethnic Diversity for the 2020 Census, Retrieved from https://www.census.gov/newsroom/blogs/random-samplings/2021/08/measuring-racial-ethnic-diversity-2020-census.html, Accessed August 2023

United States Census Bureau (2024). About the Topic of Race, Retrieved from https://www.census.gov/topics/population/race/about.html, Accessed March 2024

Valassis (2022). Marketing research: Consumer Intel Report, Retrieved from https://www.vericast.com/insights/report/consumer-intel-report/?src=val, Accessed November 2022

Wang, L., Wong, P. P., & Narayanan, E. A. (2020). The demographic impact of consumer green purchase intention toward green hotel selection in China. *Tourism and Hospitality Research*, 20(2), 210-222.

Yovovich, B.G. (1981). Views on coupons changing. *Advertising Age*, May 18, S-15.

Zhang, J. & Zhang, L. (2022). Value drivers of government issued mobile coupons usage, *Industrial Management & Data Systems*, 122(3), 702-728, DOI 10.1108/IMDS-12-2020-0727

APPENDIX A: LIST OF IMPORTANT COUPON ARTICLES

Authors	Key Concepts Examined	Findings	Coupon Type
Suryani, Rahayu, & Dirgantari (2023)	Consumer attitudes toward location-based mobile coupons and their usage intention of the location-based coupon.	Hedonic motivation and smart-shopper perception have positive effect towards usage intention of location-based coupon through location-based coupon attitudes.	Mobile
Li, Z., Guan, X., & Mei, W. (2023)	Omnichannel coupon promotion strategies considering consumers' time sensitivity in redeeming coupons.	Omnichannel retailer's motivation to provide online or offline coupons depends on retail price and a higher retail price leads to a stronger promotion motivation.	Mobile
Liu, Liu, & Jiang (2022)	Redeeming intention, sharing intention, perceived coupon value, situational product involvement	Perceived coupon value and situational product involvement positively influence redeeming and sharing intentions.	Mobile
Zhang & Zhang (2022)	Functional value, emotional value, social value, usage intention, government issued mobile coupons (GIMCs)	Functional value, emotional value (and social value positively influence consumer's attitude toward government issued mobile coupons (GIMCs) and their intention to use GIMCs.	Mobile
Ladhari et al (2022)	Intention, attitude toward coupons, fear of spam, ease of use, perceived risk, proneness, usefulness, utility	Fear of spam influences m-coupon usefulness, perceived privacy risks, m-coupon proneness, ease of use, and perceived product utility.	Mobile
Duan, Liu, & Mao (2022)	Online reviews, online coupons in e-commerce platforms, perceived usefulness, product price	Negative impact of negative online reviews on sales is moderated by price, and consumers are more tolerant of negative reviews of high-priced products.	Mobile
Gabel & Guhl (2022)	Loyalty programs, loyalty program rewards, targeted coupons	Both loyalty program (LP) point redemptions and individually targeted coupons increase shopping trip incidence, kiosk access, and expenditures.	Mobile & Paper
Luo, Li, & Chen (2021)	Mobile coupons, Geo-location targeting, asymmetric competition, mobile accessibility, price discrimination	Retailers engage in targeting promotion only when the marginal cost of targeting is not too high.	Mobile
Jiang, Y., Liu, F., & Lim, A (2021)	Platform selection, digital coupon, delivery effort, operating cost	Retailers can be better off paying a higher participation fee to the third-party platform.	Mobile
Nayal, Pandey, & Paul (2021)	Intention to redeem, coupon proneness, perceived convenience, repeat usage behavior, perceived risk.	High repeat usage behavior of mobile coupon redemption diminishes the influence of perceived risk.	Mobile
Li et al. (2021)	Omnichannel retailing, pricing, coupon promotion, distribution model, channel integration	The distribution of coupons does not always lead to increased market share, rather market volume may be reduced if the competition between different channels is intense.	Mobile & Paper
Authors	Key Concepts Examined	Findings	Coupon Type
Mills and Zamudio (2018)	Net price range, reference price, coupon value, brand loyalty, competitive intensity, and number of coupons.	Coupon value does not have any effect on coupon redemption for new customers and it has a very low effect for loyal consumers.	Mobile
Kim et al. (2017)	Familiarity, coupon proneness, trust, and intention to use location-based services.	Coupon proneness, familiarity, and trust positively affect people's intention to use location-based services.	Mobile

Gonzalez (2016)	Coupon propensity, enjoyment, and intention to redeem mobile coupons.	The two subcomponents of coupon proneness - coupon propensity and enjoyment - have direct effect on redemption intention.	Mobile
Liu et al. (2015)	Perceived value, personal innovativeness, coupon proneness and intention to accept mobile coupon applications.	Coupon proneness, personal innovativeness, and perceived value positively influence consumers' mobile coupon adoption intention.	Mobile
Im and Ha (2015)	Coupon proneness, spamming, intention to grant permissions.	The evaluation process of a transaction through utilizing mobile coupons was confirmed.	Mobile
Khajehzadeh et al. (2015)	Hedonic and utilitarian products, intention, shopper's motivation, customer's location.	For hedonic product, customer's shopping motivation impacts more on redemption intention. For utilitarian product, customer's location is more impactful on their redemption intention.	Mobile
Ha and Im (2014)	Enjoyment, compatibility, attitudes toward coupon adoption, usefulness, perceived ease of use, and intention.	Compared to perceived ease of use and perceived usefulness, compatibility and enjoyment influence customer's attitudes towards mobile coupon adoption much stronger.	Mobile
Achadinha et al. (2014)	Attitude, intention to redeem	Consumers' attitude is the most important influencing factor for their intention to redeem mobile coupons.	Mobile
Im and Ha (2013)	Attitude, perceived risk, subjective norm, redemption intention	Customer's attitude, perceived risk, and subjective norm affect their mobile coupon redemption.	Mobile
Danaher et al (2015)	Expiry length of coupon, store location, time of delivery, redemption intention	The location and time of delivery of the mobile coupon has significant influence in the redemption of the mobile coupons.	Mobile & paper
Kondo and Nakahara (2007)	Three types of coupons: ordinary mail, hyperlink mail, and telephone reservation mail	All three types of coupons caused positive impact on the shop visit for new customers.	Mobile & paper
Kondo et al. (2007)	Store visit probability, direct mail vs. mobile coupon	A paper coupon sent on a post card positively affected the probability of customers' store visit, while a mobile coupon did not.	Mobile & paper
Harmon & Hill (2007)	Gender and coupon usage	Perception toward coupon and the usage differ between male and female significantly.	Online & paper

APPENDIX B: DEMOGRAPHIC DISTRIBUTIONS

Factors	Values	Frequency	%
Gender	Male	495	49%
	Female	516	51%
Age	18 – 25 (Born in 1997-2005) – Gen Z	253	25%
	26 – 41 (Born between 1981 & 1996) – Gen Y (Millennials)	314	31%
	42 – 57 (Born between 1946 & 1964) – Gen X	293	29%
	58 – 76 (Born between 1928 & 1945) – Baby Boomer	121	12%
	77-94 (Born between 1981 & 1996) – Silent Generation	30	3%
Income	Less than $50,000 - Low Income	465	46%
	$50,000 - $80,000 – Medium Income	415	41%
	Above $80,000 – High Income	131	13%
Education	High Scholl or Equivalent	121	12%
	Associate Degree	212	21%
	Bachelor's Degree	364	36%
	Master's Degree	263	26%
	Doctoral Degree	51	5%
Race and Ethnicity	Caucasian	324	32%
	Hispanic or Latino	162	16%
	Asian American	233	23%
	African American	262	26%
	Native American	30	3%

OPTIMIZING DECISION-MAKING THROUGH GAME THEORY MODEL ANALYSIS

Angela Yan, The Hockaday School

ABSTRACT

This research leverages game-theoretical models to explore the key factors influencing a high school basketball team's chance of winning. We examine the effects of shooting percentage, free throw rate, and defensive intensity including defensive rebounds, steals, and block on game outcomes, uncovering novel insights. Our findings indicate that when a team has a high shooting percentage, it is motivated to take more shots. However, in high-pressure games—where competition is fierce and defensive intensity increases—both teams should reduce shot attempts and focus on improving shooting efficiency. Additionally, a high free throw rate incentivizes players to draw more fouls and capitalize on free throws for efficient scoring. By analyzing various scenarios, we find that while both shooting percentage and free throw percentage significantly influence game outcomes, shooting efficiency (successful shots) has the greatest impact on a team's chances of winning. However, the free throw rate remains a crucial complementary factor that enhances overall performance. Furthermore, as competition intensity increases, the score gap between the two teams tends to narrow. These insights provide valuable guidance for coaches, players, and analysts in refining team strategies and decision-making to enhance performance.

Keywords: *Sports management; Basketball; Game competition; Analysis; Game theory*

INTRODUCTION

Basketball is a cornerstone of American culture, symbolizing teamwork, resilience, and community. In high school, basketball goes beyond just a sport—it's a source of pride and identity for schools, with winning games, conference titles, and championship brackets bringing recognition and glory to both players and their institutions. These victories can create lasting legacies and unite students, faculty, and local communities in celebration. Basketball is a highly dynamic sport where a team's success depends on a combination of skill, strategy, and adaptability to game conditions. In basketball, teams that can adjust to varying game conditions—such as the opposing team's defense or game tempo—perform better and are more likely to win. Several key factors influence a team's likelihood of winning, including shooting rate, free throw efficiency, and the intensity of competition. For example, teams with higher shooting rates may increase their chances of scoring, but excessive shot attempts without a focus on accuracy can lead to inefficiency (Li et al., 2025). A study by Basketball Reference found that

teams that take fewer, higher-quality shots (e.g., three-pointers with a high percentage or close-range shots) tend to have a higher offensive rating. Teams focusing on shooting efficiency rather than volume had a 10% better chance of scoring, compared to teams with high shot attempts but low accuracy. A study by the NBA found that teams with a higher field goal percentage (above 45%) are significantly more likely to win, but teams with excessive shot attempts and lower shooting percentages (under 40%) often struggle to close games. In fact, NBA teams shooting below 40% on high-volume shots lose 70% of the time.

Previous studies such as Sutiono et al. (2015), Ruano et al. (2015), and Kostacos (2023) have primarily examined the impact of shooting rates on basketball victories but did not address the influence of competition intensity. Competition intensity—such as strong defensive pressure—is another critical component that forces teams to adjust their shooting strategies, affecting both shot selection and team's overall performance (Zhang et al., 2020). Previous study (Karipidis et al., 2001) empirically ever addressed the impact of defensive rebounds and shooting rate on game's winning. However, free throw efficiency also plays a crucial role—teams that maximize free throw opportunities often gain a competitive advantage, particularly in close games (Goldschmied et al., 2022).

Some previous studies (Csataljay et al., 2017; Chen et al., 2025) empirically analyzed how shooting rate, free throw rate, and defensive rebounds influence the game's winning. However, the optimal balance between shot attempts, successful shots, and fouls in response to defensive intensity - beyond just defensive rebounds - remains an open question in basketball analytics. Rather than empirical analysis, my research takes a different approach, focusing on mathematical model analysis to understand the game's dynamics and optimize the decisions. Teams must constantly adjust their shooting strategies based on in-game factors, making it essential to develop models to make optimal decisions. Despite extensive research on basketball performance metrics, prior studies have not fully explored the following critical questions: How do shooting rate, free throw rate, and defensive intensity interact to determine a team's success? How do teams respond to competition intensity in high-pressure games?

In this research, we examine the high school basketball team's strategic decision-making process in the game competition. Our study addresses the following key questions:

1. How do shooting rate, free throw rate, and competition intensity impact a team's likelihood of winning in high school basketball games?
2. How does a high shooting rate influence a team's decision on shot attempts during a game?
3. What role does competition intensity—such as strong defensive pressure—play in determining a team's shooting strategy and success?
4. How does free throw efficiency affect a team's overall scoring strategy and likelihood of winning?
5. What is the optimal balance between shot attempts, successful shots, and fouls to maximize a team's performance in different game scenarios?
6. Can game theoretical models effectively simulate and predict strategic decisions made by teams in high-pressure games?

To answer these questions, we employ game-theoretical models, specifically using the Bertrand Model as a framework. Traditionally applied to economic competition, the Bertrand Model describes price competition between firms in a duopoly. In the context of basketball games, this model allows us to analyze how teams make decisions on their shooting strategies in response to game situations such as foul free throws and competition intensity. Specifically, teams need to consider (a) how shots should be attempted by considering shot accuracy, (b) when to focus on drawing fouls to capitalize on free throw opportunities, and (c) how defensive intensity should be adopted.

We analyze four key factors in our research: (1) the impact of the shooting rate on shot attempts; (2) the influence of game competition intensity on shot selection; (3) the relationship between free throw success rate and foul-drawing tendencies; and (4) the relative importance of shooting accuracy versus free throw efficiency in determining game outcomes. By evaluating these scenarios, we investigate (a) how teams adjust their shot selection based on shooting accuracy; (b) the optimal strategy under defensive pressure; and (c) whether a high free throw rate can compensate for a lower shooting percentage.

In sum, our paper is the first to apply game theoretical models to high school basketball strategies that not only examine shooting accuracy but also free throw rates and defensive intensity and how they influence a team's decision-making and overall success. Additionally, our paper presents several key findings: (1) A single optimization strategy—such as increasing shot attempts—may not always yield better results, as defensive intensity can shift the focus toward shooting efficiency rather than volume; however, (2) a combined strategy that balances high-percentage shooting with efficient free throw utilization consistently produces the best competitive advantage, maximizing scoring potential while adapting to defensive pressure.

RESEARCH MODEL AND ANALYSIS

We here assume that a basketball game consists of two competing teams, each making strategic decisions based on shooting accuracy, defensive intensity, and free throw efficiency. We summarize the research motivation, methodology, and results in Table 1.

Table 1. Research motivation, methodology, and results

Research Motivation	Methodology	Results
Basketball is deeply embedded in American culture, representing teamwork, resilience, and community. At the high school level, it is more than just a sport—it serves as a source of pride and identity, with victories in games, conference titles, and championships bringing recognition to both players and their schools. These achievements create lasting legacies and foster unity among students, faculty, and local communities. This research examines the key factors that impact a high school basketball team's likelihood of winning.	Using mathematical models from game theory, we present a novel evaluation of how shooting percentage, competition intensity, and free throw rate influence game outcomes, yielding new insights.	Our results indicate that when a team has a high shooting percentage, it is more inclined to take additional shot attempts. In high-pressure games—where competition is fierce and defensive intensity rises—both teams tend to reduce their shot attempts and prioritize improving their shooting efficiency. Additionally, when the free throw rate is high, players are incentivized to draw more fouls and capitalize on free throws for efficient scoring. By analyzing various game scenarios, our study concludes that while both shooting percentage and free throw percentage contribute significantly to a team's success, shooting efficiency (successful shots) has the greatest impact on winning. Nonetheless, the free throw rate remains a crucial complementary factor that enhances overall performance and success.

In this research, we focus on analyzing the following factors:

(1) The impact of a high shooting rate on shot attempts.
(2) The influence of game competition intensity on shot selection.
(3) The relationship between free throw success rate and foul-drawing tendencies.
(4) The relative importance of shooting accuracy versus free throw efficiency in determining game outcomes.

Specifically, we have the procedures in sequence as follows:

First, we investigate if it is beneficial for a team to increase shot attempts when its shooting accuracy is high. Our results show that teams are incentivized to take more shots when their shooting percentage increases, as it leads to higher scoring opportunities.

Second, we examine how intense game competition affects shoot attempts. Our results reveal that as defensive pressure increases, teams should prioritize shot quality over quantity, reducing their total shot attempts to focus on efficiency.

Third, we investigate whether drawing more fouls and increasing free throw attempts is a viable strategy for scoring. Our results demonstrate that while a high free throw rate provides a reliable scoring method, relying too heavily on free throws can lead to fewer total shoot opportunities. This creates a strategic trade-off between shot attempts and free throw efficiency.

Fourth, we examine the combined impact of shooting accuracy and free throw reliance on overall game outcomes. Our analysis suggests that while both factors play crucial roles in determining a team's success, shooting accuracy has a more significant impact on winning. Teams with higher shooting percentages tend to secure victories more consistently, as their efficiency minimizes wasted possessions. However, free throws act as a complementary strategy, particularly in tightly contested games, where drawing fouls can provide a crucial advantage. This scenario highlights the importance of balancing shot attempts, efficiency, and foul-drawing tactics to develop a well-rounded game plan that maximizes scoring opportunities.

All notations used in this research are listed in Table 2.

Table 2. Notations used in our analytical models

Notations	Definitions
$g_i (i = 1,2)$ $(0 < g_i < 1)$	Team's potential successful shots
$T_i (i = 1,2)$	Team's potential total shots including free throws
$c\,(0 < c < 0.5)$	The intensity of game competition driven by factors such as high energy, defensive pressure, and strategic play.
$a_i (i = 1,2)\,(0 < a_i < 1)$	The free throw success rate
$D_i (i = 1,2)$	The win percentage
$R_i (i = 1,2)$	Team's total score

Higher success rates in free throws and shots increase a team's chances of winning. However, the opposing team's improved shooting accuracy adds pressure, often reducing the other team's performance and chances of success. Thus, we have

$$D_1 = a_1 + p_1 - cp_2 \quad (1)$$
$$D_2 = a_2 + p_2 - cp_1 \quad (2)$$

Building on the model development approach used by Sutiono et al. (2015), we define the successful shooting rate function as follows:

$$p_i = \sqrt{\frac{g_i}{T_i}},\ (i = 1,2) \quad (3)$$

The winning team is determined by the final score. When two teams have an equal probability of winning, the team with a higher number of successful shots will secure a higher score (i.e., more points) and emerge as the game-winner. Therefore, we have:

$$R_1 = T_1 D_1 \quad (4)$$
$$R_2 = T_2 D_2 \quad (5)$$

Given the above equations (4) and (5), we take the derivative of R_1 on T_1 and R_2 on T_2, respectively, then we obtain $\frac{\partial R_1}{\partial T_1} = T_1(a_1 + \sqrt{\frac{g_1}{T_1}} - c\sqrt{\frac{g_2}{T_2}})$ and $\frac{\partial R_2}{\partial 2} = T_2(a_2 - c\sqrt{\frac{g_1}{T_1}} + \sqrt{\frac{g_2}{T_2}})$. Letting $\frac{\partial R_1}{\partial T_1} = T_1\left(a_1 + \sqrt{\frac{g_1}{T_1}} - c\sqrt{\frac{g_2}{T_2}}\right) = 0$ and $\frac{\partial R_2}{\partial 2} = T_2(a_2 - c\sqrt{\frac{g_1}{T_1}} + \sqrt{\frac{g_2}{T_2}}) = 0$, then we have $T_1 = \frac{(1-4c^2)^2 g_1}{4(a_1+2a_2c)^2}$ and $T_2 = \frac{(1-4c^2)^2 g_2}{4(a_2+2a_1c)^2}$.

First, by taking the derivative of $T_1 = \frac{(1-4c^2)^2 g_1}{4(a_1+2a_2c)^2}$ on g_1 and $T_2 = \frac{(1-4c^2)^2 g_2}{4(a_2+2a_1c)^2}$ on g_2, respectively, we obtain $\frac{\partial T_1}{\partial g_1} = \frac{(1-4c^2)^2}{4(a_1+2a_2c)^2} > 0$ and $\frac{\partial T_2}{\partial g_2} = \frac{(1-4c^2)^2}{4(a_2+2a_1c)^2} > 0$. Thus, we have proposition 1 below.

Proposition 1: *When a team has a high shooting percentage, it is motivated to attempt more shots.*

Proposition 1 shows that a high shooting percentage reflects a team's ability to make shots at an efficient rate, which, in turn, boosts players' confidence. As a result, they are more likely to take additional shot attempts, believing their efforts are paying off. Psychologically, success in making shots creates a feedback loop of motivation—players feel rewarded for their accuracy, encouraging them to be more aggressive in seeking scoring opportunities. Coaches can capitalize on this momentum by promoting an aggressive offense, creating more scoring opportunities for in-form players while ensuring shot selection remains efficient. While confidence is beneficial, teams must balance increased shot volume with high-quality attempts to avoid reckless or inefficient play. Additionally, leveraging early-game success can provide a psychological edge in close games by setting the tone and building momentum, reinforcing the motivation cycle that drives offensive aggressiveness.

We use Figures 1 and 2 to illustrate the effect of successful shots on total shoots. The values we use in our simulations are given as $a_1 = 0.2, a_2 = 0.3,\ c = 0.3,\quad 0 < g_i < 0.6$. Figures 1 and 2 demonstrate that the number of total shots has a positive relationship with the number of successful shots, which verifies the result derived in proposition 1. In other words, a higher successful shooting rate will motivate the team to make more shots.

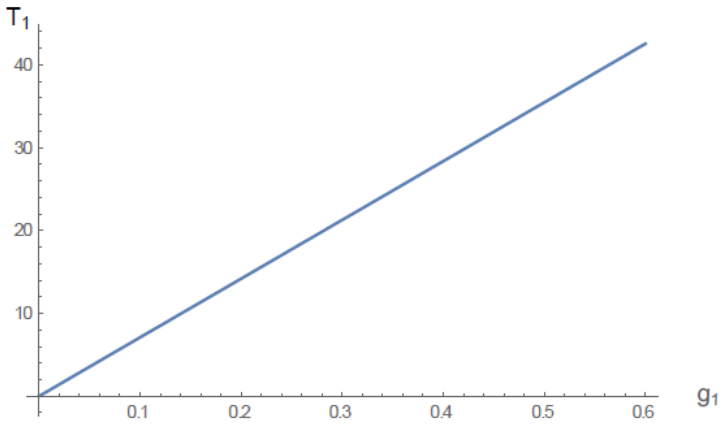

Figure 1. The effect of shooting rate on team 1's shot attempts

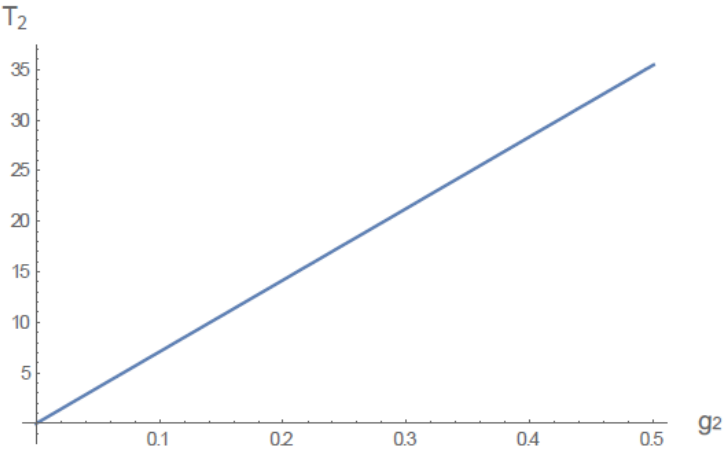

Figure 2. The effect of shooting rate on team 2's shot attempts

Next, by taking the derivative of $T_1 = \frac{(1-4c^2)^2 g_1}{4(a_1+2a_2c)^2}$ on c and $T_2 = \frac{(1-4c^2)^2 g_2}{4(a_2+2a_1c)^2}$ on c, respectively, we obtain $\frac{\partial T_1}{\partial c} = \frac{(-1+4c^2)(a_2+4a_1c+4a_2c^2)g_1}{(a_1+2a_2c)^3} < 0$ and $\frac{\partial T_2}{\partial c} = \frac{(-1+4c^2)(a_1+4a_2c+4a_1c^2)g_2}{(a_1+2a_2c)^3} < 0$. Thus, we have the proposition 2 below.

Proposition 2: *When game competition is stronger, both teams should reduce their shot attempts and focus on improving the shooting rate.*

Proposition 2 shows that when the level of competition in a game intensifies, both teams should prioritize improving their shooting efficiency rather than increasing their shot attempts. When game competition is stronger, teams often face stiffer defensive pressure, making shot attempts more difficult and less efficient. In these situations, shooting efficiency becomes

crucial, and teams may benefit more from focusing on high-quality shot attempts rather than increasing the volume of shots. A higher focus on accuracy ensures that each shot has a better chance of going in, which is critical in tight games where scoring opportunities are limited. Strong competition often forces teams to play at a more strategic pace, rather than relying on sheer volume of attempts. By reducing shot attempts and emphasizing shooting quality, teams can improve their chances of scoring, making each shot more valuable. Additionally, reducing rushed or poor-quality shots can help preserve possession and limit turnovers, which are especially damaging against tough opponents. To further enhance performance, coaches should focus on shot selection by encouraging players to take high-percentage shots when they have a clear advantage. Emphasizing team play and ball movement ensures that shots are well-timed and well-positioned, minimizing forced attempts. Improving individual shooting skills, managing game pace, and maintaining composure under pressure are all critical for maximizing scoring opportunities and achieving success in high-stakes matchups.

We use Figures 3 and 4 to illustrate the effect of the degree of game competition on total shots. The values we use in our simulations are given as $a_1 = 0.4, a_2 = 0.35$, $g_1 = 0.3$, $g_2 = 0.25$, and $0 < c < 0.35$. Figures 3 and 4 demonstrate that the number of total shots has a negative relationship with the degree of game competition, which verifies the result derived in proposition 2. In other words, higher game competition due to pressure defense and others makes the competing teams focus on the successful shooting rate, not on the number of shots.

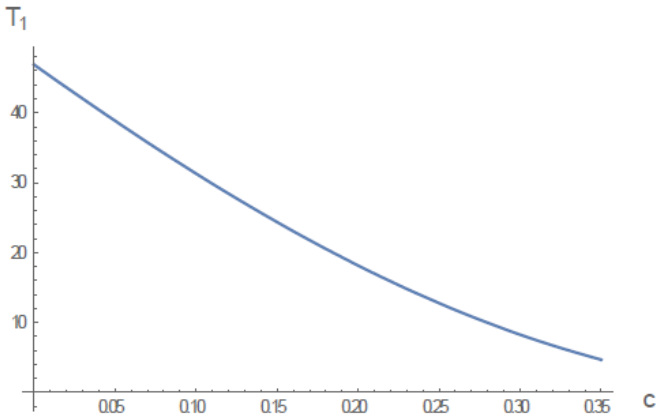

Figure 3. The effect of the intensity of game competition on team 1's shot attempts

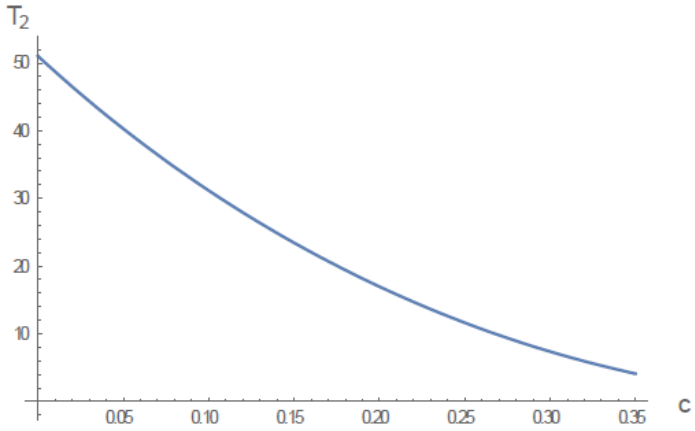

Figure 4. The effect of the intensity of game competition on team 2's shot attempts

Third, by taking the derivative of $T_1 = \frac{(1-4c^2)^2 g_1}{4(a_1+2a_2c)^2}$ on a_1 and $T_2 = \frac{(1-4c^2)^2 g_2}{4(a_2+2a_1c)^2}$ on a_2, respectively, we obtain $\frac{\partial T_1}{\partial a_1} = -\frac{(1-4c^2)^2 g_1}{2(a_1+2a_2c)^3} < 0$ and $\frac{\partial T_2}{\partial a_2} = -\frac{(1-4c^2)^2 g_2}{2(a_1+2a_2c)^3} < 0$. Thus, we have the proposition 3 below.

Proposition 3: *When the free throw rate is high, the number of shots is reduced due to increased fouls from the opposing team.*

Proposition 3 shows that when the free throw rate is high, the number of field goal attempts may be reduced due to increased fouls committed by the opposing team. As teams draw more fouls, they are awarded free throw opportunities, which can lower the total number of field goals attempted during the game. High free throw rates often indicate that players are getting to the line frequently, either through aggressive play or the opposing team's defensive mistakes. In these situations, teams can capitalize on free throws to maintain scoring efficiency without the need to increase their shot attempts. By focusing on getting to the line and converting free throws, teams can accumulate points while reducing the risk of forced or inefficient field goal attempts. Additionally, a high free throw rate can disrupt the flow of the opposing team's defense, as frequent fouls may force key players into foul trouble, limiting their effectiveness and playing time. To maximize these opportunities, coaches should adjust their offensive strategy to encourage aggressive attacks to the basket, which can draw more fouls and increase free throw chances. Controlling the tempo of the game is also critical, as slowing down the pace can reduce turnovers and help teams manage foul risks more effectively. Ensuring free throw efficiency is vital, so players should be well-trained in free throw shooting, especially under pressure, to make the most of these opportunities. Lastly, maintaining mental focus in high-pressure situations will be crucial, as players should stay composed and take advantage of foul-drawing opportunities, particularly when free throws can play a decisive role in the game.

We use Figures 5 and 6 to illustrate the effect of the free throw rate on total shots. The values we use in our simulations are given as $= 0.35$, $g_1 = 0.3$, $g_2 = 0.3$, $0 < a_1 < 0.3$, and $0 < a_2 < 0.35$. Figures 5 and 6 demonstrate that the total shoots have a negative relationship with the free throw rate, which verifies the result derived in proposition 3. In other words, a higher free throw success rate encourages players to attempt more free throws, leading to increased fouls by the opposing team and, consequently, fewer shot opportunities.

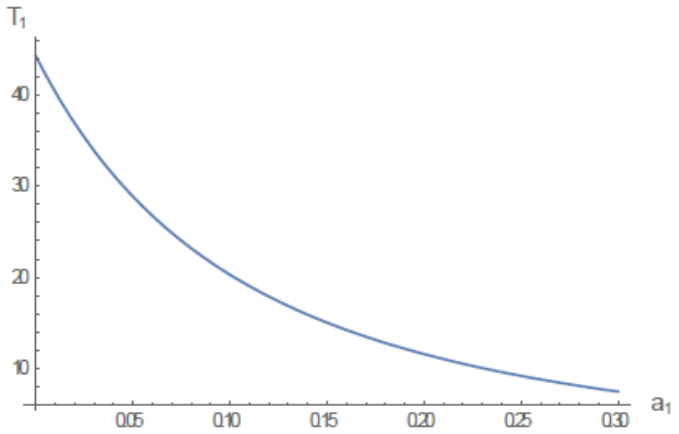

Figure 5. The effect of free throw rate on team 1's shot attempts

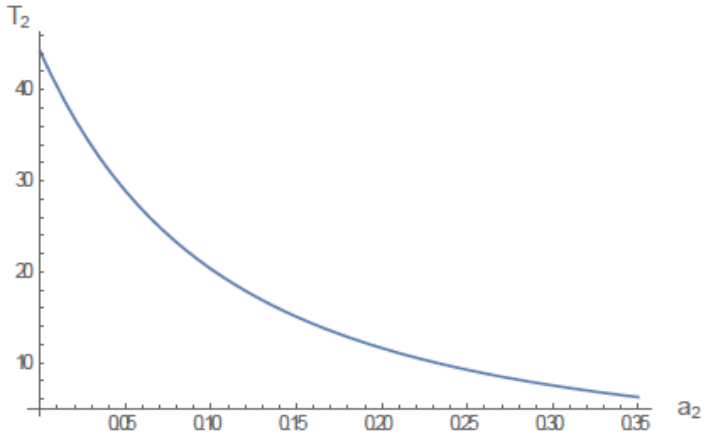

Figure 6. The effect of free throw rate on team 2's shot attempts

Finally, by comparing $R_1 = \frac{(1-4c^2)^2(a_1-2c\frac{(a_2+2a_1c)}{(1-4c^2)}+2\frac{(a_1+2a_2c)}{(1-4c^2)})g_1}{4(a_1+2a_2c)^2}$ with $R_2 = \frac{(1-4c^2)^2(a_2+2\frac{(a_2+2a_1c)}{(1-4c^2)}-2c\frac{(a_1+2a_2c)}{(1-4c^2)})g_2}{4(a_2+2a_1c)^2}$, we have the proposition 4 below.

Proposition 4: *Although both the shooting rate and free throw rates influence a team's chances of winning, the impact of a successful shooting rate is greater. Additionally, as the intensity of a game increases, the score difference between the two teams tends to decrease.*

Proposition 4 shows that the shooting rate has a greater impact on a team's chances of winning because it directly influences the flow of the game by generating points during regular play. Field goals, especially three-pointers, can significantly increase a team's offensive output and provide momentum shifts, making them more valuable over time. A successful shooting rate contributes not only to scoring but also to maintaining offensive efficiency and the overall rhythm of the game. On the other hand, while free throw rates contribute to scoring, fouls typically arise in specific situations and are often influenced by factors such as the opposing team's defense or referee decisions. While important, free throws generally don't carry the same offensive momentum as successful field goals do. Therefore, a high shooting percentage tends to have a more substantial and sustained impact on a team's ability to control the game and increase their chances of winning. As the intensity of a game increases—often due to factors like heightened competition, playoff settings, or close game situations—the score difference between the teams tends to decrease because teams tighten up defensively, and mistakes become more costly. When the pressure is higher, both teams may focus more on preventing scoring than on scoring themselves. Additionally, with the game being more contested, teams are less likely to give up large runs or open shooting opportunities, leading to a smaller margin of victory. This is particularly true in situations where teams engage in tight defensive schemes and capitalize on fewer, more crucial scoring opportunities. In such high-pressure situations, coaches should prioritize improving shooting efficiency, ensuring that players focus on high-percentage shots to maintain consistency and confidence. Maximizing offensive spacing and ball movement can create open shot opportunities, leading to higher shooting percentages, while players should focus on high-percentage shots. Free throw efficiency remains important, and coaches should ensure players are proficient at the line, especially during critical moments, while developing strategies to draw fouls. As game intensity increases and the score difference narrows, coaches must maintain composure and focus, ensuring players avoid overreacting to adversity.

We use Figure 7 to illustrate the results derived in proposition 4. The values we use in our simulations are given as $g_1 = 0.31$, $g_2 = 0.32$, $a_1 = 0.7, a_2 = 0.35$, and $0 < c < 0.35$. Figure 7 demonstrates that although the free throw rate of team 1 is two times that of team 2, and the shooting rate of team 2 is only 0.01 higher than that of team 1, team 2 still is the game-winner. In other words, a successful shooting rate is more important during the game competition, but the free throw rate can be used as a complementary means to help a team win.

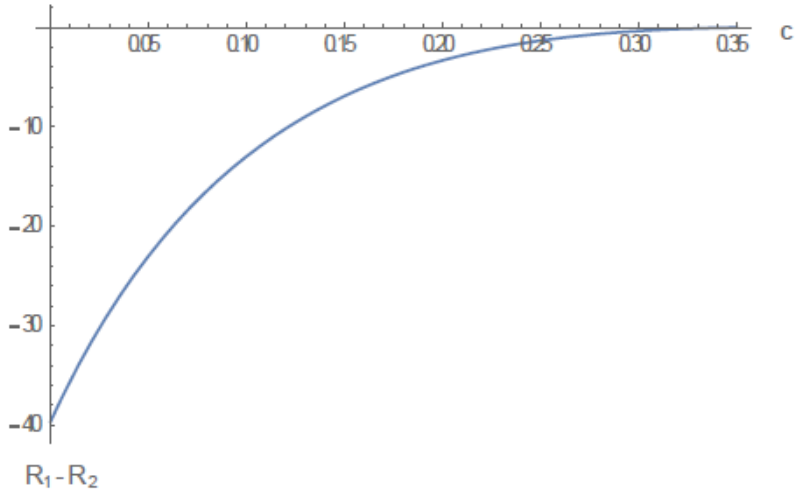

Figure 7. Two teams' score difference

CONCLUSIONS AND MANAGERIAL IMPLICATIONS

Basketball is one of the most influential and beloved sports in the United States. It plays a crucial role in American culture, sports history, and the economy. This study has explored the critical factors that influence a basketball team's chances of winning, with a particular emphasis on shooting efficiency, free throw rates, and the dynamics that arise as the intensity of the game increases. By analyzing the direct and indirect impacts of these elements on game outcomes, we have seen that a successful shooting rate - particularly in field goals - holds a significantly greater weight in determining a team's success compared to free throw rates. A high shooting percentage not only contributes to scoring but also shapes the overall pace and rhythm of the game, fostering momentum shifts that can sway the outcome in favor of the team with superior shooting efficiency. The role of free throws, while still important, was shown to be less influential in terms of maintaining offensive momentum. Free throw opportunities arise in specific situations and often depend on the defensive strategy of the opposing team or officiating decisions. Although free throws can be critical in crucial moments, their ability to sustain an offensive surge or dictate the flow of the game is limited compared to the more consistent and dynamic impact of high-quality field goals. Additionally, the research revealed that as the intensity of a game increases, such as during high-stakes matchups, playoffs, or tightly contested games, the score gap tends to narrow due to increased defensive pressure and a reduction in scoring opportunities. This heightened competition forces teams to become more strategic, focusing on creating efficient scoring chances while tightening their defense. Coaches and managers, therefore, must adjust their strategies, accordingly, emphasizing the importance of shooting efficiency, effective offensive spacing, and the ability to maintain composure in high-pressure situations. It becomes clear that in these high-stress moments, the team that can execute with greater consistency, minimize mistakes, and capitalize on crucial scoring opportunities is more likely to prevail. We summarize these results in Table 3.

Table 3. Summarized results

Result 1	When a team has a high shooting percentage, it is motivated to attempt more shots.
Result 2	When the competition is tougher, both teams should focus on reducing shot attempts and improving their shooting efficiency.
Result 3	When the free throw rate is high, the number of shot attempts decreases due to more fouls committed by the opposing team.
Result 4	While both shooting and free throw percentages impact a team's chances of winning, the effect of a high shooting percentage is more significant. Furthermore, as the game's intensity increases, the point difference between the teams typically narrows.

Considering these findings, the managerial implications are clear.

First, coaches and team managers should encourage players to maintain a high shooting percentage, as this not only improves overall scoring efficiency but also boosts player confidence and motivation to take more shots. By fostering an environment where players feel successful in their shooting, teams can capitalize on this momentum to increase their offensive output.

Second, in high-stakes or intense games, coaches should emphasize the importance of shot selection and efficiency. Teams should focus on reducing unnecessary shot attempts and prioritize quality over quantity, ensuring that each shot taken has a higher chance of success. This approach helps conserve energy, minimizes turnovers, and increases the likelihood of securing a win in competitive matchups.

Third, coaches should leverage a high free throw rate to their advantage by encouraging players to drive to the basket and draw fouls from the opposing team. With more fouls committed, the team can reduce the need for field goal attempts while capitalizing on free throws to maintain scoring efficiency. This strategy can help control the tempo of the game and limit the opposing team's ability to defend aggressively.

Fourth, coaches should prioritize improving their team's shooting efficiency, as a high shooting percentage has a greater impact on winning chances. In high-pressure games, where the competition intensifies, the score gap tends to shrink, making each possession even more critical. Therefore, teams should focus on maintaining composure and executing high-quality shots, especially in crucial moments, to secure a competitive edge and close out tight games.

In sum, this research underscores the importance of a balanced approach to both offensive and defensive strategy, with a particular emphasis on shooting efficiency as the cornerstone of a winning game plan. As basketball continues to evolve, teams that focus on refining their shooting skills and adapting their strategies to the flow of the game will be better positioned to succeed in increasingly competitive environments.

REFERENCES

Chen, R., Zhang, M., Xu, X., & Liu, Y. (2025). Game-related statistics for distinguishing winning and losing teams in Olympic basketball: The impact of game pace. *Journal of Sports Sciences*, 1–12. https://doi.org/10.1080/02640414.2024.2448360

Goldschmied, N., Raphaeli, M., Moothart, S., & Furley, P. (2022). Free throw shooting performance under pressure: a social psychology critical review of research. *International Journal of Sport and Exercise Psychology*, *20*(5), 1397-1415. https://doi.org/10.1080/1612197X.2021.1979073

Csataljay, G., O'Donoghue, P., Hughes, M., & Dancs, H. (2009). Performance indicators that distinguish winning and losing teams in basketball. *International Journal of Performance Analysis in Sport*, *9*(1), 60–66. https://doi.org/10.1080/24748668.2009.11868464

Gómez, M. A., Alarcón, F., & Ortega, E. (2015). Analysis of shooting effectiveness in elite basketball according to match status [Performance analysis]. *Revista De Psicología Del Deporte*, *24*(1), 37–41. https://www.redalyc.org/pdf/2351/235143644008.pdf

Karipidis, A., Foteinakis, P., Taxildaris, K., & Fatouros, J. (2001). Factors characterizing a successful performance in basketball. *Journal of Human Movement Studies*, *41*(5), 385–397. https://www.researchgate.net/profile/Panagiotis-Foteinakis/publication/287814881_Factors_characterizing_a_successful_performance_in_basketball/links/67478d4b876bd17778297832/Factors-characterizing-a-successful-performance-in-basketball.pdf

Kostacos, S. (2023). Effect of increased three-point shot attempts on probability of winning in high school basketball. *Wharton Sports Analytics Student Research Journal*. https://wsb.wharton.upenn.edu/wp-content/uploads/2023/05/Kostacos_2023_Basketball_HS.pdf

Li, S., Luo, Y., Cao, Y., Li, F., Jin, H., & Mi, J. (2025). Changes in shooting accuracy among basketball players under fatigue: a systematic review and meta-analysis. *Frontiers in Physiology,* 16, 1-14. https://doi.org/10.3389/fphys.2025.1435810

Magel, R., & Unruh, S. (2013). Determining factors influencing the outcome of college basketball games. *Open Journal of Statistics*, *03*(04), 225–230. https://doi.org/10.4236/ojs.2013.34026

Sampaio, J., & Janeira, M. (2003). Statistical analyses of basketball team performance: understanding teams' wins and losses according to a different index of ball possessions. *International Journal of Performance Analysis in Sport*, *3*(1), 40–49. https://doi.org/10.1080/24748668.2003.11868273

Sutiono, A. P., Ramadan, R., Jarukasetporn, P., Takeuchi, J., Purwarianti, A., & Iida, H. (2015). A mathematical model of game refinement and its applications to sports games. *EAI Endorsed Transactions on Creative Technologies*, *2*(5), 150095. https://doi.org/10.4108/eai.20-10-2015.150095

Zhang, S., Gomez, M.A., Yi, Q., Dong, R., Leicht, A., & Lorenzo, A. (2020). Modelling the relationship between match outcome and match performance during the 2019 FIBA basketball world cup: A quantile regression analysis. *International Journal of Environmental Research and Public Health. 17*(16), *5722.* https://doi.org/10.3390/ijerph17165722

COMPETITIVE INTENSITY: DOES CEO GENDER MATTER?

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ABSTRACT

As the proportion of female appointed as CEO grows, the need increases to understand how gender relates to organizational outcomes. In particular, the impact of CEO gender on firms' competitive intensity is yet to be explored. This research investigates the link between competitive intensity and CEO gender. We propose that firms led by male CEOs will likely have the capacity to compete more intensively (i.e., to launch more new competitive actions) than firms led by female CEOs. Using data for 82 Fortune 500 U.S. firms, our analysis reveals that there is not a significant difference between the competitive intensity of firms led by female CEOs and that of firms led by male CEOs. The non-significant results support theories that defend a gender-neutral vision of leadership. Our results are consistent with a stream of research that contends that differences between women and men leadership is mostly based on perception biases and stereotype.

INTRODUCTION

The number of female CEOs has increased over the past two decades. As of June 2024, there are 52 female CEOs employed at Fortune 500 companies, up from just a single female CEO in 1998 (Hinchliffe, 2024). Despite the increase in female CEOs, previous research has not examined whether CEO gender plays a role in a firm's competitive intensity. Examining this is important because it provides more insights on the impact of CEO gender on firm's competitive intensity, which, in turn, influences firm performance.

Firms in most industries are engaged in intensive competition (Bettis & Hitt, 1995; D'Aveni, 1994). In such industries, firms can outperform rivals by regularly initialing more competitive actions (Ferrier, et al., 1999). Following this Austrian perspective on competition, research in competitive dynamics has developed theory and research methodology focused on the concept of competitive action— a firm's specific and observable competitive moves to build or defend its competitive advantage or improve its market position (Andrevski et al., 2014; Chen & MacMillan, 1992; Ferrier et al., 1999; Young, et al.,1996). According to this research, a firm's performance is a result of a series of competitive actions the firm introduces over a long period (Smith, et al., 2001).

We draw on existing gender leadership literature (e.g., Byrnes, Miller, and Schafer, 1999; Chen, Crossland, and Huang, 2016; Eagly et al., 1992; Eagly, et al., 1995; Eagly & Karau, 2002; Faccio et al., 2016; Huang and Kisgen 2013; Varma et al., 2023) and the literature on competitive dynamics (e.g., Ferrier et al.,, 1999; Smith et al., 2001) to posit that firms led by

male CEOs introduce more competitive actions than those launched by firms led by female CEOs. Our contention is driven by the gender essentialist view which assumes leadership roles are masculinity-dominated (Bem, 1993; Dar-Nimrod & Heine, 2011; Gelman, 2003; Haslam & Whelan, 2008). Our hypothesis is built on three logics. First, male executives tend to take higher risks due to their overconfidence and competitiveness while female executives are likely to be more risk-averse because of their fear of failure and scrutiny (Bengtsson et al., 2005; Niederle & Vesterlund 2007). Second, drawing on regulatory focus theory (Higgins, 1997, 1998; Scholer et al., 2019), we argue that male CEOs are driven by a promotion mindset that motivates them to be competitive while female CEOs are driven by a prevention mindset that leads them to pursue conservative strategies that fulfill a need for security and safety. Third, we draw on several gender leadership theories, which contend that male executives are more competent than their female counterparts. Attitudes toward risk, a promotion mindset, and a higher degree of competence are all linked to competitive behavior and competitive intensity.

We contribute to gender leadership literature, competitive dynamics literature, and strategic leadership literature (Finkelstein et al., 2009; Hambrick & Mason, 1984) research by providing a theoretically grounded explanation of why firms with female CEOs are associated with fewer competitive actions. Our research is the first to provide empirical evidence about the relationship between CEO gender and firm competitive behavior. We conceptualize and test a theory of why gender is an important factor that determines firms' ability to launch more competitive actions. Specifically, we address the research question: Do female and male CEOs differ in their capacity for launching more competitive actions?

LITERATURE REVIEW AND HYPOTHESIS

CEO Gender and Competitive Intensity

A large body of research has suggested that gender is a trait that influences decision-making and firm performance (e.g., Dezso & Ross, 2012; Eagly et al., 1992; Parola et al., 2015; Varma, Bommaraju, and Singh, 2023). The upper echelon theory postulates that corporate decisions are shaped by managers' personalized lenses (Hambrick & Mason, 1984), and men and women display different risk tolerance through those lenses (Dezsö & Ross, 2012; Krishnan & Park, 2005). Following this line of research, we examine the relationship between CEO gender and firm competitive actions. We suggest that male-led firms are likely to have the capacity to launch more competitive actions. There are three primary reasons for our contention.

First, extant research suggests that gender influences risk preferences. A large body of research indicates that women are more risk-averse than men (Byrnes, et al.1999; Croson & Gneezy 2009; Czibor et al., 2019; Francis et al., 2015; Janahi, Millo and Voulgaris, 2021; Jianakoplos & Bernasek, 1998; Niederle & Vesterlund 2007). Male and female executives have different risk appetites and consequently, they are expected to act differently and make different decisions. For example, in the general population, a meta-analysis of gender differences in risk-taking finds significant gender differences in risk preferences across different life stages and tasks, with men taking more risks than women (Byrnes et al.,1999). Other research suggests that

women exhibit a greater failure avoidance orientation (Nelson et al. 2013) and a higher fear of scrutiny (Brescoll et al., 2010). Research finds that the gender gap in tournament entry can be explained by gender differences in risk attitudes, and overconfidence (Gillen et al., 2019; Veldhuizen, 2022). Research also finds gender differences in attitude towards risk in financial and business decision-making. For instance, Charness and Gneezy (2012) find that men invest more in risky options than women. Estes and Hosseini (1988) and Barber and Odean (2001) find that females are less confident in their financial ability, which makes it hard for females to overcome the stereotype. Female investors give more weight to risk attributes such as the possibility of loss and ambiguity than their male counterparts do (Olsen & Cox, 2001). A Federal Reserve survey finds women to be more averse to financial risk than men (see Jianakoplos & Bernasek, 1998).

Gender differences in risk preference appear to influence not only individual decisions but also firm-level decisions. There is considerable evidence that female executives are more risk-averse than male executives (Barber & Odean, 2001; Graham et al., 2013; Janahi et al., 2021; Bliss & Potter, 2002; Varma et al., 2023). For example, research finds male executives to prefer more competitive environments and make more risky investment decisions because male executives are significantly more overconfident than women (Barber & Odean, 2001; Bengtsson et al., 2005; Huang & Kisgen, 2013; Levi et al., 2014; Niederle & Vesterlund 2007; Varma et al., 2023). Devine et al., (2024) find male executives and directors to be more overconfident than female counterparts and that overconfidence is positively correlated with net investment trading activity. Female CEOs tend to make less risky financing and investment decisions than male CEOs (Croson & Gneezy, 2009; Farrell & Hersch, 2005; Levi et al., 2014; Faccio et al., 2016). For example, Huang and Kisgen (2013) compare corporate financial and investment decisions made by male versus female executives. The authors find that firms with female executives are less likely to make acquisition, less likely to issue debt, and are more likely to exercise stock options early than firms with male executives. Also, research finds a negative association between the number of female directors and firm risk (Francis et al. (2015). Women are more likely to interpret risky situations as threats and, thus, seek to avoid them; meanwhile, men see the same situations as challenges and engage in them (Harris & Jenkins, 2006; Varma et al., 2023). Nana, Prevost, and Upadhyay (2023) find a strong positive cross-sectional correlation between the proportion of independent female directors and an array of alternative CEO debt-like pension compensation. This result supports the view that gender-diverse boards incentivize CEOs to adopt lower risk strategies. Teng and Wu (2024) find firms with female CEOs experience less cost asymmetry than firms under the control of male CEOs. Also, research finds that female executives take on less risky investments in R&D and intensive advertising (Adhikari et al., 2019). Similarly, Chen, Crossland, and Huang (2016) and Levi et al., (2014) find that greater female representation on a firm's board is negatively related to both the number and size of firm acquisitions.

In addition to gender differences in risk attitudes, research shows gender differences in their competitive preference, with women being less willing to engage in a competition (e.g., Gneezy et al., 2003; Niederle & Vesterlund, 2007). Specifically, research finds that men's performance is significantly improved under a competitive environment than women's

performance (Niederle & Vesterlund, 2010). Due to their overconfidence, men favor more competitive environment (Niederle & Vesterlund 2007) and risk-taking behavior (Barber & Odean 200). Gender differences in overconfidence and competitiveness are more prominent for roles that are considered masculine (Lenny, 1977; Beyer & Bowden, 1997). Since male executives account for a very significant percentage of Fortune 500 executives, it would be reasonable to describe leadership roles and the leadership domain among the Fortune 500 companies to be fundamentally "masculine". It is thus expected that male CEOs will be more confident than female CEOs in their ability to launch more competitive actions.

An important influence on a decision maker's competitive behavior is risk preference (Hopkins, 2003; Huang and Kisgen, 2013; Varma et al., 2023). Competitive actions such as new product development is known to be inherently risky (Hopkins, 2003). Higher levels of competitive intensity are associated with higher degree of risk-taking attitude and uncertainty because they likely affect firm performance and competitive position over the long term (Hopkins, 2003) and may lead to a decline in the share price of the firm in the short term (Laverty, 1996). If the higher risk aversion of female CEOs is reflected in many firm decisions, we expect that female CEOs' risk aversion also shows up in competitive action decisions. Varma, Bommaraju, and Singh (2023) provide a direct connection between a firm's competitive intensity and gender leadership. They show that female CMOs launch fewer new products and radical innovations due to their lower risk inclination. Building on this line of research we argue that firms led by a female CEO have less appetite for initiating competitive actions to avoid risk-taking. We argue that male CEOs enhance the capacity of their firms to discover new competitive actions and enable their firms to compete intensely. Thus, male-led firms are likely to consider more options and generate more ideas for launching new competitive moves than female-led firms. Since competitive actions are motivated by a higher degree of risk-taking and competitiveness, it is expected that male CEOs are considered to be more risk-taking than their female counterparts to launch more competitive actions. Consistent with existing research, we expect risk attitudes to motivate male executives to launch more competitive actions such as introducing new technological and product-related innovations in manufacturing (Greve, 2003), acquisitions (Thornton, 2001), and fewer new products (Varma et al., 2023).

Second, we draw on regulatory focus theory (Higgins, 1998), to suggest that male CEOs who are associated with a promotion mindset are likely to launch more competitive actions than those initiated by female CEOs who are linked to a prevention mindset. Regulatory focus theory focuses on the type of actions that individuals take to align themselves with their values and aspirations. The theory is centered around goal attainment and distinguishes between two strategies for the pursuit of goals: promotion focus and prevention focus. A promotion mindset reflects a focus on opportunities, growth, goal attainment, and maximizing gains. In contrast, a prevention mindset reflects a focus on avoiding negative outcomes, preserving the status quo, and a need for security and safety (Crowe & Higgins, 1997; Higgins, 1997; Scholer et al., 2019). Research suggests that women are more prevention-focused than men, while men are more promotion-focused (Gutermuth & Hamstra, 2023). Since, the intensity of rivalry is associated with a promotion mindset (Kilduff (2014), we expect firms led by promotion mindset

male CEOs to compete more aggressively and have the capacity to launch more competitive action than firms led by prevention-focused female CEOs.

Third, several gender leadership theories suggest that male leaders are perceived to be more competent than their female counterparts (Carroll, 2006; Eagly et al., 1992). According to these theories men are perceived to have intrinsic attributes associated with effective leadership (Karakowsky & Siegel, 1999; Ridgeway, 2001). Examples of these theories include the lack of fit theory (Heilman, 2001), role congruity theory (Eagly & Karau, 2002), expectation states theory (Ridgeway 1997, 2001), and the think manager–think male paradigm (Schein, 1973, 2007)

The role congruity theory argues that leadership has long been considered a masculine domain requiring masculine (agentic) behaviors (Eagly & Karau, 2002; Schein, 2001). To be effective leaders and gain the cultural acceptance of their followers, women are expected to behave consistently with the requirements of leader roles and display traditionally masculine agentic characteristics such as assertiveness, achievement, aggressiveness, and competitiveness. However, women are socialized to be affectionate, agreeable, caring, and sensitive (Eagly, 1987). Women are considered not only as communal but also as lacking agentic qualities. Abandoning their predetermined communal qualities and adopting agentic qualities creates an incompatibility—role incongruity— between the female gender role and the stereotypical demands of leadership role creating a bias that hinders women's success in leadership roles (Eagly & Karau, 2002; Heilman, 2012; Koch et al., 2015). Because the agentic qualities associated with men tend to better match the characteristics of leadership roles, and women are viewed as deficient in such qualities (Heilman, 1983), such gender stereotypes constrain women's advancement to leadership positions (Koenig et al., 2011). Agency–communion theory (Bakan 1966) and self-construal theory (Cross and Madson, 1997) provide support for the role incongruity view and suggest that aggressiveness and competitiveness are inherently masculine traits.

Consistent with this stereotypical view, "Think manager, think male" suggests the association of male characteristics with leaders' attributes (Schein, 1973, 1975; Sczesny, 2003). According to this theoretical perspective the attributes associated with leaders' success, such as aggressiveness, competence, and competitiveness, are typically associated with men. Furthermore, Heilman proposes that there is a perceived lack of fit (Heilman, 1983, 2001) for women trying to attain leadership roles. Male leaders are considered task-oriented, while in contrast female leaders are considered person-oriented (Heilman, 1983). Leadership positions are thought to require characteristics that are held by men, not by women. Similarly, the expectation states theory suggests that society ascribes greater power and status to males as compared to females and expects males to outperform females in leadership roles (Ridgeway, 2001).

Consistent with theories suggesting that male leaders are perceived to be more competent than their female counterparts, Lee, and James (2007) find that investor reaction to announcements of female CEO appointments is significantly more unfavorable than of male CEO appointments, seemingly because female CEOs are perceived as less competent than male CEOs.

Since the capacity to compete more intensely (i.e., to launch more new competitive actions) will require agentic qualities such as assertiveness, achievement, aggressiveness, and competitiveness which are held by male CEOs, we expect firms led by agentic male CEOs to compete more aggressively and have the capacity to launch more competitive action than firms led by communal female CEOs.

Our hypothesis follows from these three arguments:

H1: Firms led by male CEOs, on average, launch more competitive actions than firms led by female CEOs.

SAMPLE

We construct a panel data set from 2011 to 2021. We obtain data on CEO gender and test our hypothesis on a multi-industry sample of firms that participate in the Fortune 500. The sample selected in this survey represents a broad cross-section of Fortune 500 firms. The sample consists of 41 firms led by female CEOs and their rival firms led by male CEOs in the Fortune 500 for three years. We identify 41 female-led CEOs over the 2011-2021 period and develop a matched sample of 41 male-led CEO appointments to test our hypothesis. We exclude firms that are not based in the U.S. to ensure equal coverage of firms' competitive actions. We also exclude utility firms due to a lack of sufficient information about competitive actions. We include only Fortune 500 firms that have a female CEO for a minimum of 3 consecutive years during the sample period. We focus on the most recent three years, if a female CEO stays longer than three years, during the period of measurement (2011-2021). We then identify the closest direct male-led competitor of each female-led firm included in the sample. We identify potential matched firms using industry and firm size. Our sample, therefore, includes 41 Fortune 500 firms that are led by female CEOs for three years and their 41 peers in the Fortune 500 that are led by male CEOs. As a result of this process, we have a data set of 82 firms (i.e., 41 rivalries) representing a broad variety of industries.

DATA COLLECTION

Dependent Variable: Competitive Action Intensity

We measure the intensity of competitive action as the total number of competitive actions initiated by a firm during the three years of measurement. Competitive action refers to externally directed, specific, observable, and newsworthy moves, such as new marketing campaign, new product introduction, and capacity increase, initiated by a firm to enhance its relative competitive position (Smith et al., 2001; Young et al.,1996; Smith et al., 1992). Actions that are observable to customers, competitors, and other industry watchers are most likely to be reported in the business press (Miller & Chen, 1994) and thereby are available for identification, data collection, and analysis. Following researchers in the competitive dynamics area (e.g., Ferrier et al., 1999), we identify and code observable competitive actions by conducting a structured content analysis (Jauch et al.,1980) of newspaper and trade magazine articles found on the Factiva article index

and MarketLine's Industry Statistics databases. Each competitive move is classified into one of five action types based on the keywords that reflect each type. These types are as follows: capacity expansion (keyword examples: extend, increase, distribute, and acquire), development announcement (develop, reinvent, adopt, and improve), marketing action (advertise, celebrate, marketing, sponsor, and promote), new product introduction (breakthrough, available, introduce, unleash, and unveil), and sales agreements, including licensing (choose, deliver, ship, retail, and sell). The keywords and action types developed in this study are highly consistent with previous studies (e.g., Basdeo et al., 2006; Kim et al., 2018). We use the identified keywords to search the Factiva and MarketLine databases. We find a total of 2,323 competitive actions taken by female-led firms and 1404 competitive actions taken by male-led firms over 3 years. Only the earliest report of an action is keyed into the database. To verify the accuracy of the coding, we randomly select 10 percent of the article citations for each industry, which two coders independently record. Perreault and Leigh's (1989) reliability index is 0.81, exceeding the convention of 0.70 (Ryan & Bernard, 2000). We calculate the total CA of a firm in a year by totaling the numbers of all types of actions. Total competitive actions has been commonly used in competitive-dynamics research because it is a potent measure of capturing a firm's capability to create value (Basdeo et al., 2006; Kim et al., 2018). We operationalize competitive intensity as the total number of any newly created competitive actions a firm carried out in a given year. Accordingly, we count all identified competitive actions for each firm in a given calendar year. High scores indicate that firms initiated more competitive actions.

Independent Variable

CEO gender

We identify the CEO's gender and his/her tenure period using MarketLine database and information reported by his/her firm. Additionally, we identify the CEO's gender from inferences in the news announcement (use of words such as she and her). We code CEO gender as a dummy variable that takes a value of 1 if the CEO is female and 0 if the CEO is male.

Control Variables

In our model, we control for three variables that influence competitive action intensity. Previous studies have shown large firms often have greater resources and therefore are more likely to engage in competitive activity. Thus, we control for firm size with the natural logarithm of the total number of each firm's employees. Additionally, a firm must be able to undertake competitive actions. Therefore, we control for firm slack (measured by the focal firm's quick ratio) to account for organizational slack. Previous research has shown that poor past performance motivates firms to take more competitive actions, but good past performance may lead to competitive inertia (Hambrick et al.,1996; Miller & Chen, 1994). Hence, a firm's past performance is an indicator of its motivation to take competitive action (Ferrier, 2001; Ferrier et

al., 2002). Performance is therefore included as a control variable, measured as each firm's lagged return on equity.

MODEL

A statistical model to test the effect of the CEO gender on the competitive action intensity is established using multiple linear regression, controlling for firm size, return on equity lagged one year, and firm slack using the firm's quick ratio. We test for multicollinearity using the Variance Inflation Factor (VIF) (Johnston & DiNardo, 1997) and we test autocorrelation using Durbin-Watson Test (Durbin, & Watson, 1951).

RESULTS

Table 1 shows descriptive statistics and correlation of variables examined in this study:

	Minimum	Maximum	Mean	Std. Deviation	Size	Lagged Return on Equity	Quick Ratio	Gender	Total actions
Size	840.00	485666.60	70266.58	92039.18	1.00				
Lagged Return on Equity	-112.98	271.32	28.25	45.78	0.069	1.00			
Quick Ratio	0.00	23.87	1.46	2.72	0.289	-0.045	1.00		
Gender	0.00	1.00	.51	.50	0.133	0.277	-0.101	1.00	
Total actions	4.00	328.00	45.45	58.12	0.378	0.319	-0.015	0.175	1.00

Table 2 shows Durbin-Watson test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.512[a]	.262	.224	51.2150699	2.021

a. Predictors: (Constant), Quick Ratio, Lagged Return on Equity, Gender, Size
b. Dependent Variable: Total actions

Table 3 shows the regression analysis results.

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
(Constant)	12.464	10.038		1.242	.218		
Size	.000	.000	.413	3.983	<.001	.892	1.121
Lagged Return on Equity	.323	.136	.243	2.371	.020	.909	1.100
Gender	17.504	11.941	.151	1.466	.147	.898	1.114
Quick Ratio	-2.359	2.238	-.108	-1.054	.295	.910	1.099

a. Dependent Variable: Total actions

The correlation levels between variables from Table 1, and Variance Inflation Factor (VIF) from Table 3 suggested no problems of multicollinearity. From Table 2, the Durbin-Watson test value of 2.021 indicates that there is no presence of autocorrelation in the residuals of a regression model.

The regression model based on the ANOVA table 3 is found significant with F value = 6.831 and P value less than 0.001. As expected, the firm's size and past performance are important predictors of its strategic competitive actions. Firm size is a statistically significant predictor (P value 0.001), with large firms being more likely to implement strategic competitive actions. Firm past performance is a statistically significant predictor (P value 0.02). The firm slack variable measured by quick ratio is statistically insignificant (P value 0.295).

The regression procedure reported in Table 3 fails to support our Hypothesis: Firms led by male CEOs, on average, launch more competitive actions than firms led by female CEOs. As indicated in the regression model, the coefficient for CEO gender in predicting competitive intensity is statistically insignificant (P value 0.147). Therefore, there is no significant difference in the competitive actions accorded to male and female CEOs. It can be assumed that neither gender was linked to a higher degree of competitive intensity. In a sense, this means that as CEOs in many of the world's top companies, men and women have equal capacity to launch competitive actions. Although we control for several important confounding factors, many unobservable factors may create an omitted variable problem.

The hypothesis that male-led firms launch more competitive actions than female-led firms is not supported. There is not enough evidence in this study to support the hypothesis.

DISCUSSION

Our study contributes to the existing debate that examines whether female and male leaders differ methodically in terms of underlying personality characteristics, preferences, and cognitions. We examine the impact of CEO gender on firm competitive intensity. We theorize that firms led by male CEOs will likely have the capacity to launch more new competitive actions than firms led by female CEOs. There are three primary reasons for our hypothesis. First, a large body of research suggests that male executives are significantly more likely than female executives to engage in risk-taking competitive behavior. Second, firms led by a promotion mindset male CEOs tend to compete more aggressively and have the capacity to launch more competitive action than firms led by prevention-focused female CEOs. Third, several theories suggest that male managers are more competent than female managers, which in turn increases the capacity to recognize and exploit opportunities for new competitive actions. Hence, compared to firms led by female CEOs, firms with male CEOs have the capacity to launch more competitive actions.

We find that there is no significant difference in competitive actions generated by firms led by female CEOs and firms led by male CEOs. These results do not support our hypothesis and dispute the essentialist view of gender leadership. There are several theoretical arguments that can be advanced to explain our findings. First, our findings can be explained by the

theoretical perspectives attributing the essentialist view of male and female leadership differences to perception biases and cultural stereotypes that associate the characteristics needed for leadership with men but not with women (Carroll, 2006; Donnell & Hall, 1980; Eagly et al., 1992; Eagly et al., 2003; Powell, 1990; Heilman, Block, Martell, and Simon, 1989; Eagly and Karau, 2002; Lee and James, 2007; Oakley, 2000; Powell, 1990; Ryan & Haslam, 2007; Schein, 2001). The bias against women in leadership roles is believed to be rooted in prevalent stereotypical beliefs that women are ineffective and incompetent to perform successfully in leadership roles like their male counterparts (e.g. Carroll, 2006; Eagly & Carli 2003; Eagly et al., 1992; Deal & Stevenson, 1998; Schein & Davidson, 1993). Other authors suggest that prejudice toward female leaders largely stems from the perceived incongruity between the characteristics of women and the requirements of leadership roles (Eagly & Karau, 2002; Heilman, 2012; Koch et al., 2015).

Second, our results can be explained by the gender-neutral studies which suggest that there is no significant gender difference in leadership competence (e.g. Kolb, 1999; Vecchio, 2002; Smith et al., 2018). For example, Dobbins and Platz (1986) conduct a meta-analysis of 17 studies that examined sex differences in leadership and find that the sexes do not differ and call for a halt to sex differences studies of managerial leadership.

Third, other scholars argue that because women overcome more hurdles than men to secure senior executive positions, women who rise to the CEO position may be "particularly gifted and/or especially good at learning and/or dealing with adversity" (Gupta et al., 2018: 2039). Several studies find that there are no gender differences among senior executives. For example, Adams and Ragunathan (2017) find that female executives in the financial industry do not display risk-aversion preferences similar to the general population of females. Atkinson et al. (2003) find that the ways in which men and women manage funds do not differ significantly in terms of performance, risk, and other fund characteristics. They suggest that differences in investment behavior often attributed to gender may be attributed to investment knowledge and wealth constraints. Sila et al. (2016) find that female directors have no effect on firms' equity risk. Hence, female leaders who occupy CEO positions are likely to think like men and to exhibit similar performance to that of their male counterparts (Branson, 2006; Johnson & Powell, 1994).

Fourth, although there is substantial evidence that women are more risk averse than men in the general population, it may not be necessarily true among senior executives given the unique capabilities required to make it to that position. Indeed, there are not many women in senior executive positions, and female managers are unlikely to be exhibit the female population. Instead, they are more likely to represent a special group of women who choose to pursue a career in the male-dominated professional management jobs. Adams and Funk, (2012) provide support for this argument by showing that in the general population, women have communal characteristics while men reflect agentic characteristics. However, in contrast to the findings in the general population, they find female directors are more open to change, are less conservative, and love risk more than male directors. Adams and Ragunathan (2017) suggest that some gender theories that support female risk aversion in the general population might not apply to professional executives. Specifically, they find that female executives are not more risk averse in financial firms compared to their male counterpart.

Fifth, there is a need for gender leadership and competitive dynamics research to examine moderating variables such as the characteristics of the context. Characteristics of the context may moderate gender differences in initiating competitive actions. This explanation is aligned with the view that considers the position of the role congruity theory "simplistic and inappropriate and offers a stereotype view that largely ignores the importance of contextual contingencies" (Eagly and Carli, 2003; Vecchio, 2002). Recent research shows how masculine identity and gender stereotypes significantly depend on work environments (Rinne & Sonnabend, 2022). Rinne and Sonnabend (2022) find that in a female-dominated industry, which nevertheless demonstrates the typical feature of a very low share of women in advanced leadership positions, female soccer coaches reveal a higher level of risk taking than male coaches on average.

Finally, the lack of significant associations between the presence of male CEOs and competitive intensity can be explained by the omission of unobservable variables in the regressions.

LIMITATIONS AND FUTURE DIRECTIONS

First, we examine the direct effect of CEO gender variable on competitive intensity. However, there could be other mediating factors that can mediate the impact of CEO gender on competitive intensity. For example, future research can examine the mediating impact of risk propensity. Second, future research should also examine the mediating role of competitive intensity in the relationship between CEO gender and firm performance. Third, since it is challenging to collect survey data from senior executives, we rely on secondary data to describe the relationship between CEO gender and competitive action. Future research can examine the mediating role of risk propensity through collecting survey data. Fourth, the data we employ in our study is specific to the United States. However, there may be cultural differences in gender behavior and decision making. Future research can investigate how the impact of CEO gender on firm's competitive actions varies across cultures.

CONCLUSION

This study advances competitive intensity research stream by examining the effects of CEO gender on competitive intensity. We examine the impact of CEO gender on competitive intensity. Since competitive intensity and launching more competitive actions require a risk-taking behavior, we suggest that firms led by the risk-taking male CEOs are likely to have the capacity to develop more competitive actions that firms led by the risk aversive female CEOs. Contrary to our theorizing, we find that the competitive intensity of female-led firms is not significantly different from that of male-led firms. These results provide evidence that CEO gender may not play a significant role in a firm competitive intensity. More broadly, our results challenge a widespread view that male executives are more competent than female executives. The impact of gender leadership on organizational phenomena such as competitive actions is unclear and there is a need for further research to examine gender superiority in leadership roles.

We hope our research will draw greater attention to the impact of CEO gender on competitive intensity.

REFERENCES

Adams, R. B., & Ragunathan, V. (2017). *Lehman sisters* [Working paper]. Available at SSRN: https://ssrn.com/abstract=3046451

Adams, R. B., & Funk, P. (2012). Beyond the glass ceiling: Does gender matter? *Management Science, 58*(2), 219–235. https://doi.org/10.1287/mnsc.1110.1452

Adhikari, B. K., Agrawal, A., & Malm, J. (2019). Do women managers keep firms out of trouble? Evidence from corporate litigation and policies. *Journal of Accounting and Economics, 67*(1), 202–225. https://doi.org/10.1016/j.jacceco.2018.09.004

Andrevski, G., Richard, O. C., Shaw, J. D., & Ferrier, W. J. (2014). Racial diversity and firm performance: The mediating role of competitive intensity. *Journal of Management, 40*(3), 820–844. https://doi.org/10.1177/0149206311424318

Atkinson, S. M., Baird, S. B., & Frye, M. B. (2003). Do female mutual fund managers manage differently? *Journal of Financial Research, 26*(1), 1–18. https://doi.org/10.1111/1475-6803.00041

Bakan, D. (1966). *The duality of human existence: Isolation and communion in Western man.* Rand McNally.

Barber, B. M., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics, 116*(1), 261–292. https://doi.org/10.1162/003355301556400

Basdeo, D. K., Smith, K. G., Grimm, C. M., Rindova, V. P., & Derfus, P. J. (2006). The impact of market actions on firm reputation. *Strategic Management Journal, 27*(12), 1205–1219. https://doi.org/10.1002/smj.556

Bengtsson, C., Persson, M., & Willenhag, P. (2005). Gender and overconfidence. *Economics Letters, 86*(2), 199–203. https://doi.org/10.1016/j.econlet.2004.07.012

Bem, S. L. (1993). *The lenses of gender: Transforming the debate on sexual inequality.* Yale University Press.

Bettis, R. A., & Hitt, M. A. (1995). The new competitive landscape. *Strategic Management Journal, 16*(S1), 7–19. https://doi.org/10.1002/smj.4250160915

Beyer, S., & Bowden, E. M. (1997). Gender differences in self-perceptions: Convergent evidence from three measures of accuracy and bias. *Personality and Social Psychology Bulletin, 23*(2), 157–172. https://doi.org/10.1177/0146167297232005

Bliss, R., & Potter, M. (2002). Mutual fund managers: Does gender matter? *The Journal of Business and Economic Studies, 8*(1), 1–17.

Branson, D. M. (2006). *No seat at the table: How corporate governance and law keep women out of America's boardrooms.* New York University Press.

Brescoll, V., Dawson, E., & Uhlmann, E. (2010). Hard won and easily lost: The fragile status of leaders in gender-stereotype-incongruent occupations. *Psychological Science, 21*(11), 1640–1642. https://doi.org/10.1177/0956797610384744

Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk-taking: A meta-analysis. *Psychological Bulletin, 125*(3), 367–383. https://doi.org/10.1037/0033-2909.125.3.367

Carroll, J. (2006). Americans prefer male boss to a female boss. *Gallup Brain.* http://brain.gallup.com

Charness, G., & Gneezy, U. (2012). Strong evidence for gender differences in risk-taking. *Journal of Economic Behavior & Organization, 83*(1), 50–58. https://doi.org/10.1016/j.jebo.2011.06.007

Chen, G., Crossland, C., & Huang, S. (2016). Female board representation and corporate acquisition intensity. *Strategic Management Journal, 37*(2), 303–313. https://doi.org/10.1002/smj.2330

Chen, M. J., & MacMillan, I. C. (1992). Nonresponse and delayed response to competitive moves: The roles of competitors' dependence and action irreversibility. *Academy of Management Journal, 35*(3), 539–570. https://doi.org/10.5465/256484

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature, 47*(2), 448–474. https://doi.org/10.1257/jel.47.2.448

Cross, S. E., & Madson, L. (1997). Models of the self: Self-construals and gender. *Psychological Bulletin, 122*(1), 5–37. https://doi.org/10.1037/0033-2909.122.1.5

Crowe, E., & Higgins, E. T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision-making. *Organizational Behavior and Human Decision Processes, 69*(2), 117–132. https://doi.org/10.1006/obhd.1996.2675

Czibor, E., Claussen, J., & van Praag, M. (2019). Women in a men's world: Risk-taking in an online card game community. *Journal of Economic Behavior & Organization, 158*, 62–89. https://doi.org/10.1016/j.jebo.2018.12.002

Dar-Nimrod, I., & Heine, S. J. (2011). Genetic essentialism: On the deceptive determinism of DNA. *Psychological Bulletin, 137*(5), 800–818. https://doi.org/10.1037/a0021860

D'Aveni, R. A. (1994). *Hypercompetition: Managing the dynamics of strategic maneuvering.* Free Press.

Deal, J. J., & Stevenson, M. A. (1998). Perceptions of female and male managers in the 1990s: Plus ça change. *Sex Roles, 38*(3–4), 287–300. https://doi.org/10.1023/A:1018782521676

Devine, A., Jolin, I., & Kok, N. (2024). How gender diversity shapes cities: Evidence from risk management decisions in REITs. *Journal of Business Ethics, 189*, 723–741. https://doi.org/10.1007/s10551-024-05378-2

Dezso, C. L., & Ross, D. G. (2012). Does female representation in top management improve firm performance? A panel data investigation. *Strategic Management Journal, 33*(9), 1072–1089. https://doi.org/10.1002/smj.1955

Dobbins, G. H., & Platz, S. J. (1986). Sex differences in leadership: How real are they? *Academy of Management Review, 11*(1), 118–127. https://doi.org/10.5465/amr.1986.4282639

Donnell, S. M., & Hall, J. (1980). Men and women as managers: A significant case of no significant differences. *Organizational Dynamics, 8*(4), 60–76. https://doi.org/10.1016/0090-2616(80)90031-0

Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation.* Erlbaum.

Eagly, A. H., & Carli, L. L. (2003). The female leadership advantage: An evaluation of the evidence. *Leadership Quarterly, 14*(6), 807–834. https://doi.org/10.1016/j.leaqua.2003.09.004

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review, 109*(3), 573–579. https://doi.org/10.1037/0033-295X.109.3.573

Eagly, A., Makhijani, M., & Klonsky, B. (1992). Gender and the evaluation of leaders: A meta-analysis. *Psychological Bulletin, 111*(3), 3–22. https://doi.org/10.1037/0033-2909.111.1.3

Estes, R., & Hosseini, J. (1988). The gender gap on Wall Street: An empirical analysis of confidence in investment decision making. *Journal of Psychology, 122*(6), 577–589. https://doi.org/10.1080/00223980.1988.10542941

Faccio, M., Marchica, M.-T., & Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance, 39*, 193–209. https://doi.org/10.1016/j.jcorpfin.2016.02.008

Farrell, K. A., & Hersch, P. L. (2005). Additions to corporate boards: The effect of gender. *Journal of Corporate Finance, 11*(1–2), 85–106. https://doi.org/10.1016/j.jcorpfin.2003.12.001

Ferrier, W. J. (2001). Navigating the competitive landscape: The drivers and consequences of competitive aggressiveness. *Academy of Management Journal, 44*(5), 858–877. https://doi.org/10.5465/3069419

Ferrier, W. J., MacFhionnlaoich, C., Smith, K. G., & Grimm, C. M. (2002). The impact of performance distress on aggressive competitive behavior: A reconciliation of conflicting views. *Managerial and Decision Economics, 23*(6), 301–316. https://doi.org/10.1002/mde.106

Ferrier, W. J., Smith, K. G., & Grimm, C. M. (1999). The role of competitive action in market share erosion and industry dethronement: A study of industry leaders and challengers. *Academy of Management Journal, 42*(4), 372–388. https://doi.org/10.2307/257009

Finkelstein, S., Hambrick, D. C., & Cannella, A. A. (2009). *Strategic leadership: Theory and research on executives, top management teams, and boards.* Oxford University Press.

Francis, B., Hasan, I., Park, J. C., & Wu, Q. (2015). Gender differences in financial reporting decision making: Evidence from accounting conservatism. *Contemporary Accounting Research, 32*(3), 1285–1318. https://doi.org/10.1111/1911-3846.12120

Gelman, S. A. (2003). *The essential child: Origins of essentialism in everyday thought.* Oxford University Press.

Gillen, B., Snowberg, E., & Yariv, L. (2019). Experimenting with measurement error: Techniques with applications to the Caltech cohort study. *Journal of Political Economy, 127*(4), 1826–1863. https://doi.org/10.1086/701986

Gneezy, U., Niederle, M., & Rustichini, A. (2003). Performance in competitive environments: Gender differences. *The Quarterly Journal of Economics, 118*(3), 1049–1076. https://doi.org/10.1162/00335530360698496

Grimm, C. M., & Smith, K. G. (1997). *Strategy as action: Industry rivalry and coordination.* South-Western.

Graham, J. R., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics, 109*(1), 103–121. https://doi.org/10.1016/j.jfineco.2013.01.010

Greve, H. R. (2003). A behavioral theory of R&D expenditures and innovations: Evidence from shipbuilding. *Academy of Management Journal, 46*(6), 685–702. https://doi.org/10.2307/30040664

Gupta, V. K., Mortal, S. C., & Guo, X. (2018). Revisiting the gender gap in CEO compensation. *Strategic Management Journal, 39*(8), 2036–2056. https://doi.org/10.1002/smj.2803

Gutermuth, D., & Hamstra, M. R. W. (2023). Are there gender differences in promotion–prevention self-regulatory focus? *British Journal of Psychology, 114*(6), 1-18. https://doi.org/10.1111/bjop.12659

Hambrick, D. C., Cho, T., & Chen, J. M. (1996). The influence of top management team heterogeneity on a firm's competitive moves. *Administrative Science Quarterly, 41*(4), 659-684. https://doi.org/10.2307/2393871

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9*(2), 193-206. https://doi.org/10.5465/amr.1984.4277628

Haslam, N., & Whelan, J. (2008). Human natures: Psychological essentialism in thinking about differences between people. *Social and Personality Psychology Compass, 2*(3), 1297-1312. https://doi.org/10.1111/j.1751-9004.2008.00112.x

Heilman, M. E. (1983). Sex bias in work settings: The Lack of Fit model. *Research in Organizational Behavior, 5*, 269–298.

Heilman, M. E. (2001). Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of Social Issues, 57*(4), 657–674. https://doi.org/10.1111/0022-4537.00234

Heilman, M. E. (2012). Gender stereotypes and workplace bias. *Research in Organizational Behavior, 32*(2), 113–135. https://doi.org/10.1016/j.riob.2012.11.003

Heilman, M. E., Block, C. J., Martell, R. F., & Simon, M. C. (1989). Has anything changed? Current characterizations of men, women, and managers. *Journal of Applied Psychology, 74*(6), 935-942. https://doi.org/10.1037/0021-9010.74.6.935

Higgins, E. T. (1997). Beyond pleasure and pain. *The American Psychologist, 52*(12), 1280–1300. https://doi.org/10.1037/0003-066X.52.12.1280

Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 30, pp. 1–46). Academic Press. https://doi.org/10.1016/S0065-2601(08)60381-0

Hinchliffe, E. (2024, June 4). The share of Fortune 500 companies run by women CEOs stays flat at 10.4% as pace of change stalls. *Fortune.* https://fortune.com/2023/06/05/fortune-500-companies-2023-women-10-percent/

Harris, C. R., & Jenkins, M. (2006). Gender differences in risk assessment: Why do women take fewer risks than men? *Judgment and Decision Making, 1*(1), 48–63.

Hopkins, H. D. (2003). The response strategies of dominant U.S. firms to Japanese challengers. *Journal of Management, 29*(1), 5–25. https://doi.org/10.1177/014920630302900102

Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics, 108*(3), 822–839. https://doi.org/10.1016/j.jfineco.2013.01.003

Janahi, M., Millo, Y., & Voulgaris, G. (2021). CFO gender and financial reporting transparency in banks. *European Journal of Finance, 27*(3), 199–221. https://doi.org/10.1080/1351847X.2020.1845911

Jauch, L. R., Osborn, R. N., & Martin, T. N. (1980). Structured content analysis of cases: A complementary method for organizational research. *Academy of Management Review, 5*(4), 517–526. https://doi.org/10.5465/amr.1980.4288921

Johnson, J. E., & Powell, P. L. (1994). Decision making, risk, and gender: Are managers different? *British Journal of Management, 5*(2), 123–138. https://doi.org/10.1111/j.1467-8551.1994.tb00076.x

Jianakoplos, N. A., & Bernasek, A. (1998). Are women more risk-averse? *Economic Inquiry, 36*(4), 620-630. https://doi.org/10.1111/j.1465-7295.1998.tb01740.x

Karakowsky, L., & Siegel, J. P. (1999). The effects of proportional representation and gender orientation of the task on emergent leadership behavior in mixed-gender work groups. *Journal of Applied Psychology, 84*(4), 620. https://doi.org/10.1037/0021-9010.84.4.620

Kilduff, G. J. (2014). Driven to win: Rivalry, motivation, and performance. *Social Psychological and Personality Science, 5*(8), 944–952. https://doi.org/10.1177/1948550613519685

Kim, K.-H., Kim, M., & Qian, C. (2018). Effects of corporate social responsibility on corporate financial performance: A competitive-action perspective. *Journal of Management, 44*(3), 1097-1118. https://doi.org/10.1177/0149206315602530

Koch, A. J., D'Mello, S. D., & Sackett, P. R. (2015). A meta-analysis of gender stereotypes and bias in experimental simulations of employment decision making. *Journal of Applied Psychology, 100*, 128–161. https://doi.org/10.1037/a0036734

Koenig, A. M., Eagly, A. H., Mitchell, A. A., & Ristikari, T. (2011). Are leader stereotypes masculine? A meta-analysis of three research paradigms. *Psychological Bulletin, 137*(4), 616–642. https://doi.org/10.1037/a0023557

Kolb, J. A. (1999). The effect of gender role, attitude toward leadership, and self-confidence on leader emergence: Implications for leadership development. *Human Resource Development Quarterly, 10*(4), 305–320. https://doi.org/10.1002/hrdq.3920100403

Krishnan, H. A., & Park, D. (2005). A few good women—On top management teams. *Journal of Business Research, 58*(12), 1712–1720. https://doi.org/10.1016/j.jbusres.2004.09.003

Laverty, K. J. (1996). Economic "short-termism": The debate, the unresolved issues, and the implications for management practice and research. *Academy of Management Review, 21*(3), 825–860. https://doi.org/10.5465/amr.1996.9702100316

Lee, P. M., & James, E. H. (2007). She-e-os: Gender effects and investor reactions to the announcements of top executive appointments. *Strategic Management Journal, 28*(3), 227–241. https://doi.org/10.1002/smj.575

Lenny, E. (1977). Women's self-confidence in achievement settings. *Psychological Bulletin, 84*, 1–13. https://doi.org/10.1037/0033-2909.84.1.1

Levi, M., Li, K., & Zhang, F. (2014). Director gender and mergers and acquisitions. *Journal of Corporate Finance, 28*, 185–200. https://doi.org/10.1016/j.jcorpfin.2013.11.005

Miller, D., & Chen, M. J. (1994). Sources and consequences of competitive inertia: A study of the U.S. airline industry. *Administrative Science Quarterly, 39*, 1-24. https://doi.org/10.2307/2393492

Nelson, K. L., Newman, D. N., McDaniel, J. R., & Buboltz, W. C. (2013). Gender differences in fear of failure amongst engineering students. *International Journal of Humanities and Social Science, 3*(16), 10–16.

Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much? *The Quarterly Journal of Economics, 122*(3), 1067–1101. https://doi.org/10.1162/qjec.122.3.1067.

Niederle, M., & Vesterlund, L. (2010). Explaining the gender gap in math test scores: The role of competition. *The Journal of Economic Perspectives, 24*(2), 129–144. https://doi.org/10.1257/jep.24.2.129

Oakley, J. G. (2000). Gender-based barriers to senior management positions: Understanding the scarcity of female CEOs. *Journal of Business Ethics, 27*, 321-334. https://doi.org/10.1023/A:1006226129868

Olsen, R. A., & Cox, C. M. (2001). The influence of gender on the perception and response to investment risk: The case of professional investors. *Journal of Psychology and Financial Markets, 2*, 29–36. https://doi.org/10.1207/S15327760JPFM0201_3

Parola, H. R., Ellis, K. M., & Golden, P. (2015). Performance effects of top management team gender diversity during the merger and acquisition process. *Management Decision, 53*(1), 57–74. https://doi.org/10.1108/MD-03-2014-0165

Powell, G. N. (1990). One more time: Do female and male managers differ? *The Executive, 4*(3), 68–75. https://doi.org/10.5465/ame.1990.4274682

Ridgeway, C. L. (1997). Interaction and the conservation of gender inequality: Considering employment. *American Sociological Review, 62*(2), 218–235. https://doi.org/10.2307/2657301

Ridgeway, C. L. (2001). Gender, status, and leadership. *Journal of Social Issues, 57*, 637–655. https://doi.org/10.1111/0022-4537.00233

Rinne, U., & Sonnabend, H. (2022). Female workers, male managers: Gender, leadership, and risk-taking. *Southern Economic Journal, 88*, 906–930. https://doi.org/10.1002/soej.12560

Ryan, M. K., & Haslam, S. A. (2007). The glass cliff: Exploring the dynamics surrounding the appointment of women to precarious leadership positions. *Academy of Management Review, 32*, 549–572. https://doi.org/10.5465/amr.2007.24351856

Sattar, M., Biswas, P. K., & Roberts, H. (2022). Board gender diversity and firm risk in UK private firms. *Global Finance Journal, 54*. https://doi.org/10.1016/j.gfj.2022.100678

Sczesny, S. (2003). A closer look beneath the surface: Various facets of the think-manager-think-male stereotype. *Sex Roles: A Journal of Research, 49*(7–8), 353–363. https://doi.org/10.1023/A:1025112204526

Sila, V., Gonzalez, A., & Hagendorff, J. (2016). Women on board: Does boardroom gender diversity affect firm risk? *Journal of Corporate Finance, 36*, 26–53. https://doi.org/10.1016/j.jcorpfin.2015.10.003

Smith, K. G., Ferrier, W. J., & Ndofor, H. (2001). Competitive dynamics research: Critique and future directions. In M. A. Hitt, R. E. Freeman, & J. S. Harrison (Eds.), *The Blackwell handbook of strategic management* (pp. 315–360). Malden, MA: Blackwell.

Smith, K. G., Grimm, C. M., & Gannon, M. J. (1992). *Dynamics of competitive strategy*. Newbury Park, CA: Sage.

Schein, V. E. (1973). The relationship between sex role stereotypes and requisite management characteristics. *Journal of Applied Psychology, 57*(2), 95–100. https://doi.org/10.1037/h0037128

Schein, V. E. (1975). Relationships between sex role stereotypes and requisite management characteristics among female managers. *Journal of Applied Psychology, 60*(3), 340–344. https://doi.org/10.1037/h0076637

Schein, V. E. (2001). A global look at psychological barriers to women's progress in management. *Journal of Social Issues, 57*, 675-688. https://doi.org/10.1111/0022-4537.00235

Schein, V. E. (2007). Women in management: Reflections and projections. *Women in Management Review, 22*, 6–18. https://doi.org/10.1108/09649420710726220

Schein, V. E., & Davidson, M. J. (1993). Think manager, think male. *Management Development Review, 6*(3), 24-28. https://doi.org/10.1108/09622519310039995

Scholer, A. A., Cornwell, J. F. M., & Higgins, E. T. (2019). Regulatory focus theory and research: Catching up and looking forward after 20 years. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (2nd ed., pp. 47–66). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190666453.013.3

Thornton, P. H. (2001). Personal versus market logics of control: A historically contingent theory of the risk of acquisition. *Organization Science, 12*, 294–311. https://doi.org/10.1287/orsc.12.3.294.10100

Teng, H., & Wu, Q. (2024). Do female CEOs manage costs differently? Evidence from asymmetric cost behavior. *Journal of Accounting, Auditing & Finance, 0*(0). https://doi.org/10.1177/0148558X241277046

Varma, R., Bommaraju, R., & Singh, S. S. (2023). Female chief marketing officers: When and why do their marketing decisions differ from their male counterparts? *Journal of Marketing Research.* https://doi.org/10.1177/00222437231160000

Vikram, N., Prevost, A., & Upadhyay, A. (2023). Risk preferences of gender-diverse boards: Evidence from CEO debt-like compensation. *British Journal of Management, 34*(4), 2263–2289. https://doi.org/10.1111/1467-8551.12696

Vecchio, R. P. (2002). Leadership and gender advantage. *Leadership Quarterly, 13*, 643–671.

Veldhuizen, R. (2022). Gender differences in tournament choices: Risk preferences, overconfidence, or competitiveness? *Vol. 20*(4), 1595-1618. https://doi.org/10.1016/S1048-9843(02)00156-X

Veldhuizen, R. (2022). Gender differences in tournament choices: Risk preferences, overconfidence, or competitiveness? *Journal of the European Economic Association*, 20(4), 1595–1618. https://doi.org/10.1093/jeea/jvac020

Young, G., Smith, K. G., & Grimm, C. (1996). Austrian and industrial organization perspectives on firm-level competitive activity and performance. *Organization Science, 73*, 243-254. https://doi.org/10.1287/orsc.7.3.243