MOBILE IN-APP ADVERTISING: CONSUMER EXPERIENCE OF FREQUENCY AND TARGETING

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MOBILE IN-APP ADVERTISING: CONSUMER EXPERIENCE

OF FREQUENCY AND TARGETING

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Abstract

This thesis examines consumer attitudes and behaviors towards in-app advertising considering the pillar parameters of digital in-app advertising campaigns, namely targeting and frequency. The thesis suggests how these parameters should be strategically dosed for higher advertising campaign success with higher ad click-through rates (CTR) and higher consumer conversions on advertisers' e-commerce websites. The research method of the study was quantitative with a survey as the main research instrument. The user survey (online from February 2019 till March 2019) was targeted at Lebanese mobile application users aging 18 to 35. The survey analysis was carried out by using the tools and tests provided by the SPSS software.

The results show that better targeting techniques within mobile apps positively affects consumer attitude and behavior toward ads, thus positively affecting clicks on the ad. Moreover, higher ad frequency negatively impacts consumer in-app ad experience, while not positively correlating with higher ad clicks. However, when paired with targeting techniques, higher ad frequency might positively impact consumer attitude and behaviors towards the ad resulting in clicking on the ad. The thesis outcome serves the digital advertising industry by conveying a positive lookout to the mobile advertising industry reflected in app users' attitudes and behaviors toward targeted ads. It also opens doors for marketers to better frame their mobile ad campaigns by testing several ad placements and formats within different application types. Moreover, this alerts advertisers to be more strategic in the choice of most optimal ad frequency within in-app campaigns through the usage of newest targeting technologies provided by the digital ad industry such as Programmatic Advertising.

MOBILE IN-APP ADVERTISING: THE EFFECTS OF FREQUENCY AND TARGETING ON CONSUMER EXPERIENCE AND MARKETING EFFECTIVENESS

1. Introduction

Recently, as the mobile ecosystem becomes more complex, advertisers and marketers are focusing on targeted marketing to maximize the impact of advertising. The digital advertising opportunities on mobile applications are growing daily with more consumers spending more time on their smartphones and with shopping behavior becoming more apt to the digital screens that serve as virtual vitrines with unlimited consumer access to markets, products and brands. This opens doors for digital advertisers to seek more developed targeting techniques and get a step ahead of competitors in a very fierce digital market. Previous studies examined social media app user attitudes, reflecting a majority of users who do not highly appreciate the presence of poorly targeted advertisements on the Instagram application (Pessala, 2016). However, in Lebanon no previous local studies have approached the topic of mobile in-app advertisement in relation to consumer attitude and effectiveness on consumer behavior. Noting the statistics revealing the increased numbers of smartphone internet users in Lebanon with 82% of total population in 2018 using mobile internet (United Nations, U.S. Census Bureau, Internet World Stats, 2018), this thesis study reveals important data on Lebanese internet consumers' attitudes and behaviors toward mobile in-app advertising campaigns and their effectiveness. Moreover, with 4 million active social media users in Lebanon, and 3.6 million among them who access social media app via mobile, it is crucial to study the behaviors and attitudes of these users towards in-

app ad campaigns they are exposed to understand how to make the advertising experience more effective to advertisers and more pleasing to users.

i. Purpose of this Study

Using the theory of reasoned action, this thesis examines how mobile in-application advertisements affect the 18 to 35 year old Lebanese consumers' attitude and behavior towards the ad by testing both advertisement frequency and targeting variables. Targeting and frequency are two major tools that should be strategically manipulated for higher digital advertising success and increased CTR on in-app advertising campaigns.

ii. Structure of the Thesis

The thesis will be structured as follows:

1) Introduction to the Thesis

This chapter describes in general the implications that online in-app advertisements have on user's attitude and how effective they seem to be.

2) Literature Review

This chapter reviews pertinent scholarly literature. None of the local studies have approached the topic of mobile in-app advertisement in relation to consumer attitude and effectiveness on consumer behavior.

3) Theoretical Framework

This chapter discusses the theory that will guide the thesis work. It details the theory of reasoned action that models the interrelation of consumer attitude, intention, and behavior and how each can directly affect the other.

4) Methodology

This chapter discusses the methodology used to carry out this research and the justification of the use of quantitative method. In addition, it conceptualizes each variable used to structure the survey questionnaire and analyze survey findings. It also reviews the process of data collection, sampling, and includes a summary of the data analysis.

5) Findings

This chapter details the results from survey data in frequency percentages and results from the tests computed on the different tested variables.

6) Discussion

This chapter analyzes the findings of the survey conducted, and whether the research has succeeded in answering them.

2. Literature Review

The literature review will cover four sections that closely go over findings related to mobile usage and in-app advertising revenues, consumer attitude toward online ads, and finally the concepts of targeting and frequency and their relation to mobile in-app advertising success.

2.1 Mobile In-App Advertising Industry and Ad Revenues

The abundance of connectedness through the web and consumer immersion into the web experience through the mobile phone devices has changed the dynamics of interaction among media, connectivity, commerce and marketing. This opened wider doors and more targeted opportunities for advertisers to reach audiences and consumers through the web on mobile devices and through mobile applications. By definition, a mobile app is:

> Type of application software designed to run on a mobile device, such as a smartphone or tablet computer. Mobile applications frequently serve to provide users with similar services to those accessed on PCs. Apps are generally small, individual software units with limited function (Technopedia, 2018).

Even more than personal computers (PCs), mobile applications provide users with a more personalized experience, while offering them limited and isolated functionality for a certain desired service or experience such as a game, web browsing, e-shopping, etc (Technopedia.com).

Mobile application specificity is part of their desirability because they allow consumers to hand-pick what their devices are able to do. For users, applications (apps) are functional as they provide connectivity services as well as being a source of entertainment, information, distraction, leisure, or convenience. To app developers mobile applications have become a lucrative source of income as many new app developers and tech startups are following the trend to serve applications that cater to different audiences, thus monetizing these apps through several strategies such as in-app advertising, and in-app purchasing (thinkmobiles.com). The monetization of mobile apps opens opportunities for media and advertising, as well as e-commerce expansion through the web. Mobile application monetization is defined by ironSouce.com (2018) as:

> Mobile app advertising is a popular monetization strategy for app developers, in which app developers get paid to serve ads on their app. The mobile app ads are served through a mobile app advertising network, which connects advertisers and developers. The app requests an ad from the network, and the network uses algorithms to identify and deliver the highest paying ad to the user in real time. There are many different types of mobile ad formats app developers can integrate into their app in order to increase app monetization, including video ad units, mobile app display ads, and native mobile app ads.

This new in-app advertising network has opened doors for a multibillion dollar industry that is currently the fastest growing form of mobile advertising on the market. According to BI Intelligence, United States app-install ad revenue is estimated to grow to more than $7 billion by year-end 2020 (Desaulniers, 2018). The mobile application has not only become a service, but a space for consumers to spend time while being exposed to media

when they are connected to the web. According to Mary Meeker's recent State of the Internet Report (2018), smartphone users are now spending 89% of the total time spent on any media on mobile apps and only 11 percent on the mobile web. People who are spending more time on mobile apps are consequently more exposed to advertisements in-app, as the report indicates. Consequently, the increased amount of exposure to in-app content is becoming more significant as adults in the US spent 5.9 hours per day on digital media in 2017, up from 5.6 hours the year before. The statistics also show most of this time is spent on mobile, a time that totals 3.3 hours out of a total of 5.9 hours (Meeker, 2018).

This growth in consumer media consumption on the web, and more precisely on mobile devices leads us to further investigate the advertising industry on the web portals, and to investigate how consumers experience advertisements over their mobile devices and in-app. Compared to mobile web, in-app advertising can provide a better solution to capture targeted consumers' attention and encourage them to interact without interruption (Chen, 2016). AOL web portal and online service provider director of mobile, Chad Gallagher (2015) explains how in-app mobile ad has become the future of the mobile advertising with more people accessing their smartphone or tablets an average of three hours per day and 84 percent of all smartphone time is spent in-app. He also alerts advertisers, marketers, and agencies on the engagement possibilities in-app where the growth will be for the next five years. Shifting its focus to long-term profitability, the app business has now become part of the world economy. With several monetization models that have emerged over the years, numerous mobile advertising networks have established app developers to generate more revenue from apps (Dogtiev, 2018). Some

industry statistics give further insight on this matter, and why in-app ads work. App Annie app market Data Company provide data on the total revenue generated across all mobile operating systems citing that it was $70 billion in 2015, and it increased in 2016 to reach $88 billion. By 2020 the combined mobile app revenue is expected to reach $189 billion (Statista, 2017).

Some of many ways an application can make revenue is advertising, in-app purchase and paid for app download (thinkmobiles.com). The first form of monetization was paid for apps, where consumers would make an online transaction to download or purchase a mobile app. In 2009, Apple introduced in-app purchase micro-transactions to change the economy of in-app revenues (techcrunch.com). By definition, in-app purchase refers to the buying of goods and services from inside an application on a mobile device, such as a smartphone or tablet (Investopedia, 2017). In-app purchases allow developers to provide their application for free (Investopedia, 2017). The developer then advertises upgrades to the paid version, paid feature unlocks, special items for sale or even advertises other apps and services to anyone who downloads the free version. This allows the developer to make profit despite giving the basic app itself away for free (Investopedia, 2017). This infers that in-app purchase is a kind of an upselling technique that offers additional features for an amount of money within a certain app that is downloaded for free by users. Gradually, year-by-year in-app purchases began to take over other monetization models and by 2017 over 50% of mobile app revenue was generated via in-app purchases (Dogtiev, 2018). Moreover, in order to increase app revenue developers also turned to placing ads within apps, as applications have also become a dynamic space where consumers actively receive information and data. In-app

ads have different formats including display, video, social, and search ads, with the highest revenue generated from mobile video ad formats. In terms of revenue from in-app ads, data from Business Insider (2014) point out to mobile video ad revenue in the US, forecasting a revenue of over $4.4 billion in 2018, up by a five-year compound annual growth rate of 73% from 2013; a growth five times faster than desktop. Some reports also provide further insight on revenue by different app category split. For the last 6 years, gaming apps beat all others categories by a big margin. In 2013 games were generating 74% of the total app revenue but by 2017 their contribution went down and constituted just 49%, so games continue to be the major money-making category but its contribution to the total app revenue diminished. Among non-game categories growing categories include social networking, entertainment, medical and books (Dogtiev, 2018).

E-consultancy reports statistics on mobile app usage reveal that "time spent in apps grew 6% in 2017 with users spending an average of five hours per day on their smartphones" (Econsultancy.com, 2018). It also reveals that 'shopping' is a growing app category that increased by 54% from previous year, suggesting that consumers are feeling increasingly comfortable browsing and making in-app purchases (Gilliland, econsultancy.com, 2018). This increase in spending time on-apps results in higher advertising opportunities and higher consumer conversions. Gilliland (Econsultancy.com, 2018) reports that research suggest that impressions (ad views) in-app are far more valuable than on web. An Opera Mediaworks study found that apps produce more than double the CTR of web and 13.5x as much revenue.

The significant growth of in-app ads can be further explained with new technology breakthroughs that were introduced with the birth of the mobile. The answer

revolves around data, consumer data and insight. In-app advertising works well because it is enhanced by different kinds of data such as location data, and user mobile usage behavior data. CEO of mobile in-app ad platform Ubimo Ran Ben-Yair explains how location data is the first step in understanding context and increasing engagement within apps (Ben-Yair, 2016). In effect:

> Location unlocks the many rich layers of data which marketers can analyze, such as weather, local events, demographics, to get a full picture of what is going on at a certain location in real-time, mixing and matching these several 'real world' data layers allows marketers to create dynamic, on-the-go audiences. Combining all these data layers to find the right audience for your message is what makes in-app advertising truly effective. (Ben-Yair, 2016)

All this consumer data helps marketers to better target consumers. Geo-targeting is effective through accessing consumer location data via mobile, in addition to location-based targeting, Google and Apple have access that make tracking, attribution, and targeting better. Technology companies have abundant data on user behavior, what apps people have downloaded, and what people are likely to do (Chen, 2016). Combining all these consumer data with campaign tracking tools, in-app advertisers can become very powerful at building more efficient and effective advertising campaigns.

With a digital world economy reliant on data, mobile in-app ads have become more targeted and lucrative through the use more specific targeting tools. The latest 2017 statistics prove how global mobile advertising spending has jumped up to $107 million (Businessofapps.com, 2018). Moreover, in 2015 mobile ad spending constituted 50% of

the total digital spending of $60 billion, by 2020 it'll jump to almost 75% of the total digital media spending that is projected to reach $105 billion (Dogtiev, 2018).

2.2 Digital Advertising Sector in Lebanon

Globally, total ad spending has been on the rise, increasing by a compounded annual growth rate (CAGR) of 5.25% since 2008. Moreover, digital advertising had the fastest growing rate in the industry globally, with a CAGR of 15.93%, to reach $167.76B in 2015 (Blom Bank Invest Report, 2015). After reviewing global figures on the digital advertising industry, this section will go over the Lebanese market figures to understand the growth of the digital ad sector, thus the importance of this thesis.

The annual survey of the ad market by Arab World magazine and research firm Ipsos shows that ad expenditure in Lebanon totaled up to $174.1m in 2016, a decline of 8.4% from $190m in 2015. Yet, the ad industry grew by 4.5% in 2012, 1.9% in 2013 and 2014, but remained unchanged in 2015. This decline in ad expenditure reflects an economical struggle in Lebanon (Byblos Bank report, 2017).

Yet despite the economic hardship, Blom Bank Invest 2015 report shows an increase in demand for digital ads with a significant year-on-year growth. Digital ad spending in Lebanon reflects the highest CAGR (55.59%) among all other ad categories from 2009 till 2015. Arab Media Forum reports that the size of the Lebanese digital advertising market stood at $22.7M in 2015. Digital advertising has shown the highest compounded growth, followed by magazine and TV with lower CAGRs of 2.53% and 2.49%. The other categories of advertising saw declines in the budget allocated to them. This shift from the traditional to digital marketing in Lebanon reflects the embrace of the

internet and digital networks by Lebanese consumers with the increasing time spent over the internet. Moreover, this reflects the need for advertisers in Lebanon to shift to digital techniques that are growing in reach and the necessity to use digital advertising especially because of its accuracy in reporting quantifiable results that are the main drivers of the digital advertising sector (Blom Bank Invest, 2015).

A 2018 statistics report on Lebanon's key digital statistical indicators also reveals that mobile internet users comprise 82% of the total population with increasing numbers of active mobile social media users with 3.6 million people tuned to their mobile smartphone, a 59% penetration of total population of 6.09 million (United Nations, U.S. Census Bureau, Internet World Stats, 2018). The increase of mobile social media users in Lebanon reflects a significant 16% increase since 2017. The share of web traffic by device is distributed as 51% on desktop, 46% on mobile phones, 3% of tablets and 0.07% on other devices (2018). Google.com.lb ranks number one in the ranking of top websites Facebook, Instagram and Aliexpress websites rank as numbers 4, 12 and 16 respectively according to the 2018 report. In addition, the total number of monthly active Facebook users in Lebanon is 4 million, 90% of which access this app from their mobile phones. Digital advertising is becoming a lucrative market. Due to its ease of use, efficiency in targeting, and accurate reporting of campaign results, this market will continue to flourish, providing new services for the advertisers that other platforms cannot offer.

The significant reports on digital ad spending and mobile usage figures in Lebanon further accentuate the need for marketers to understand how consumers perceive digital ads, how they react and behave after being exposed to them, and how targeting plays a role in affecting consumer attitude and behavior toward in-app ads. This thesis

aims to fill the gaps in consumer behavior research concerning mobile in-app ads in Lebanon to further understand how this increasing number of users perceive in-app ads and behave towards them. The coming sections in the literature review will examine previous research done on consumer attitude toward mobile ads, and how the targeting tools play a major role in affecting these reactions plays.

2.3 Consumer Attitude toward Mobile Ads

The previous literature review section showed how mobile usage has permeated consumers' lives and how media consumption on the mobile devices has evolved, leading to an increase in ad consumption through mobile devices. It also revealed real figures on the advertising industry growth on mobile devices and more specifically in-app advertising. It also showed the year-on-year increase in ad revenue on mobile and in-app.

The growth of ad consumption on mobile device and the increase in revenue it generated require a look at the consumer targeted by the ad. It is imperative that marketers understand how consumers perceive ads within an app's dynamic environment. In addition to understanding consumer attitude towards in-app ads, studies (Merisavo, Vesanen et al., 2006; Tsnag, Ho, & Liang, 2004; Ketaki, Varsha & Subhadip, 2013; Jingjun Xu, 2006) have also covered consumer behavior following ad consumption in app. These studies will help understand the key factors affecting consumer actions directly connected to conversion and real marketing return on in-app ad investments.

Mobile advertising effects on consumers has been the topic of study of many academics and field experts. The studies led to varied conclusions. Merisavo, Vesanen et al. (2006), studied the impact of permission request from consumers prior to exposing them to mobile ads (SMS ads) on consumer daily mobile service expenditure. The study

was done in Finland using an experimental methodology on 5500 random Finnish customers with half of the customers in the sample who had given their permission for mobile advertising and had received promotional messages and the other half of the sample customers who had not given permission or received any messages. Findings show a significant difference in consumer daily expenditure when exposed to permission-based advertising using SMS versus consumers who were not exposed. The analysis of the impact of SMS mobile advertising on customer's purchases reveal that mobile advertising can sell more mobile services. The study also examined how mobile ads work differently for different types of customers. Service usage levels (heavy, medium, or light) is a variable affecting the effectiveness of mobile SMS ads on these customers. Heavy users of the company's mobile services brought in the highest gains in terms of sales. However medium and light users reflected the highest proportional gains (Merisavo, Vesanen et al. 2006).

Permission-based advertising was also investigated in Taiwan in 2004, through a quantitative methodology with 430 surveys distributed to random people in three train stations in Taiwan. The 380 returned questionnaires revealed a sample that included 181 males and 199 females with 85% under age of 30, 76% having a college degree, and 60% who were students; this indicates that the respondents were primarily young and well educated (Tsnag, Ho, et Liang, 2004). The main Taiwanese study topic revolved around consumer attitude toward mobile advertising and the theoretical framework that guided this research was Fishbein's theory of reasoned action (TRA) that researchers used to develop their own research framework model and five hypotheses. Findings revealed that respondent attitudes toward mobile advertising were negative. However, permission-

based advertising resulted in a positive attitude, whereas unauthorized spamming generated a negative attitude. (Tsnag, Ho, and Liang, 2004). Other variables such as product characteristics or type associated with mobile display ads (MDA) effectiveness were studied between 2007 and 2010, revealing that MDA campaigns significantly increase consumer positive attitude and buying intentions for products that are categorized as high involvement and utilitarian (Bart, Stephen, & Sarvary, 2014). This can imply that products that are more connected to consumer needs not emotional wants and that are of high involvement are products that trigger favorable attitudes and higher purchase intentions when advertised on MDAs.

The attitude model toward web advertising that was developed in the previously discussed Taiwanese study investigated consumer attitudes toward receiving mobile SMS-based mobile advertisements and the relationships among attitude, intention, and behavior (Tsnag, Ho, & Liang, 2004). The model showed how the variables of informativeness, entertainment, credibility, and irritation were all related to developing attitudes towards SMS mobile ads. Entertainment, informativeness, and credibility were positively correlated to the overall attitude, whereas irritation was negatively correlated to the overall attitude. Results also showed that entertainment was the major and most significant factor affecting attitude, followed by credibility (Tsnag, Ho, & Liang, 2004). This study's implications indicate how the general attitudes about receiving mobiles ads are negative, unless the ads were sent with prior permission thus generating more favorable attitude. The study also showed how attitude is positively correlated to the intention to receive mobile ads, the latter being positively affected by incentive associated with the ad, as respondents were more willing to accept incentive based

mobile advertising. Finally, intention significantly affected how and when the respondents read the message. This is also consistent with Fishbein's theory of reasoned action that will be further developed in the methodology chapter (Fishbein, 1970).

Studies on consumer attitude and mobile ads further extend to different cultural backgrounds with Ketaki, Varsha and Subhadip studying generation Y's (people born in the year gap 1980-2000) orientation toward mobile applications and in-app advertising in India in 2013. The methodology used for this study was qualitative. Using in-depth interviews and focus group methods the key factors that were examined were credibility, permission, control and incentive. Results showed that Gen Y's attitude to in-app advertising was influenced by involvement with the app, hindrance caused by the ad, screen size, contextualization, personalization, relevance, and permission (Ketaki, Varsha & Subhadip, 2013). The key question was to examine what develops Gen Y's liking & preference toward mobile ads. Study findings emphasized that Gen Y did not mind in-app ads, but they did have a preference towards ads that were based on involvement with the application. So the advertisement targeting in-app should be related to the type of app the user is engaging with, thus reflecting ad placement importance. Other findings show that Gen Y preferred in-app ads that were less intrusive, relevant to the app context, personalized and useful. In-app ads also lead to higher brand recall that is associated with purchase intention (Ketaki, Varsha & Subhadip, 2013). This study further extends to findings related to mobile in-app ad format preference. Gen Y consumers prefer click-to-expand ads rather than ads that redirect them to another page, and prefer interactive and engaging story-based ads in gaming apps. Finally, targeting was also examined to reveal that Gen Y like geo-targeted ads only through especially targeted applications controlled

by consumers. This study shows that consumers have positive attitude defined by "liking", toward ads that are relevant, personalized, not intrusive and geo-targeted. So the better the context, relevancy and personalization of the ad message, the more it is positively perceived by consumers, thus the more positive the intention to behave towards it.

Other studies examined the personalization factor on consumer attitude toward mobile ads. The results of a study in China indicate that personalization is one of the most important factors in affecting consumers' attitude toward mobile advertising, particularly for female users. The study was carried out through a field survey method in 2005 utilizing a convenience sampling with a questionnaire designed to collect data regarding factors that will affect consumer attitude and intention toward mobile advertising. The framework used in the Chinese study relied mainly on a previous research by Tsang et al. (2004) that correlated entertainment, credibility, irritation and informativeness to consumer attitudes toward mobile advertising. Findings from this research also showed how attitudes toward mobile advertising were not highly favorable but attitudes improved if the message were personalized, thus implying that personalization plays a very important role in affecting people's perception toward mobile advertising (Jingjun Xu, 2006). Those who are more favorable toward personalized mobile advertising have higher intentions to shop after receiving mobile advertising and are more willing to disclose personal information to get personalized mobile advertising; they also tend to perceive that mobile advertising is more personalized, entertaining, informative, credible, and less irritating. In terms of personal information disclosure, those whose attitudes toward mobile advertising were more favorable (44.5% of

respondents) were more willing to disclose personal information. Finally, in terms of demographics, the study reached a conclusion that female respondents believe that personalization is the most important factor in mobile advertising. For male respondents, entertainment is still the most important variable. Hence, personalization is particularly favored by females and entertainment is emphasized by males (Jingjun Xu, 2006).

The idea of personal information disclosure over the web has become very substantial to marketers. Whenever it is possible, web surfers are asked for their permission to use cookies on any website they are browsing. Cookies are:

> A mechanism to identify your computer out of the millions of users accessing the Internet. The information contained in a cookie is used to track a user's activity when visiting pages online, but the user needs to give permission before a site can store a cookie on the machine (allaboutcookies.org, 2018).

These cookies help marketers gather user browsers' behavior while visiting websites. Similarly, consumer data is also tracked and collected through mobile applications and data is sold to third-party companies that are subsidiaries to Google. The Financial Times (2018) reviewed a study by Oxford university researchers on how smartphone applications track data and share them with Google. "1m Android apps has revealed how data from smartphones are harvested and shared, with nearly 90 per cent of apps set up to transfer information back to Google" (*The Financial Times*, 2018). Data collected by third parties through smartphone apps can include anything from profile information such as age, gender, location details, including data about nearby cell phone towers or Wi-Fi routers, and information about other apps on user's phone. As reported in the article, the FT app was one of the apps analyzed by the researchers, finding out that it sends data to

seven third parties. A spokesperson for the FT (2018) said: “We send data to these providers to enable services such as push notifications, crash tracking, Google sign-on and personalized advertising.” These third-parties collecting the wide data from in-app are mostly companies that are parent to Google such as Alphabet, Facebook, Twitter, Verizon, Microsoft and Amazon. (Ram, Wisniewska, Kao, Rininsland, & Nevitt, 2018). So in-app data collection is widely used by these big technology corporations for the sake of retargeting the users of these applications to sell their own products. One of the computer scientists leading the Oxford research, Reuben Binns explained how most of the applications that are now downloaded for free rather than being sold on Google play are making revenues from advertising which in turn are led and targeted to users through the data gathered on their usage behaviors. “Users, regulators of even app developers and advertisers are unaware of the extent to which data flows from smartphones to digital advertising groups, data brokers and intermediaries that buy, sell and blend information” (The Financial Times, 2018).

From this section on consumer attitude toward mobile ads, it can be noticed in several studies that factors such as permission, entertainment, personalization, relevancy and contextualization lead to more positive consumer attitude toward mobile ads, whether they are SMS-based, or in-app ads. By definition, personalization is a means of meeting the customer's needs more effectively and efficiently, making interactions faster and easier and, consequently, increasing customer satisfaction and the likelihood of repeat visits (Techtarget.com, 2012). The studies also showed that contextualization and relevancy, also variables studied to positively affect consumer attitude towards mobile ads, are both concepts related to targeting. Targeting has been applied since the very early

marketing stages (SmartInsight.com, 2018). Targeting has also been applied to digital marketing with the development of new tools that provide digital marketers with precision in selecting a target audience. Consumer data, today's treasure is harvested and monopolized by the biggest tech and data corporations such as Google that use this information to successfully target more web users through their smartphones and via the web. Thus, the following literature will cover previous studies on the targeting effects of mobile in-app ads in order to better contextualize the framework of our study.

2.4 Targeting Effects on Consumer Attitude & Behavior through In-App Advertising

As covered by the previous section, consumer attitude toward mobile advertising is linked to several factors such as entertainment, personalization, irritation, and relevancy. Personalization is one of the key factors leading to positive attitude toward mobile ads, thus nurturing positive intention to act or behave upon the viewing of ads on mobile smartphones. To further understand the effects of advertising targeting in-app, and to extend our understanding on the topic of targeting in Lebanon, some targeting techniques such as Geo-Targeting were reviewed. Geo-targeting defined by marketingterms.com, is the method of determining the geo-location of a website visitor and delivering different content to that visitor based on their location. This includes country, region/state, city, metro code/zip code, organization, IP address, ISP or other criteria. Geographically targeting consumers has been proved to be efficient to many brands who have mastered their mobile campaigns based on location data. A mobile geo-location is identifying the real-world geographical location of an object through either GPS tracking or inbuilt data transmitting ability of smart devices. Mobile identifier

locates smartphone devices' position and reports it to ad servers that maintain a database of location data and ad campaigns. When receiving location updates from a device these ad servers send relevant ad notifications to it. The objective is to draw the customer to the brand's point-of-sale (Smart Insights, 2015). Several case studies on successful mobile geo-targeted campaigns have led us to further investigate its implications on consumer attitude. One of these case studies reported by streetfightmag.com, shows how e-commerce brand Purple Mattress generated higher click-through rates when it ran Facebook ads with content that is targeted based on users' geographic locations. "Purple Mattress' conversion-focused campaign, which ran on Facebook, Instagram, YouTube, and the Google Display Network, targeted consumers in warm weather locations. By personalizing the advertising message to include the city name and a reference to the current weather—for example, including the words "start sleeping cooler" in an ad during periods of hot weather, Purple Mattress was able to generate higher click-through rates" (Miles, 2017). Another example is the Urban Outfitters brand that leveraged location data to better understand and target its customers' behaviors. For example, the company sent push notifications promoting party dresses to females who had recently visited bars and nightclubs. The targeted campaign resulted in a 75% increase in conversions and a 146% lift in revenue (Miles, 2017).

Many updates and developments made use of the benefits of the targeting feature including the introduction of the "Geo-Fencing" & "Geo-Conquesting" concepts. Geo-Fencing is building a virtual fence around a geographical location to send advertisement messages within that area. If this perimeter is constructed near a store, customers who happen to fall within the perimeter receive these marketing messages (Smart Insights,

2015). Geo-Conquesting is the concept of targeting competitor's audience by building a geo-fencing around their competitor store such that when consumers enter the competitor store, they automatically receive alluring offers from the advertiser's store.

A study on the effects of geo-conquesting on consumer behavior was performed in a large city in Asia in 2015 to reveal competitive locational targeting effects on consumer, here defined as geo-conquesting. The study used a field experimentation method with a movie theater advertiser. The experiment was done by running an ad message for a discounted movie voucher valid only on the day of the offer. Since movie screenings are consumed on-site, location of the recipient was assumed to affect response. Mobile customers were offered discounts for the immediate purchase of a special offer via SMS, and the discounts offered were at three levels: low discount = 20%, medium discount = 40%, high discount = 60% (Fong, Fang, Luo, 2015). The experimentation of the effects of the location targeting on consumer behavior to the ad was studied through location targeting of the mobile ad in three different locations:

1. Focal retailer targeting (consumers who are inside or nearby the advertiser store)
2. Competitive locational targeting (consumers who are inside or nearby the competitor store)
3. Benchmark location (location that does not have neither retailer shop nor competitors nearby

Results of the study show that competitive locational targeting can take advantage of heightened demand that a retailer would not otherwise capture. Geo-conquesting or competitive locational targeting produced growing returns to promotional discount, however targeting the focal location produced decreasing returns to deep discounts,

indicating saturation effects and profit cannibalization, (Fong, Fang, Luo, 2015) which refers to a reduction in sales volume, sales revenue, or market share of one product as a result of the introduction of a new product by the same producer. The study also provides evidence that competitive location targeting represents a real-time demand hotspot, as the advertisement is directly targeting a consumer who is actively in search of a product similar to the retailer's offering. More specifically, the study outcome shows that the higher the incentive of the promotion, the more positive the response to it, as competitive groups showed a positive locational targeting effect at medium and high discount depths. Mobile advertising at the focal retailer's location show a positive effect at all three discount rates offered (low, medium, and high).

Finally, by comparing consumer attitude results in both locations study findings show that the focal location targeting results in a higher purchasing rate than the other two locations, at all discount depths. Competitive location targeting produces a higher purchasing rate than the benchmark location but only at the high discount depth, although the benchmark location is closer. This study proves how effective location targeting is in-app and through geo-fencing techniques; but we should note that permission should be taken from users to use his location information (Fong, Fang, Luo, 2015).

Geo-targeting was also tested through several advertiser campaigns with results showing the effectiveness of geo-conquesting and how it drove to a collective increase in foot traffic to more than 7,000 store locations. The results showed that geo-conquesting led to a 30% higher click-through rate than standard geo-fencing (Walsh, MediaPost, 2013).

In addition to geo-targeting, Nielson studies show the positive effect of in-app ads on certain audience profiles. Following the analysis of 40,000 US mobile campaigns (including web and in-app) in 2016, research reveals how 60% of these campaigns reached their intended audiences, and led to an increase of 11% from 2015. Mobile campaigns were also found more effective for reaching narrow audiences, or more niche customers, as targeting people between 18 to 35 had a 63% on-target percentage on mobile, compared to 53% on desktop. This may be the result of the nature of mobile devices that are more personal than desktops (Elder, 2016).

2.5 Advertising Frequency Effect on Consumer Attitude and Ad Effectiveness

The definition of mobile advertising effectiveness has been a challenge to marketers and digital marketing experts for the last few years, as effectiveness has been the study subject of digital gurus who reviewed digital campaign effectiveness with different measurements such as views, clicks, conversions, leads, and more variables defined by a set of digital metrics such as CTR (Click-Through-Rate) that shows the percentage of users who click the ad after seeing it.

A 2011 study in Malaysia on advertising effectiveness evaluated the concepts of liking, recall and Click-through rate on purchase decision. The study found that all three measures: 1) attitude towards ad, 2) ad recall, and 3) CTR were significant predictors of ad effectiveness. The most important predictor was ability to recall online ads, followed by frequency of clicking online ads (CTR) and lastly attitude or liking toward the ad (Lim, Yap and Lau, 2011). The methodology of the Malaysian study was quantitative using a convenience sampling method with questionnaires distributed to 200 employees

at a private university in Malaysia. Findings also reflected how receptive Malaysian consumers are to Internet ads. They research information online for products and services and that is why research recommendations for Online marketers and retailers was to place more attention on the design, usefulness, and integrity of online ads to promote a positive attitude toward online ads among the consumers (Lim, Yap and Lau, 2011).

The concept of advertising frequency was linked to ad effectiveness since the days of traditional media with studies dating from the early advertising days. "The Impact of Television Advertising: Learning Without Involvement" was the study that declared a 'three hit theory' implying that that there should not be more than three levels of frequency exposure in order for an ad message to successfully make it through the three psychological levels of message receipt: Curiosity, recognition and decision (Herbert Krugman, 1965). However, the dynamics of media have changed along with the market competitiveness shifts and the introduction of the web and e-commerce. Since then, marketers and media planners have been trying to find the optimal ad frequency that offers maximum efficiency in exposure and cost effectiveness. With the immense amount of time spent online, the quantity and frequency of advertising messages that a user gets exposed to is exponentially increasing with the increase of exposure time. Although, there is no research on a specific optimal frequency, many studies overlooked how frequency affects online consumer attitude, thus affecting ad effectiveness in terms of conversion and cost. An online conversion rate is the percentage of users who take a desired action on a website. It is the percentage of website visitors who buy something on the site. For example, an e-commerce site visited by 100,000 people with 2,000 users

purchasing something; site's conversion rate is 2,000/100,000 = 2% (Nielson, NNGroup.com, 2013).

Research on digital ad frequency effectiveness done in the year 2000 designed a field experiment to evaluate the changes in sales leads or conversions resulting from shifts in frequency of ad exposure. The research was done in two experimental stages to explore the relationship between ad frequency of exposure and ad effectiveness. Two case studies demonstrate this relationship for campaigns with different basic marketing approaches: direct response marketing versus brand building (Broussar, 2000). The two experimental stages were:

1. Single site analysis: Evaluation of one site with significant changes in impression levels and unique visitors to clearly illustrate their effects on leads.

2. Multisite reallocation of advertising weight: Using the learning achieved in Stage 1, optimize a full schedule of sites to achieve more leads per dollar spent.

Stage 1 of the experiment resulted in finding that best advertising results (lowest CPL-cost per lead defined by a conversion made on website) were achieved when frequency of banner exposure was relatively low. Also, results were poorest (highest CPL – cost per lead) when impressions were unusually high, and, therefore, frequency levels were high (Broussar, 2000). Lower frequency levels improved the rate of response, thereby lowering CPL, subsequently the cost per impression (the number of times an advertisement is seen by a user) was lower and the rate response higher. In the experiment's last few weeks, the advertising banner impressions were increased to match competitive pressure. This growth in advertising weight proved to be overkill as response

rates declined. Also, cost per lead rose dramatically. Consequently, the best results occurred when frequency levels were relatively low compared to a bombardment of repetition (Broussar, 2000). In general, the study showed that direct response campaigns require a lower level of advertising frequency to achieve campaign objectives compared to branding programs. When establishing advertising frequency goals, media planners should consider to what extent a campaign strategy is direct response as opposed to brand building. Brand building goals need higher ad frequency.

A survey about in-app ad frequency concerns was undertaken on a sample of mobile game professionals. Results were displayed in a blog post on the Mobile Marketer website revealing that 36% of the surveyed sample mentioned that a high frequency of in-app ads could result in less player engagement and lower levels of player enjoyment (Carr, n.d.). Moreover it was advised to integrate two to three strategically placed ads within specific formats rather than over-stuffing the app with ads to drive app revenue. To extend user engagement, the study advised to use native ad formats that come in a variety of formats, from video ads to rewarded video ads, and even static display. As the article stated:

> Native ad simply refers to the right placement of the ad within an app, so that it complements the app environment by matching its look and feel, fits the game flow, and does not cover important screen space, block or prevent an action, or further disrupt a player by popping-up unexpectedly (MobileMarketer.com).

Moreover, a standard practice in digital ad frequency is frequency capping which is setting a ceiling to the maximum number of ads a user is exposed to. Standard numbers

tend to be 3 views per visitor per 24 hours. This means if a specific user views an ad three times, the ad will no longer be displayed for that individual for the next 24 hours. Frequency capping is an option that Advertising Networks are offering as a targeting option across their platform (Quora.com).

Adage.com also discussed frequency capping and in-app ad frequency in an article by Jack Neff (2018) who revealed how multinational brands like Procter and Gamble are using this technique. Procter & Gamble said it tried not to show its digital ads to people more than three times a month finding success in capping digital ad exposures at three monthly as they believed they reached more people fewer times, and that it worked better. Moreover this digital media planning approach helped P&G produce its best quarterly organic sales results in five years last quarter (up 4 percent) on 6 percent lower marketing spending. Facebook research, done in conjunction with Oracle and based on tracking sales response to ads for packaged-goods products, found that the ideal average exposure frequency was one to two impressions weekly over at least 10 weeks for a campaign. That was according to Lisa Barnes, marketing science partner at Facebook. Barnes suggested that an ideal of four to nine exposures monthly, in some product categories, may be optimal (Adage.com, 2018). A 2016 Marketing Evolution study for the Mobile Marketing Association, found three exposures to be generally optimal for mobile ads, compared to 12 to 15 for cable TV over the life of a campaign (Adage.com, 2018).

Overview: Literature reviews how targeting and frequency affect user attitude towards mobile ads. Moreover, with the significant numbers of mobile users in Lebanon, and the lack of studies on how Lebanese consumers perceive these ads, and behave towards

them, this thesis outcome is essential in the contribution to the literature on mobile in-app ad studies in Lebanon.

3. Theoretical Framework

This section will develop the key components of the theory of reasoned action used for the development of the thesis paper, also going over other studies that used this theory to discuss the topic of mobile advertising. Moreover, the model of the TRA will be explained to be used later in the development of a new consumer behavior model adapted to the digital environment. Hypotheses and research questions will also be advanced in this section.

i. Theory of Reasoned Action

The theory of reasoned action was developed to explain how a consumer is lead toward a certain buying behavior (Fishbein, 1980). The theory of reasoned action asserts that attitude toward buying and subjective norm are the antecedents of performed behavior. The two antecedents (attitude and subjective norm) influence the purchase behavior additively. Subjective norms are also defined as the social influence inflicted on the behavior. These are the opinions of the social surrounding such as friends and family. Attitude is defined as an "overall evaluation that enables one to respond in a consistently favorable or unfavorable manner with respect to a given object or alternative" (Kumar, 2000, p.184). Attitude is also defined by Churchill and Iacobucci (2002) as an individual's "preference, inclination, views, or feelings toward some phenomenon" (p.261). Attitude towards advertisements is "a learned predisposition to respond in a

consistently favorable or unfavorable manner towards advertising in general" (MacKenzie and Lutz, 1989, p.54).

Attitude is a very important concept in marketing research and consumer insight analysis. Fishbein (1975) defined an attitude as "a learned predisposition of human beings." Based on this predisposition, "an individual would respond to an object (or an idea) or a number of things," thus as a response to an attitude, action can be taken by a consumer. Fishbein & Ajzen (1975) further developed research on the theory of reasoned action to postulate that behavior is a function of behavioral intentions that are, in turn, a function of attitudes and subjective norms. (Figure 1)

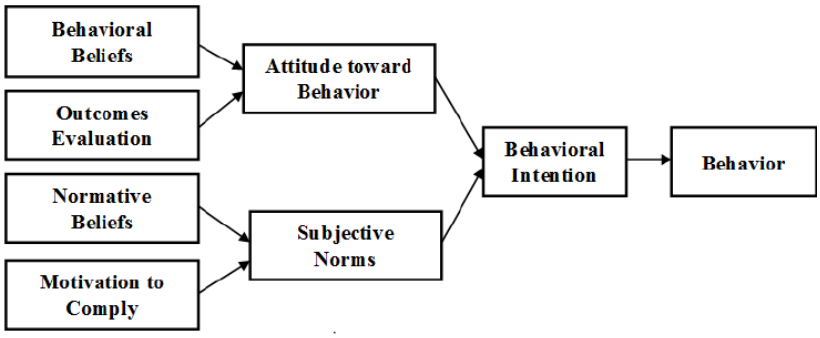


Figure 1: Theory of Reasoned Action – TRA (Fishbein & Ajzen, 1975)

Kotler (2000) also stated that "an attitude is a person's enduring favorable or unfavorable evaluations, emotional feelings, and action tendencies toward some object or idea". Hence attitude is a major factor affecting consumer actions.

This thesis applies the TRA model by testing how consumer behavior is a consequence of behavioral intention which is partly affected by consumer attitude toward in-app advertisements. The thesis studies the consumer attitude (positive or negative) towards an in-app ad by asking consumers about advertising within mobile apps & by measuring their willingness or intention to click on these ads. Also in the realm of digital

marketing, this study brings forward two variables: targeting & frequency. These two variables are investigated to measure how each can influence both attitude and behavioral intention.

Theory of reasoned action (TRA) also investigates important improvements to previous theories on attitude formation and behavior. Previous theories such as the theory of information integration (Anderson, 1981), implies that behavior is a direct result of attitude, however, reasoned actions add a new element in the process of persuasion, which is the element of behavioral intention. Noting the nature of this thesis paper that is not experimental but rather quantitative using survey method, the behavioral intention variable will play an important role in conducting this study and being able to predict consumer behavior. The questions asked in the survey expose consumers to specific mobile ad-related scenarios, to then ask them about their intention or willingness to take a specific action or behavior which is defined as behavioral intention. This study also opens doors to further extend research on the topic by implementing experimental techniques to test effects of frequency and targeting on actual behavior.

The theory of reasoned action also recognizes that there are factors or situations limiting the influence of attitude on behavior, such as financial and social that affect attitude and behavior. Thus attitude (liking or not liking) is not the only factor affecting a person's behavior as other factors also get into the way to alter behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). In this thesis, two major factors or digital marketing elements are studied to examine how these two shape or limit the influence of attitude on behavior.

In the framework of the TRA, the thesis investigates these two digital marketing factors that separate "attitude toward a mobile ad" from "intention to click on a mobile ad" by examining consumer attitude & consumer behavioral intention within the digital media scheme. Moreover, these two concepts targeting & frequency will be probed to develop an attitude model that is more akin to the digital marketing domain, thus, adding additional constructs such as targeting or frequency that are specific to the formation of consumer positive or negative attitude, and behavioral intention towards an ad within the digital consumer/advertiser interactions.

The implications of the TRA will be utilized in this thesis to further explain the relationship between attitudes and behavioral intention of consumers after experiencing in-app mobile ads. The above TRA model will be used to guide the formation of an adapted model introduced to test the variables affecting attitude that are under study in this thesis. The model will be further developed in the data analysis section of this thesis by examining these two variables' effect on attitude. The two previously introduced variables are targeting & frequency. These two concepts previously defined in the literature section, will be tested to understand their implications on the formation of attitude, then the behavioral intention that results from attitude and can be translated by clicking on the advertisement or visiting an e-shop. So, assuming that an in-app advertisement is interesting to a consumer and well-targeted toward his/her interests and needs, would a consumer have the intention to interrupt his in-app activity to click on the ad, hence take action or make a conversion? So does in-app ad targeting affect attitude positively, and correlate with the positive intention of behavior that is translated by taking a positive action such as clicking on the ad to visit the website, or download an

application? All of these latter actions translate the effectiveness of an advertisement modeled within the TRA.

The emergence of the internet has led to a substantial amount of research that focuses on internet advertising. Studies deal with consumer attitudes toward Internet advertising on the web. Some surveys report that respondents perceive internet ads as more informative and trustworthy than a similar traditional advertising (Schlosser, Shavitt, & Kanfer, 1999). The factors of informativeness and entertainment are important elements defining web ad effectiveness (Ducoffe, 1996; Aaker et al., 1992). Adding onto entertainment and informativeness, other factors previously discussed in the literature review, such as irritation from advertisements also influences users attitude toward them (Ducoffe, 1996). This is consistent with earlier research findings that interesting and pleasing ads have a positive impact on consumers' attitudes toward a brand (Mitchell et al., 1981; Papacharissi et al., 2000).

This thesis will not deal with the informativeness & entertainment parameters that affect attitude, but will rely on the theory of reasoned action to investigate new parameters by studying the correlation between targeting and frequency on user attitude toward in-app advertisements and consumer behavioral intention defined by the willingness to take action after seeing an advertisement while being engaged with an application.

The type or category of application used will also be covered within the scope of this thesis which investigates the effect of app type or category on the in-app ad attitude formation. Social media targeting professionals categorize applications in order to define which types of apps are increasingly consumed by defined target audiences. Apps are

categorized by functionality (duckma.com, 2019); for example a common breakdown would be into six major types: lifestyle apps (such food apps, fitness apps, music apps), social media apps (such as Facebook, Pinterest, Instagram), utility apps (such as weather, flashlight, calculator), gaming/entertainment apps (such as PubG, Candy Crush), productivity apps (such as e-banking apps, or photo editing apps) and news/information apps (such as Redit, LBC News, Google News).

The questions to be answered in this research paper would be: Is consumer attitude more positive when receiving ads within a type of application such as social media for example? Moreover, is consumer attitude toward an in-app ad correlated with the ad relevance to the application type for instance in case of receiving food delivery advertisements while consumer is using a food application? Several research questions to be answered will be further developed in the following methodology section.

3.2 Studies Applying TRA

Using Fishbein's TRA model, a Taiwanese study develops a framework to study permission-based advertising in 2004 (Tsnag, Ho, et Liang, 2004). The Taiwanese study used the model to introduce five hypotheses dealing with the perceived entertainment, informativeness, irritation, and credibility of mobile ads on attitude and whether attitudes are different for permission-based and general mobile advertising. Findings reveal respondents negative attitude towards mobile ads, but a more positively-skewed result for mobile ads that request permission prior to exposing respondents to mobile ads.

Another study examined Japanese consumers' attitudes toward ads on the mobile internet using a convenience consumer survey with undergraduates (Haghirian & Inoue, 2006). Using attitude models suggested by Ducoffe (1996) and Brackett and Carr (2001),

the study investigates the factors of entertainment, informativeness, credibility, irritation and gender in relation to attitude towards mobile advertising. Results show that Japanese mobile consumers perceive ads which contain little irritation and a high credibility as valuable. Informativeness had no influence on the perceived value of advertising on the mobile internet as ad value was mainly generated by entertaining message content. Japanese consumers' attitude towards ads on the mobile internet were positively influenced by high informativeness and credibility of the advertising message, but not so much by the entertainment factor. Unlike other studies, Japanese consumers relate a high entertainment factor negatively to attitudes toward advertising on the mobile internet. Informativeness and credibility were highly significant and positively related to attitude towards advertising on the mobile internet, information being the most influential factor on attitude (Haghirian & Inoue, 2006).

In the framework of the TRA, brand loyalty was also the subject of a research study by Choong Lyong Ha in 1998. The research studies conceptualize a presentation of the "unit brand loyalty" concept made by Jacoby and Chestnut (1978). Jacoby and Chestnut (1978) provided three kinds of observable property of brand loyalty: behavior, attitude and subjective norms. The study develops brand loyalty measures combining the three elements of unit brand loyalty. Following previous studies on brand loyalty that have been measured by one of these three properties, Lyong Ha developed combinations between these three properties to explain brand loyalty. Previous studies on brand loyalty have only featured the behavioral aspect of brand loyalty (e.g., repeat purchases) without considering cognitive aspects of brand loyalty (Lyong Ha, 1998). In Lyong Ha's brand loyalty model, the first property is behavior defined by the consistency in repurchasing of

the same brand over time. The second property of brand loyalty stresses on attitudes-brand loyalty being the property of psychological commitment (i.e., the beliefs, and feelings) that result in the consistent repurchase of the same brand over time. The measurement of brand loyalty in terms of attitude ignores the behavioral outcome, which can be completely opposite to the attitudes (Lyong Ha, 1998). In the brand loyalty study by Lyong Ha, the TRA model is used to integrate its underlying elements (attitude, behavior and subjective norm) of a consumer's purchasing behavior. In the combinations suggested by Liong Ha, when all of the three elements are shown favorable, the unit brand loyalty will be regarded as maximum and consumers who have both cognitive and behavioral aspects high level of brand loyalty will not easily switch brands. Marlboro was given as an example in the study to be identified as a high-loyalty product (Fisher, 1985).

Similar to the above brand loyalty study that utilizes the TRA model's components to examine the effects of each on the concept of loyalty, this research paper will use the model to study the effects of targeting & frequency on consumer behavioral intention to predict consumer behavior toward in-app ads.

3.3 Hypotheses

The hypotheses extracted from the TRA to be investigated in this thesis are the following:

H1: Positive attitude towards an in-app ad is correlated with positive behavioral intention toward the ad.

H2: Positive behavioral intention towards an in-app ad is highly linked to a positive behavior towards an ad such as clicking on the ad.

3.4 Research Questions

To further extend the TRA model for the sake of studying the topic of this thesis, and to be able to investigate how Lebanese consumers perceive digital in-app ads and how impactful these ads can be on their behavior, this study introduces two digital marketing concepts; targeting" and frequency that will be addressed in the following research questions to study their impact on attitude formation toward in-app advertisements:

RQ1: Does relevance or context of in-app ads to the application "type/category" relate to in-app ad impact?

RQ2: Are targeted in-app ads less intrusive to consumer mobile app experience?

RQ3: Do consumers have a positive a) attitude b) behavioral intentions towards targeted ads?

RQ4: Is high advertising frequency negatively associated with in-app experience?

RQ5: Is higher ad frequency positively correlated with consumer clicking on the ad?

4. Research Methodology

This chapter will discuss the research design, sampling method, operationalization of the variables under study, data collection and analysis methods, and the validity and reliability of the study.

4.1 Research Method

For this study, a quantitative research was used. Quantitative research is statistical and it's about numbers percentages and quotas, while qualitative research uses non-

statistical methods (Andale, 2016). To examine the hypotheses and research questions of this research paper, a survey was administered to adults between the ages of 18 to 34 who actively use their mobile smartphones and are likely to use the applications on these phones. Therefore quantitative methodology is most appropriate for this thesis because the numeric data from the survey responses can be analyzed to derive important consumer behavior facts in regard to the subject of in-app ad attitudes and behaviors.

4.2 Research Sample

A non-probability sample was chosen. The convenience sample is composed of Lebanese males and females aged 18 to 34 who actively use mobile applications and are consequently exposed to mobile ads. The choice of the sample age group 18 to 34 was due to the Ipsos study published in 2017 on the demographic split of mobile application users (Google Mobile App Growth report, 2017). Study divided app users into four categories: game app users, news app users, entertainment app users, and sports app users. The highest percentage of gaming app users were aged between 18 to 34 years with 50% of app penetration by this age range. As for the entertainment the highest penetration rate was for users aged between 18 to 34 with 51% and 49% rate respectively for males and females.

For this study, the sample consisted of 202 participants. The respondents were demographically divided as 62.4% females and 37.6% males. The widest respondent age bracket was 25 to 34 with 64.4% of respondents belonging to this age range. 27.7% aged 18 to 24, 6.4% aged 35 to 44 and only 1% aged 45 to 54. As for mobile app usage patterns and preferred application, time spent on mobile apps was mainly categorized into three big groups with 34.7% spending more than 3 hours daily on apps, 34.2% of

respondents spend 2 to 3 hours, 21.3% spend 1 to 2 hours. Only 5.9% of respondents spend 31 to 60 minutes on mobile apps. As for the smallest group who spend the least time on mobile apps (0 to 30 minutes), they form 4% of the total respondent pool analyzed.

When going into the types of applications that consumers used the most, several items were listed in a check list which respondents can choose from. Social networking was on top with 95% of respondents using these apps, messaging apps came in next with 79.2%, 40% use gaming apps, 34.7% use online shopping applications, 30.7% use food apps, 21.3% use news apps, 18.8% use photo or video editing apps and 13.4% use applications related to social media such as boomerang.

4.3 Research Tool

The sample was contacted by sending out a link to the questionnaire through a post on social media platforms or through the Whatsapp mobile messaging app. The questionnaire included both open-ended and closed ended questions about experience with in-app mobile advertisement and how these ads affect attitudes and behavior towards the ads and the mobile app experience. The participants approximately spent 15 minutes to complete the survey questions. Participation was voluntary and responses were anonymous and only used for academic purposes. Consent was established before the start of the online survey by clicking the "next" button in agreement with the consent statement. Once participants agreed to take the survey, they were asked to fill out the questionnaire. The survey included questions to screen for whether they used mobile apps. If they answered, no they were directly notified to stop and thanked for their

participation. When participants answered yes, they were asked to answer all the questions that followed.

4.4 Variables

This section will define the dependent and the independent variables that were tested for each hypothesis and research question. Moreover it will include a brief conceptual and operational definition for each variable in relation to the study frameworks.

- ***Advertisement impact (ad impact):*** advertisement impact is often defined as the influence that an ad has on the decision-making process of a given consumer. This influence on the consumer is a behavior-oriented pursuit that marketers wish to alter (Pendleton, Smallbusiness.com). In order to test RQ1 and to operationalize ad impact in relation to application relevance, two scenarios were presented to the respondents as per the following: scenario 1"while using a certain type of app (ex: a movie app), a random advertisement pops out" and scenario 2 "while using a certain type of app (ex: a movie app), a targeted ad related to the app pops out". Respondent were asked to rate different statements through a Likert-type scale from 1 = strongly agree to 5 = strongly disagree with statements defining their behaviors such as "I would most probably click on this advertisement" and "I would skip this advertisement" ($\alpha = 0.9$, $M = 2.74$).
- ***Ad intrusiveness:*** Advertising intrusiveness is an in-app experience that is conceptually defined as the process that prompts undesired behaviors of spectator (e.g., advertising avoidance) as well as attitudes contrary to those that advertisers hope to achieve. It also leads to diminished advertising efficacy in terms of consumer

decrease in positive attitudes towards the message and brand, and declined purchasing intention (Rejón-Guardia, Martínez-López, 2014). Ad intrusiveness was operationalized through a number of statements that respondents were asked to rate through a Likert-type scale from 1 = strongly disagree to 6 = strongly agree with statements such as "I am annoyed when receiving irrelevant ads during mobile app usage", "I am less annoyed when receiving ads that interest me during mobile app usage", and "I do not mind receiving ads during mobile app usage, only if these ads are targeted towards my interests" ($\alpha = 0.813$, $M = 3.036$, $SD = 0.555$).

- ***In-app experience:*** is explained by smartinsight.com as the several components of an application that make consumers spend more time of it and enjoying they time while using the application by getting the most out of what they are searching for while using this application (SmartInsight.com, 2018). In-app experience was operationalized with a number of statements such as "I am annoyed or irritated when receiving irrelevant ads during mobile app usage" & "I feel that advertisements ruin my mobile application usage experience". Respondents were asked to rate these statements through a Likert-type scale from 1 = strongly disagree to 6 = strongly agree.
- ***Targeted ads*:** Targeting is how advertising placement on mobile devices & in-app are knitted in a personalized way to optimize effectiveness. Targeting can be geographic, demographic, behavioral, and seasonal. Targeting is operationalized to test RQ2 through statements directly stating whether ads are targeted or not by mentioning targeted ads & untargeted ads. Also terms such as "irrelevant" ads or "ads that are not targeted to your interests" are used to define untargeted ads. This variable

was also operationalized through Yes or No questions such as “Would you like to receive location-targeted ads? (e.i: New movie release ad, while you are nearby the cinema theaters / or ad about the new collection (or sale) from your favorite clothing store while you are shopping at the mall?)” ($\alpha = 0.855$, $M = 2.718$, $SD = 0.825$).

- ***Mobile in-app ad Frequency***: refers to how often an advertisement appears to a single user in a certain time frame. It is most often measured and expressed as a per hours figure, even when talking about a day. Frequency is an important measure because the number of times a user sees an ad affects the likelihood of them clicking on it or buying a product because of it (Driskill, 2017). The operationalization of this variable in this survey was through yes or no questions referring to frequency such as: “Do you think that frequency of an ad (how many times advert appears when you are using an app) affects your application experience?” and several points scale questions such as “I am willing to receive mobile advertisements” with 6-point answer scale: every one minute, to more than five minutes.
- ***Consumer attitude:*** consumer attitude is defined in marketing terms as a general evaluation of a product or service formed over time (Solomon, 2008). Perner (2010) defines consumer attitude simply as a composite of a consumer’s beliefs, feelings, and behavioral intentions toward some object within the context of marketing. Consumer attitude variable is operationalized in this study using a Likert-type scale from 1 = strongly disagree to 6 = strongly agree with statements such as “I am annoyed when receiving irrelevant ads during mobile app usage”, “I am less annoyed when receiving ads that interest me during mobile app usage”, “I do feel that in-app

ads I receive are relevant to my interests", "I am not annoyed when receiving ads that offer me a discount on products that interest me" ($\alpha = 0.719$, $M = 2.763$, $SD = 0.815$).

- ***Behavioral intention***: is introduced by the theory of reasoned action model, to demonstrate how behavior is not a direct result of attitude, however attitude paired with the concept defined as "subjective norms" result in the formation of "behavioral intention", a predecessor and predictor of behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). To operationalize behavioral intention in this research, respondents were asked to rate statements such as "I have the intention to read the advertisement" and "I have the intention to click on the ad" through a Likert-type scale from 1 = strongly likely to 6 = strongly unlikely ($\alpha = 0.819$, $M = 2.898$, $SD = 0.798$).
- ***Consumer behavior:*** is defined in different consumer behavioral theories as a study which deals with the various stages a consumer goes through before purchasing products or services for his/her end use (managementstudyguide.com). This variable is operationalized in the survey, through several "negative" or "positive" actions that were selected and can be undertaken after viewing an ad such as "skipping the ad", "ignoring the ad", "viewing the ad", "clicking on the ad", "visiting a website after clicking on an ad". Statements such as "I am willing to click on an advertising that is targeted to me and interests me while I am using an app", "I am willing to click on an in-app ad that offers me a discount", "I am not willing to click on any in-app add even if it offers me a discount", measure behavior using a Likert-type scale from 1 = strongly disagree to 6 = strongly agree ($\alpha = 0.859$, $M = 3.139$, $SD = 1.056$).

4.5 Data Analysis

For this quantitative research analysis, SPSS program was used to analyze results based on numbers and percentages. The data was assessed for outliers. There were 49 such cases that did not fit the requirement and/or did not complete the survey. Only 202 survey responses were analyzed using the SPSS program by performing several analysis for each research question and hypothesis.

5. Findings

5.1 Respondent demographics and mobile app usage behavior

The first section of this research survey collected information on respondents' mobile app usage behaviors and general their general attitude toward in-app ads.

With regards to current behavior toward mobile in-app ads, out of the 202 participants 66.3% of the respondents had previously bought something, visited a website, or downloaded an application after receiving an ad within an application, and 33.7% have not. As for the question tackling general attitude or liking of ad receipt within applications, 69.3% of respondents answered that they do not like receiving these ads, 2.5% like receiving ads, and 28.2% like receiving ads under certain conditions. When looking into the conditions, the highest answers were for "the ad does not appear too many times" with 74.3% of respondents checking this answer and the second condition that "the ad is relevant to me and my interests" with 71.3% also choosing this condition. For respondents who do not like receiving in-app ads, 56.4% think that in-app ads are annoying, 42.6% said they disrupt their in-app experience, 15.3% said that they do not fit their needs and 12.4% checked the option "I feel that they are not made for me or well-targeted to me".

5.2 In-app Ad Impact & Ad Relevance to App

The research question was tested using 3 questions. The first set of questions used several items with two scenarios of in-app ads that are "random" or "irrelevant" to the application and another question for in-app ads that are "relevant" or "targeted" to the app category.

For the question showcasing random and irrelevant ads, advertising impact was tested through four statements reflecting a higher rate of disagreement to the four statements. For the items testing in-app ad impact for the first question "While using a certain type of app (example: an online shopping app like HiCart.com), a random advertisement pops out about any type of product/or service (the ad is not targeted to you)" (Appendix 2) a 5 level Likert-type scale was used. In this section, the recording of the answers was divided into 3 levels "Agreement", "Neutral", & "Disagreement" as the first two levels of agreement "Strongly Agree" and "Agree" were merged as well as the two levels of disagreement "Strongly Disagree" and "Disagree." 58.9% of respondents showed disagreement to the statement "I would be interested in this ad," while 6.9% agreed and 34.2% were neutral to this statement. Similarly, 71.2% of showed disagreement to the statement "I would most probably click on this ad", while only 6.9% agreed and 21.8% were neutral.

The rate of agreement was raised for the third statement "I would click only if it interests me" with 62.4% showing agreement, 20.3% neutral and 17.3% disagreeing to this statement. Finally, for the statement "I would tell my friends only if it interests me", 41.0% showed agreement, 19.8% neutral and 39.1% showed disagreement.

For the second scenario question "While using a certain type of application (example: an online shopping application like HiCart.com), a targeted ad related to the app you are using pops out (example: if you are checking earphones on HiCart.com, an ad appears featuring earphones on discount on another e-shopping website or app)" (Appendix 3), five statements were used to test advertising impact within apps relevant to ads. ($\alpha = 0.9$); the mean score (= 2.74) reflecting a higher rate of agreement to the five statements.

Statement 1 “I would be interested in this ad” received a higher rate of agreement than in scenario 1 with 61.8%. 23.8% were neutral to this statement and 14.4% disagreed. For statement 2 “I would most probably click on this ad”, agreement scored 56.4%, with 23.3% who were neutral and 23.3% of the 202 respondents in disagreement to this item.

Item 3 “I would skip this ad even if it is related to the app I am using” showed a higher rate of disagreement with 49.5% and only 17.9% of respondents agreeing. Item 4 “I would tell my friends about the advertised product/service” scored 38.2% agreement, 33.7% Neutrality and 28.3% disagreement. The last statement “I would download to try the new advertised app” scored 39.1% agreement, 32.7% neutral, and 28.2% disagreement.

The third question investigated consumer attitude toward receiving in-app ads that related or relevant to the application they were using. The question was direct and also included an example to clarify it to respondents “Would you like to receive ads that are related to the applications you are using? (Example: Receive ads about a new restaurant or a food delivery service, while you are on a food app? Or receive an ad about a new football application while you are playing a sports game on a mobile application)”. This Yes or No question, received 56.4% in positive feedback and 43.6% negative feedback.

5.3 In-app Ad Intrusiveness & Targeting

To test intrusiveness of in-app ads, five questions were raised in the survey for respondents to rate. The statement “I am annoyed or irritated when receiving irrelevant ads during mobile app usage” (Appendix 4) received 87.2% agreement. However, the item “I am less annoyed or irritated when receiving ads that interest me during mobile app usage” received 59.9% agreement and 24.8% neutral results. This shows that the

majority of respondents feel that in-app ads are intrusive, but are less annoyed by in-app ads that are targeted towards their interests. 71.8% of total respondents think that "advertisements ruin their mobile application usage experience". 44.5% of respondents did not mind receiving ads during mobile app usage, only if these ads were targeted towards their interests, however 26.2% felt neutral toward this statement while 29.2% disagreed. For the last item tested on intrusiveness, 50% of respondents positively agreed with the statement "I think that advertisements within mobile apps are a great idea if they are properly targeted", while 27.2% were neutral about this statement and 22.8% disagreed.

To further test the perceived difference of in-app ad intrusiveness on two levels, data was assessed using an Independent T-test. An Independent T-test was computed on intrusiveness data to find out associations between the dependent variable "intrusiveness" in relation to the independent variables "targeted ads" and "untargeted ads". A new variable was created based on previous answers, separating the 202 respondents into 4 categories "respondent interested in targeted ads", "respondent who is not interested in targeted ads", "respondent interested in both targeted and untargeted ad", and "respondent who is neutral about targeted ads". This division was applied based on the answers to statement 1 "I would be interested in this ad" in questions 1 and 2 of the targeting section in the survey (appendix 1). Respondents who answered in agreement to the latter statement in both questions 1 & 2 were categorized as "respondents interested in both targeted and untargeted ad". Respondents who answered in disagreement in question 1 and agreement in question 2 to the statement "I would be interested in this ad" were categorized as "respondent interested in targeted ads". Respondents who disagreed to this

statement in question 2 were categorized as “respondents who are not interested in targeted ads”. And respondents who answered “neutral” to this statement in question 2 are categorized as “respondent who are neutral about targeted ads”.

Two independent sample t-tests were conducted to see if there was a significant difference and to compare the means of the two groups. The first t-test compared mean scores for “respondents interested in targeted ad” versus “respondents who are interested in both”. While the second t-test compared mean scores for the two groups “respondents interested in targeted ad” and “respondents who not interested in targeted ads”. T-test results showed the mean score on intrusiveness levels difference between 3 categories of respondents. For “respondents interested in targeted ad” the mean score is 3.0368 in comparison with “respondents who are interested in both” who scored 3.1636. Intrusiveness mean scores for “respondents who not interested in targeted ads” is 3.7172.

The significance (2-tailed) of the first t-test (0.609) was greater than 0.05, implying that the difference in intrusiveness mean scores between respondents who were interested in targeted ads and respondents were interested in both targeted and untargeted ads was statistically insignificant. So the null hypothesis is accepted for this t-test noting that the variability in the two groups is about the same. So both respondents who are interested in targeted ads and in untargeted ads view ads as intrusive to their mobile in-app experience.

The p-score of the second t-test is $0.000 < 0.05$, implying that there is a significant difference between intrusiveness mean scores for “respondents interested in targeted ads” and “respondents who are not interested in targeted ads”. Concluding that respondents who are not interested in targeted ads find in-app advertisements more intrusive than respondents who are interested in targeted in-app ads.

In addition to RQ2 that tested the relation between intrusiveness levels and in-app advertisement targeting, one additional item in the questionnaire tested in-app ad intrusiveness in relation to the types of application used. Question 23 of the survey (Appendix 1), asked respondents to rate ad intrusiveness level for different application types on a 4-level scale from 1 “Less annoying” to 4 “More annoying”. The types of applications tested were ‘social media’, ‘gaming’, ‘online shopping’, ‘food’, ‘news’, and ‘photo editing’. Results are grouped into 2 categories and recorded in this section as per 1 and 2 being “less annoying” and 3 and 4 being “more annoying”. Intrusiveness scores were the highest for Gaming apps with 88.2% of respondents who scored in-app ads within gaming apps as ‘more annoying’. The second type of apps with high intrusiveness scores was photo editing apps with 75.8 % of respondents scoring it as “more annoying”. Intrusiveness scored the least within food apps, with 66.3% of respondents who found in-app ads within food apps “less annoying”. Social media apps scored 53.3% of respondents who found ads not so annoying on the platform. Online shopping scored 59.9% less annoying and News apps scores on in-app ad intrusiveness were 41.1% “less annoying” and 56% “more annoying”.

5.4 Targeted In-app Ads: Attitude, Behavioral Intention, & Behavior

To test if consumers have a positive attitude and positive behavioral intention towards targeted in-app ads in research question 3, several tests were run on the survey data. First, the frequency results for six statements (Appendix 5) on attitude and behavioral intention were developed in this section. Second, the results of two correlation tests that were computed on the results of attitudes, behavioral intention, and behavior

was used to test whether there was a correlation between these three consumer behavior components of the theory of reasoned action in order to test H1 and H2.

Attitude results for targeted in-app ads, was mainly skewed toward positive and neutral scores. Five statements were used to test attitude. The first statement "I feel happy to have received this ad that is targeted for me" resulted in 53.5% agreement, 27.7% neutral, and 18.8% disagreement. The second statement on attitude "I feel interested in reading this ad to see what information is provides" had similar scores to statement 1 with 53.9% agreement, 26.2 neutral, and 19.8% disagreement. As for statement 3 "I am always annoyed or irritated when receiving ads while using an app, even if the ad is well targeted to me" scores were equally divided with 32.7% agreement, 36.6 neutral, and 30.7% disagreement. Scores to these three attitude statements confirm that targeting positively affects consumer attitude toward in-app ads, yet a significant cluster of the surveyed sample expressed neutral feelings regarding targeted ads, or in-app ads in general. As for the group who expressed negative attitude toward targeted ads, they formed a minority in the tested sample; moreover in regards to the first and second attitude statements this group constituted less than 20% of the sample. As for statement 3 "I am always annoyed or irritated when receiving ads while using an app, even if the ad is well targeted to me", the level of disagreement rose to 30.7% with 36.6% neutral. This shows the decreasing levels of irritation among consumers when exposed to ads in-app and increasing levels of acceptance of in-app ads, only when correctly targeted toward a consumer's interest.

Moreover, targeting was assessed using two additional items in the question "While using an app, a targeted ad appears", the statement scored as followed. For "I feel

positive toward this ad" 51.4% agreed, 29.2% were neutral, and 17.3% disagreed. And the opposing statement "I feel negative even if the ad is interesting to me" gets 43% disagreement, 31.7% neutral, and 23.2% agreement.

Behavioral intention was also tested with five items in the targeting section of the survey "If you are exposed to a targeted ad featuring a product/service that interests you while using any application". Respondents were asked to rate the following three statements. Statement 1 "I am willing to click on an ad that is targeted to my interests while I am using an app" scored 42.5% in agreement, 34.7% neutral and 22.7% in disagreement. Statement 2 "I always skip ads when I see them in-app" scored 48.1% agreement, 30.2% neutral, and 21.8% disagreement. As for statement 3 "I look at an ad only if it interests me, when non-skippable ads appear"; scores show 58.9% agreement, 26.2% neutral and 14.9% disagreement. Behavioral intention scores toward targeted in-app ads were mainly skewed toward agreement and neutral results, reflecting consumer's willingness to positively behave when exposed to targeted ads within mobile applications. Two additional statements also tested behavioral intention "I have the intention to read the ad" when a targeted ad appears received 46.1% agreement, 27.7 neutral scores, and 24.2% disagreement. The statement "I have the intention to click the ad" got 39.1% agreement and 30.2% disagreement with 28.7% of respondents scoring neutral.

Hypothesis 1 predicted that positive attitude towards an in-app ad is correlated with positive behavioral intention towards the ad. Hypothesis 2 predicted that positive behavioral intention towards an in-app ad was highly linked to a positive behavior towards an ad such as clicking on the ad. These two hypotheses were supported by the

significant outcome from Pearson's correlation test. The first correlation test was run on attitude and behavioral intention variables. Correlation results showed that Pearson's r for attitude and intentional behavior 0.864 ($p < .05$). This value is positive and close to 1 showing that there is a strong positive correlation between attitude and behavioral intention from the survey data. This means that positive changes in attitude were strongly correlated with positive changes in behavioral intention. H1 was supported.

The second correlation test was computed on the two variables behavioral intention & behavior. Correlation results for this test show that Pearson's r for the correlation between the above two variables is 0.838 ($p < .05$). Again, results indicate a strong positive relationship behavioral intention and actual behavior. This means that positive changes in behavioral intention are strongly correlated with positive changes in behavior, which relate back to the direction in the theory. H2 is also supported.

The two correlation tests support the theory of reasoned action, and Fishbein's model of consumer attitude which posits that "attitude towards behavior affects consumer's behavioral intention which in turn affects consumer's behavior" (1975).

5.5 Location Targeting & Incentives

The above section recorded results on attitude and behavioral intention toward targeted in-app ads, considering one type of targeting which is interest targeting. Mobile in-app ad targeting is distinguished for its geographic targeting feature, elaborated in the literature review. This survey added location-targeting specific questions to test consumer attitude towards this geographic targeting, a type that is very specific to the mobile platform. The first question on geographic targeting is a Yes or No question that also

includes an example for respondents to better identify the scenario "Would you like to receive location-targeted in-app ads? (Ex: New movie release ad, while you are nearby the cinema theaters / or ad about the new collection (or sale promotion) from a clothing store you like while you are shopping at the mall where this shop is located?)". Results were as follows, 55% of respondents answered Yes and 45% answered No. The following question "Would you share your location info while using an application if the app asks your permission to use your location" resulted in 49% of respondents answering yes and 51% answering no. An additional question tackled the issue of respondents awareness that location request in-app can serve the advertising industry. The question "Are you aware that applications request your location once accessing app to send you ads relevant to your location" received 62.4% positive and 37.6% negative answers. This reflects that a large size of the sample is still not well informed or knowledgeable about all technological and digital advancements with regards to the advertising and mobile marketing industry. Results on location targeted advertising attitude revealed a nearly equal division among responses on attitude toward geographic in-app ad targeting; this reflects that was no consensus among consumers' attitude toward this type of advertising, therefore no clear conclusion can be made in this regard. This opens doors to further research on location-based targeting, how it serves consumer benefit and what the positive and negative influences of this feature on consumer attitude and behavior are.

Moreover, two questions recorded consumer attitude with regards to discounts or incentives offered to consumers through in-app advertising platforms. The first item was "would you like to receive ads that offer you discounts?" 19.3% answered Yes, 24.8% answered No and 55.9% answered Yes, if the discount was on a product that was relevant

to their interests. The second question on discount ads recorded 43.6% of respondents who had previously clicked on in-app ads offering discounts and 56.4% who had not.

5.6 In-app Ad Experience and Ad Frequency

Consumer in-app advertising experience was tested through four questions in the frequency section of the questionnaire (Appendix 1). The vast majority of respondents, (93.6%) agreed that if they saw less ads in an application they would enjoy the application experience more. The next question on in-app ad experience and frequency was similar to the first but included an additional answer option. The question was “Do you think that high frequency of an ad (how many times advert appears when you are using an app) negatively affects your application experience” (Appendix 6); Responses to this question were 74.3% yes, 5.4% no and 17.3% of respondents chose statement 3 “This is related to the type of app I am using”. These answers reveal a negative attitude toward higher frequency of ads in applications. Similar results were recorded for the statement “The higher the ad frequency the higher my dissatisfaction with my app experience” with 80.2% agreement, 12.4% neutral scores and 4.5% disagreement.

The above results reflect that consumers tend to enjoy their application experience more while not exposed to advertisements on their mobile phones.

The following question in the survey asked respondents to rate, how annoyed or irritated they were when exposed to ads on several types of apps. Rating was from 1 to 4 with 1 being less annoying to 4 being more annoying. In the previous section on intrusiveness, results were recorded per a two group division. Respondents who answered 1 and 2 were considered less annoyed and respondents who rated 3 and 4 were considered more annoyed. The rating results recorded in the above section reflect that the

highest score was for gaming apps with 88.2%, followed by photo editing apps that scored 75.8% on intrusiveness frequency. This shows that the majority of respondents felt more annoyed when receiving in-app ads while using a gaming app or photo/video editing apps. These results lead to further investigation of the factors that make consumers accept ads less on these types of applications. One factor could be the immersiveness of the application since more immersive applications engage consumers' focus and senses. Another factor could be consumers' use of different types of apps and gratification sought from using several applications. Scoring least on intrusiveness are food, online shopping and social media apps with respective scores of 66.3%, 59.9%, and 53.3% of respondents who are less annoyed.

The last question on frequency asked about respondents' behavior with regard to high advertising frequency within apps. 78.7% of respondents agreed that they might stop using an application because of its high ad frequency. 11.9% were neutral about this statement and 6.4% disagreed.

5.7 Ad CTR and Ad Frequency

Consumer clicking behavior was tested in relation to high advertising frequency through a set of statements. Respondents were are asked "Do you think if you see an ad a higher number of times during your app usage you are more likely to click on the ad" (Appendix 7) and answers were 55.4% unlikely, 28.2% neutral, and 13.4% likely. The second statement "Do you think if you see an ad a higher number of times during your app usage you are more likely to click on the ad only if the ad interests you" (Appendix 7) received 52.5% likely, 22.8% neutral, and 21.8% unlikely. The second behavior question in terms of advertising frequency reveals that 36.6% of respondents were likely to click on an ad that interests them the first time it appears, 27.7% mentioned they would

click the second time.7.9% the third time and 24.8% click on the ad when they see it over three times.

These results reflect that higher advertising frequency alone had negative impact on consumers since only 13.4% of the respondents were likely to click on ads when they exposed to them. However paired with targeting metrics, the results of clicking on the ad increased to reach 52.5%. These results reflect that frequency alone negatively affects both in-app ad experience and advertising click-through rate. Moreover, when asked the question “How many times out of 10 do you skip and ad while using an application”, respondent results recorded 35.1% every time, 20.3% 8 time out of 10, and 16.3% 9 times out of 10 and 9.4% skip ads 7 times out of 10. This question echoes that the majority of consumers tend to skip ads that they see online.

Result Summary

The above results can be summarized by stating that in general 69.3% of respondents don’t like receiving ads within apps, because 56.7% of them think these ads are annoying and 42.6% believe that ads disrupt their app experience.

With regards to ad impact and ad placement within app, results show that ad placement affects ad impact as 58.9% of respondents would not be interested in a randomly placed ad, but 61.8% would be interested in a targeted ad related to the app they use. In terms of behavior with regards to ad placement within app, 71.2% would not click on the ad when the placement is random while 56.4% would click when the ad placement is relevant to the app used.

Ad intrusiveness results were high concerning untargeted in-app ads with 87.2% of respondents feeling annoyed when receiving irrelevant ads and 59.9% less annoyed when receiving targeted ads. Moreover, 44.5% of respondents stated that they did not mind receiving ads if they were targeted. So, in-app ad intrusiveness levels dropped when these ads were targeted to consumers. T-test results on intrusiveness also reflected that respondents who were not interested in targeted ads find these ads more intrusive than respondents who were interested in targeted ads. Finally, results reflected that in-app ad intrusiveness levels was also related to the type of app used; Gaming and photo editing apps, for instance, replicate higher levels of annoyance or intrusiveness than online shopping and food applications.

The two hypotheses were supported in the results thus endorsing the Theory of Reasoned Action, and showing that positive attitude towards in-app ads was correlated with positive behavioral intention, in turn highly linked to positive behavior towards the ad, thus higher CTR.

The frequency questions revealed how higher in-app ad frequency negatively affected in-app ad experience with 93.6% of respondents enjoying apps with less ads, 80.2% displaying higher dissatisfaction with the app experience when exposed to higher ad frequency and 78.7% who might stop using the app because of high ad frequency. Moreover, in terms of frequency and CTR, or ad clicking rate, results demonstrated that high frequency alone did not have positive consequences on CTR, with only 13.4% of respondents more likely to click on an ad when exposed to it a higher number of times. While clicking behavior increased with higher frequency when the ad was targeted, with

52.5% of respondents more likely to click on an ad when exposed to it a higher number of times only if the ad interested them.

6. Discussion

The aim of this research study is to understand consumer attitudes, behavioral intentions and behaviors toward advertising on mobile apps. This research intended to better understand how consumers perceive ads on these apps to help make the advertising experience richer and more positive to consumers and more beneficial to advertisers. Keeping that in mind, this thesis dealt with the two pillar metrics of digital advertising, targeting and frequency,

Results of this research, with a majority of young adults aging 25 to 34 (64.4%) and 18 to 24 (27.7%), show that these young age groups who spend a significant amount of time of mobile apps (2 to 3 hours daily or more) used several types of applications, but mostly used social networking apps with (95%). Noting that more than half of respondents (66.3%) have previously bought something, visited a website, or downloaded an app after receiving an ad, this study went through the several parameters affecting consumer in-app experience as well as their experience with ads on applications to increase effectiveness of advertising on the mobile smartphone platforms. The different variables results will be discussed in this section.

6.1 Advertising Impact

Advertising impact was analyzed in relation to ad context or relevance to application. Ad relevance to app was also operationalized as an in-app ad that appears in apps of similar content or field of interest. Advertising relevance to app was viewed as a

targeting method noting that users/consumers visited specific websites or downloaded certain applications to seek specific interest-related information or other types of gratifications and needs. This targeting method is called managed ad placement, "a targeting method that gives the advertiser granular control over where their ads are being placed" (Da Cunha, 2019). Ad placement targeting is used for interests or topic targeting, as Google picks the sites that are relevant to ads allowing advertisers to choose the sites where their ads would be displayed in order to have control of display ad campaigns (Da Cunha, 2019).

Results of ad impact toward "ad relevance to application" were positively reflected in respondent' answers, as rates of agreement to the different statements such as "I'd be interested in this ad" or "I would click on this ad" increased from scenario 1 where the ad is placed within a 'random' app, to scenario 2 where ad is placed in an app relevant to the application used. For Scenario 1, 58.9% of respondents disagreed to the first statement "I'd be interested in this ad", whereas the majority (61.8%) agreed to the same statement in scenario 2. This demonstrates how targeting through ad placement (or relevance to app) positively affects consumers attitude or interest toward ads as well as consumer willingness to click on the ad, which positively affects click through rates notably advertising campaign effectiveness and impact on the user. These results come in line with the study from the literature section on Gen Y's attitude toward in-app advertising reflecting that Gen Y do not mind in-app ads, but prefer ads that are relevant to app context personalized and useful (Ketaki, Varsha & Subhadip, 2013).

Results to the question on consumer attitude or liking of receiving ads that were relevant to applications they used received 56.4% positive response and 43.6% negative

response, reflecting the room for positively accepting ads within apps, when these ads are targeted to the specific type of application used, and offering information on product or service related to consumer interests. Analysis of this section, can lead to concluding that one of the targeting techniques that can help positively affect consumer attitude toward ads within apps, is app placement techniques. Targeted and strategic ad placement within apps relevant to the topic of the ad will positively affect consumer attitude toward these ads, thus also positively affecting CTR of this ad. Strategic ad placement within apps was also shown to positively affect CTR in several expert studies in the literature review, such as MobileMarketers.com, who advised the integration of fewer strategically placed ads will drive higher app revenue, this also with consideration to specific ad formats. Over-stuffing an application with ads is never a good strategy for driving better returns (Carr, n.d.). Moreover, strategic ad placement is the technique of placing the advertisement within the app in the right place and at the right time to optimize ad effect, thus user conversion. Placement optimization is a combination of both 1) using ad units in the correct way; and 2) identifying the different user flows within an app (StartApp.com, 2017). The most important consideration when it comes to ad placement is keeping the ad away from any major app controls, so as not to annoy the user. StartApp points out to several techniques for the strategic placement of ads, explaining that one of the most basic ways to optimize ad placements in an app is to identify natural breaks points and note where users spend the most time within the app (StartApp.com, 2017). A breakpoint within an app is identified as an intentional pausing place within a program (Technopedia.com). This suggests that the best time to place an ad within a game app is for example when a game level is completed or a specific task is finished within an app.

Placing an ad at natural break points within apps will thus not disrupt the user's flow; and the ads can even serve as space filler on loading screens to keep users engaged with the overall experience (StartApp.com, 2017). Another beneficial strategy offered by StartApp is to monitor user' actions when placing interstitial or video ads. Interstitial ads are defined by Google Ads Manger as full-screen ads that cover the interface of their host app. "They are displayed at natural transition points in the flow of an app, such as between activities or during the pause between levels in a game" (Google Ads Manager, 2018). StartApp suggest that monitoring users' actions is beneficial to the ad placement as the best time to show an ad is when the user has accomplished something positive on the app as winning a level. The positive emotions elicited when achieving an accomplishment on the app will positively reflect on user attitude towards the ad, thus the ad will be embraced more positively, then when failing to complete a level within a game and receiving an ad which might amplify the negative experience.

Overall it is best advised for advertisers to strategically book their ad spaces within app through strategic targeting to optimize consumer attitude toward these ads, and increase consumer CTR of the ad.

6.2 Targeting & In-app ad Intrusiveness

In terms of intrusiveness, data from this study shows how intrusiveness level is high when consumers are faced with irrelevant ads (87.2% agreeing that they feel annoyed/irritated when receiving irrelevant ads). However, intrusiveness levels drop when the ads are interesting to the app user with 59.9% agreeing that they are less annoyed when the ads interest them. Intrusiveness results also reflect that 44.5% of respondents do not mind receiving targeted ads and 50% of respondents who think in-app

ads are a great idea is well targeted. These result convey a positive lookout to the mobile advertising industry reflecting respondents' willingness to receive ads when these ads are targeted. Moreover, this alerts advertisers to be more strategic in the programming of their mobile in-app campaigns and placement of ads within apps while targeting relevance of ad to user interests.

T-test scores reflect the same with intrusiveness scores being higher for respondents who are not interested in targeted ads than for respondents who are interested in targeted in-app ads. T-test scores difference for respondents who are interested in targeted ads and in untargeted ads is insignificant, meaning that respondents who are interested in targeted ads and in untargeted ads have similar scores on intrusive levels to their mobile in-app experience. These T-tests suggest that mobile users in general, feel annoyed when exposed to in-app ads, however results from the second statement "I am less annoyed when the ad interests me" show that users who are interested in targeted ads may feel less annoyed, when ads are knitted to their interests. However the second T-test that shows no significant difference in intrusiveness scores between respondents interested in targeted and untargeted ads may suggest that there might be other factors related to the application affecting user's levels of intrusiveness when exposed to an ad.

Intrusiveness or consumer irritation was tested on different types of apps, showing that consumers are more irritated when receiving ads on gaming apps (88.2% of respondents more annoyed), photo editing apps (75.8% more annoyed) and news apps (56% more annoyed). This deals with the subject of users' interaction with the app and how app types influences advertising acceptance. Some applications such as gaming apps require user being in a more active state and more immersed with the app. Moreover,

apps on which users are less engaged and more passive reflect a lower level of intrusiveness, thus a higher level of ad acceptance, for instance with food apps respondents were the least annoyed (66.3%), and followed by online shopping apps (60%), and social media apps (53.3%). These results on intrusiveness levels on in-app ads on different types of applications leads to further research on consumer's level of interactivity and engagement with several types of application and how this can affect the acceptance of advertisements on these types of applications.

To raise the levels of consumer ad responsiveness within apps, advertisers should rework their in-app ad strategies and consider the different types of advertising formats available. In-app ad formats include native ads, banner ads, video ads, rich media ads, interstitial ads, rewarded video ads and more. Native ads are types of ads that cannot be blocked and are designed to blend in with the natural mobile environment and be perceived as part of the app (Medium.com, 2018). Native ads may be used as a technique to cater ads by also avoiding the disrupting of a users' mobile app experience. In fact, studies by Sharethrough.com and IPG Media Lab show that the time spent for watching native ads, which is sponsored content, is the same as for the original editorial content (Medium.com, 2018). Furthermore, it is significant to study consumer engagement with different ad formats within several types of apps. For example, is was shown that some ad types perform better than other on gaming apps. Most popular ad types within casual gaming applications (such as Candy Crush) are: rewarded video ads, interstitial ads and native banners (PubNative, 2019). The blog post explains how engaging gaming apps might require a combination of rich interstitial ads (or playable interstitial ads), rewarded video ads and native ads. Interstitial ads are "full-screen images or videos that appear at

natural app transition points such as going to the next game level" (Google Ads Manager). Rewarded video ads are creative non-skippable rewarded videos that offer certain kind of "reward" to gamers when clicking on it. These types of ads might not only reduce annoyance levels of gamers, but also encourage them with new rewards and experiences when watching the ads. Some interesting strategies suggested by the Pubnative blog post, were to place playable interstitial video ads within gaming apps when a player is waiting for the next round. A playable video ad is an ad that sponsors a new game that can be played in few seconds within the ad (so an ad of a new app to download). Pubnative.com suggests that playable interstitial ads will keep gamers engaged when waiting for a new level to load, thus guaranteeing that user experience is not bothered and making more revenue for application publishers. This idea of having engaging ads such as playable ads is also aligned with one of the findings in the literature reflecting that Gen Y consumers prefer interactive and engaging story-based ads in gaming apps (Ketaki, Varsha & Subhadip, 2013). The effectiveness of rewarded video ads in gaming apps is also explained by Pubnative blog post by the rewards given to players through ads to keep them more engaged with the game and increase application revenue by 30 to 40% (PubNative, 2019).

To conclude this section, this thesis suggests the expansion of studies on different ad formats within different apps that require different levels of interactivity. In addition, with advanced technologies being integrated within the app experience such as the VR (Virtual Reality) experience, it would be interesting to test how consumers engage with advertisements at higher levels of engagement within the VR versions of some apps. An interesting case study would be the testing of consumer acceptance of highly engaging

VR ads within the retail business, such as having virtual trial rooms for trying different advertised apparel. Would consumers be more engaged with the targeted ad for a clothing e-commerce that offers the feature "try before you buy" with a 360-degree product's visual experience? It would be very interesting to extend studies on this topic to forecast the future of digital advertising and e-commerce.

6.3 Targeting, Attitude, Behavioral Intention and Behavior

The results of respondents' attitude, behavioral intention and behavior toward targeted in-app ads were recorded in the previous section of this paper. Moreover, correlation tests computed on these three variables supported the two hypotheses formulated for this research and show the positive relationship between attitude, behavioral intention and behavior, also supporting the theoretical framework of this study based on the theory of reasoned action (Fishbein & Ajzen, 1975). Attitude results reflect a positive general consent toward targeted in-app ads with very low disagreement rates on statements like "I feel happy to receive targeted ads" (18.8% disagree), "I feel interested in reading targeted ads" (19.8% disagree), "I feel positive toward this ad because it targets me" (17.3% disagree). Moreover agreement rates to these three statements were respectively 53.5%, 53.9%, and 51.4%. These rates confirm that targeting positively affects consumer attitude toward in-app ads. Yet, a significant cluster of the surveyed sample (around 26 to 30%) who expressed neutral feelings toward targeted ads in the survey can be subject to further testing as this research is limited to a survey questionnaire and may not reveal the different behavioral reactions when the consumer is faced with in-app advertising. This suggests the need for an experimental

study that can fill the gaps of this survey-based research to better understand consumer action and behavior toward ads while using applications on their mobile smartphone.

Similarly, behavioral intention results were also mostly positive toward targeted in-app ads with respondent agreement rates of respectively 42.5%, 58.9%, 46%, and 39% to statements such as “I am willing to click on targeted ads”, “I look at the ad only if it interests me”, “I have the intention to read” and “I have the intention to click the ad”. Moreover, behavior results towards targeted ads reflected respective agreement rates of 35.2%, 43.1% to statements like “I click on the ad” and “I read the ad”. However, looking at the last behavior statement “I skip the ad” with 48.5% agreement rate shows that consumers or mobile app users are still resistant to in-app ads even if these ads are targeted. Consumers might have positive attitude towards the ad, but skip it. They might read them, but not click on them thereby not making a real conversion on the landing page of this advertisement. Similar to interest targeting, location-targeting questions conveyed similar results with more than half of the respondents who have a positive attitude toward receiving location-targeted ads and who would share their location to receive such ads. These results align with two studies from the literature. Ketaki, et al.’s, 2013 study on Gen Y in India showed how this tested sample like geo-targeted ads only through especially targeted applications controlled by consumers. Gen Y consumers also have positive attitude defined by ‘liking’, toward ads that are relevant, personalized, not intrusive and geo-targeted (Ketaki, Varsha & Subhadip, 2013). Moreover, a field survey study done in China reflect that attitudes toward mobile ads were not highly favorable but attitudes improved if the ad message was personalized (Jingjun Xu, 2006). This implies that personalization or targeting plays a very important role in affecting people's

perception toward mobile advertising As for ads offering incentives or discount, these ads are also positively viewed when the discounts offered are targeted, thus offering promotions on items of interest with 55.9% of respondents who answered that Yes they would like to receive ads offering them discounts, if the discount is on a product that is relevant to their interests.

This leads to the conclusion that digital mobile advertising targeting techniques should be carefully taken by advertisers when buying advertising spaces online. Moreover, recent automated targeting techniques involved in the buying and selling of ad spaces online such as "Programmatic Advertising" should be considered by advertisers as it involves several algorithms that handle the placement of ad impressions (ad view). Programmatic advertising uses techniques that incorporate traffic data and online targeting methods such as tracking user's surfing data to target a certain user profile who might be a strong potential customer for the published ad, based on their historical surfing data (Kloot, 2018).

Moreover, as previously mentioned correlation results support both H1 and H2 showing a statistically significant correlation between each of the two variables attitude and behavioral intention and behavioral intention and behavior, thus falling in line with thesis' the Theory of Reasoned Action applied in several mobile marketing studies, as shown in the literature review . The Taiwanese study on SMS-based mobile ads and the relationships among attitude, intention, and behavior (Tsnag, Ho, & Liang, 2004), also showed the correlation between attitude, intention and behavior consistent with Fishbein's theory of reasoned action (Fishbein, 1970). This theory is developed in the framework section postulating that behavior is a function of behavioral intentions that

are, in turn, a function of attitudes and subjective norms (Fishbein & Ajzen, 1975). Results from this thesis also show the connection between user attitude towards targeted in-app ads and the intention to click or read this ads. In fact, users who were interested in targeted ads had more positive intention to click on these in-app ads, and were more likely to actually click or read or engage with the ad to visit the advertiser's website or to download an app. Nevertheless, and as previously suggested data pertaining to actual behavior can be further scrutinized within a more experimental setting to fully support this theory adding supplementary components such as targeting and frequency to further support the new suggested model of consumer behavior within the digital mobile advertising environment.

6.4 Frequency, App Experience and CTR

Results of the survey done for this thesis clearly reflect that respondents view high ad frequency as invasive to their in-app experience, making them less satisfied. Users enjoyed using apps more when not exposed to ads. This can point out to several explanations, one of which is the factor of interruption of users, while engaged with a certain activity on their mobile application. This also leads to asking an important question on consumers' favorability toward embracing ads while tuned to a certain type of application as 17.3% of respondents answered that their negative or positive attitude toward high ad frequency was affected by the type of app they were using. The types of apps on which respondents feel more annoyed when receiving ads are gaming apps, editing apps and news apps, where consumers are more engaged in their in-app activity. Contrastingly, applications like online shopping, social media, or food apps were considered as less annoying platforms for ad reception. Such applications should be

highly considered by marketers in their strategies as consumers tend to be more tolerant to ads when on these apps,. Another explanation might be that consumers are used to seeing ads or being interrupted during the activity or browsing food apps or e-shopping apps. Consumers who are actively seeking a new summer dress or browsing several restaurants for more food options might not be disturbed by an ad as they might be more open to ads offering them more options and discounts on products they are looking for. It is also interesting to test in experimental forms how targeted ads are received by consumers when logged onto different types of apps that require different levels of engagement or focus.

Moreover, with regards to in-app experience and frequency, results showed that 78.7% of respondents might stop using an application because of its high ad frequency. Add to that ceasing to use an application due to high ad frequency should be carefully examined by mobile advertising networks, app developers and marketers to avoid negative in-app ad experience and therefore negative reactions towards 1- the ad itself caused by ad clutter and untargeted messages, and 2- the platform or application used. Negative in-app ad experience leading to the cessation of application usage would hence negatively affect consumer attitude towards the app and the brands advertised on that app. App developers aiming to monetize their platform will thus be negatively affected as less users will be tuned onto their platforms. The purpose of in-app advertisements is to better serve the digital market and e-shoppers, yet without generating negative consumer feelings and attitude toward the platform or the advertised brands. This thesis tested the effect of frequency of in-app ads on consumers, and how they behaved towards these in-

app ads to better cater to consumer and advertiser's needs by linking the online bridges between these two parties.

In terms of in-app ad frequency and clicks, results showed that advertising high frequency alone has a negative impact on consumers as it negatively affects in-app experience as well as CTR. However, some findings in this study might infers that the pairing of targeting metrics, and frequency methods might aid the raising of Click-through-rates. However, the results do not directly prove this outcome. This pairing can be further studied in different experimental settings in order to understand the best dosing within several consumer exposure situations. Considering that CTR is increased while targeting metrics are paired with higher frequency rates, marketers and advertisers should find ways to better cater these ads to consumers in the effort of making them more responsive to these ads and to generate better leads on their websites, thus higher sales conversions. Frequency or "impressions" on digital can be a subject of study in order to find the optimal frequency for in-app ads to reach user conversion by clicking the ad and landing on the advertised land page. Moreover, advertising clutter should also be considered online, as consumers are increasingly and more frequently exposed to different ad types and formats while logged onto any application. This goes in line with the literature review discussing frequency capping techniques used by big advertisers such as Procter and Gamble who set a ceiling for the number of ad exposure per user session on an application. Procter & Gamble finds success not showing its digital ads to people more than three times a month (Adage.com, 2018). Standard frequency capping ceilings discussed in the literature section tend to be 3 views per visitor per 24 hours (Quora.com). Another example of frequency capping technique elaborated earlier was

used in the packaged-goods products industry finding the ideal average exposure frequency to be one to two impressions weekly over at least 10 weeks for a campaign according to marketing science partner at Facebook (Adage.com, 2018). This option offered by Advertising Networks is to be highly considered and studied by advertisers through several trial and error campaigns to understand the optimal techniques by type of platform and industry.

7. Suggested Consumer Behavior Model Adapted to Digital Marketing

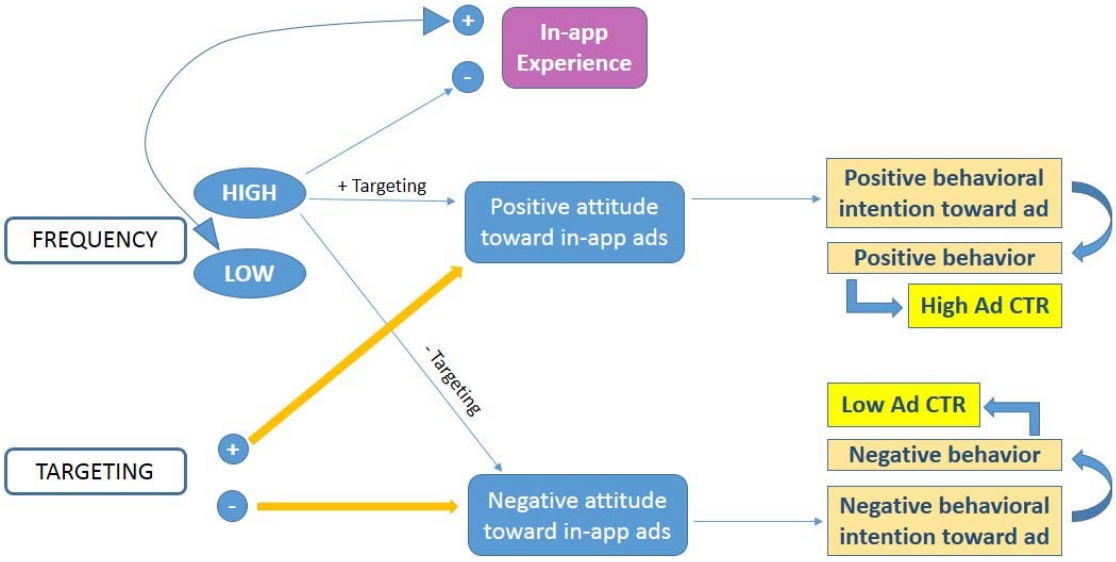


Figure 2: Consumer Behavior Model Applied to In-app Advertising

This thesis suggest a new model of consumer behavior, an extension to the TRA applied that is focused on in-app advertising consumer attitude, behavioral intention and behavior; the new model takes into consideration the two main metrics explored in this thesis: targeting and frequency of in-app advertisements. This model reflecting the main findings of this thesis:

- Frequency and targeting metrics are main pillars affecting in-app advertising experience, and consumer behavior when exposed to ads within mobile applications. In this suggested model, targeting is shown to affect attitude directly. Strategic targeting (here demonstrated with the positive + sign) affects attitude positively, however poor targeting has negative effect on consumer attitude towards in-app ads. Moreover, Frequency is modeled here

through two scenarios, high and low frequency. Low frequency positively impacts consumer in-app experience as reflected in the results while high frequency affects in-app experience negatively. Furthermore, with regards to frequency and user attitude toward in-app ads, the thesis results show that high frequency has negative impact on attitude toward in-app ads, and more specifically when the advertisement is not well targeted. However, some results display that higher ad frequency paired with targeting metrics, might have more positive impact on consumer attitude, but this finding was not directly tested in this thesis paper.

- As per modeled by the TRA (Fishbein & Ajzen, 1975), this model also supports that attitude directly impacts behavioral intention which in turn impacts behavior here modeled by higher or lower user click-through-rate (CTR). So positive attitude towards in-app ad positively impacts behavioral intention leading to positive behavior translated by higher CTR. Contrastingly, negative attitude toward in-app ad negatively impacts behavioral intention leading to negative behavior translated by lower CTR.

This model may serve future research and can be tested within several experimental situations. It may be applied to different application types as well as different targeting techniques such as geographical or behavioral to further examine outcomes on consumer attitudes and behaviors within different settings.

8. Limitations

Like all theses, this thesis has a number of limitations. In the methodology, not all variables tested had a pre-tested scale which the researcher could adapt for greater

reliability scores. Some had to be created using very specific items and scenarios, however when assessed for reliability scores turned out to be more than sufficient. Another limitation of this thesis was testing frequency. In-app advertising frequency could not be tested through a survey questionnaire as consumer response or behavior with regards to in-app ad frequency could be different than the user's actual expected behavior. New and more efficient methods should be formulated to measure in-app ad frequency.

Moreover, this research can be considered a preliminary background study of consumer behavior toward digital in-app advertising, especially when dealing with Lebanese consumers as it is an under researched group and subject in Lebanon. Despite the limitations of this study, it contributes to understanding consumer behavior in the digital marketing field and can be extended further to experimenting on digital ad formats and campaigns while considering the many parameters of mobile advertising such as targeting and "frequency". For a more developed understanding of this research topic, a suggestion for an experimental research methodology can be put forward. Experimentation is required for testing consumer behavior with regards to ads on mobile applications.

The above suggested model is a future research suggestion open to be tested within different experimental settings and several advertising campaign time frames. A suggested experimental setting is to have a pre-set respondent sample with specific interests, to whom targeted in-app ads are shown and served with different frequencies. Moreover, the study of consumer response behavior toward ads can be tested within different types of application, to test the relation between consumer responsiveness to ad

and app immersiveness degrees that affect user responsiveness to several types of apps with different levels of needed consumer engagement or immersiveness.

Another drawback of this research was the inability to properly test frequency. As displayed in the suggested model, the frequency metrics were not properly tested, as it was only shown that higher frequencies negatively impact in-app ad experience, and negatively affect consumer attitude when these ads are not well targeted. Yet, no actual results reflect the optimal ad frequencies that positively impact attitude and how the pairing of strategic frequency setting and targeting can endorse more positive attitude.

Also, low frequencies were not fully explored in this thesis. The literature review revealed several advertisers and marketing expert suggestions on lower frequencies for more effective advertising impact, it would be important to further extend studies on this specific area. The pairing of targeting with changed dozes of frequencies require further testing to track the optimal range of ad frequency within a certain digital campaign. Nonetheless, external factors should also be considered in future research; these factors include advertising clutter, hence the exposure of the user to other ads on the same app, as well as consumer inter-application usage as consumers tend to use several applications simultaneously while logged onto their smartphone.

9. Conclusion

Digital mobile advertising success is highly related to key parameters such as targeting and frequency both examined in this thesis. Geographic and interest targeting as well as ad placement targeting techniques positively affect consumer attitude and behavior towards in-app ads. Advertisers should carefully set targeting techniques when buying ad spaces online while considering ad placement, behavioral and geographic

targeting strategies, since poor targeting and clutter can lead to higher negative attitude towards in-app ads resulting in consumer irritation or increased feelings of intrusiveness to the mobile app experience. Strategic ad placement techniques should consider user flow within an application, while considering the type of application user is tuned to.

Levels of engagements on different application types should also be subject of interest to advertisers, and subject to further research as several app types such as food apps, social media apps and shopping apps seem to be more inviting to ads as consumer levels of acceptance is higher on these types of ads. However, advertisers should consider ways to gain consumer acceptance on more engaging apps such as gaming apps on which consumers seem to be more irritated when receiving ads as revealed in this thesis. This could be done through the right choice of ad format such as rewarding playable video ads best fitting immersive gaming platforms, and strategic ad placement within the app break points. Finally, the thesis reveals that frequency is a very delicate parameter as it should be well paired with advanced targeting techniques to deliver successful in-app ad campaign results. Higher ad frequency is shown to result in higher dissatisfaction with app experience and results in higher feelings of invasiveness among app users. This study suggests how frequency should be further explored within several settings to understand optimal frequency and targeting metrics through advanced digital advertising techniques such as Programmatic Ads.

The importance of this thesis study lies is in its ability to understand how Lebanese consumers feel towards in-app ads within the framework of a well-established consumer behavior theory, the Theory of Reasoned Action. The significance of this thesis is also in its investigation of how the two parameters of targeting and frequency affect the

Lebanese smartphone users' behavior toward these ads, an unexplored area of study in Lebanon. To optimize the uses and techniques of mobile in-app advertising, this thesis suggests fine tuning of both targeting and frequency parameters, that together result in more positive consumer attitude towards these ads and higher click-through-rates.

Moreover, this thesis forms a preliminary research ground for the development of future experimental frameworks to study the topic of consumer in-app advertising experience in Lebanon. The thesis also contributes in suggesting a new consumer behavior model applied to digital marketing which serves future research and testing of in-app ad effectiveness within several experimental situations, application types, ad formats and in different cultures.

10. Appendices

Appendix 1: Survey Questionnaire.

Q1: What is your gender?

1- Female
2- Male

Q2: What is your age?

1- Under 18
2- 18-24
3- 25-34
4- 35-44
5- 45-54

Q3: How much time do you spend daily Mobile apps?

1. 0-30 minutes
2. 31-60 minutes
3. 1 to 2 hours
4. 2 to 3 hours
5. More than 3 hours

Q4: What type of apps do you use?

1. Gaming
2. Social Networking
3. Apps related to social media: Ex: Boomerang, Unfollowers, etc…
4. News
5. Messaging apps. Ex: Viber, Whatsapp,
6. Graphic/photo editing
7. Online shopping
8. Food apps
9. Other, specify -------

Q5: List 6 apps you use the most ranking them from 1 (used most) to 6 (used least):

1-

2-

3-

4-

5-

6-

Q6: Have you ever bought something, visited a website, or downloaded an application after receiving an ad within an app?

1. Yes
2. No

Q7: Do you like receiving ads while you are using an app?

1. Yes
2. No
3. Yes, under certain condition

a) If NO, Why not: (You can choose more than 1 answer)

- In-app ads are annoying
- In-app ads disrupt my application experience
- They do not fit my needs and interests
- I feel the ads are not made for me (or well-targeted to me)
- Other, specify: ----------

b) If YES under certain conditions, what are these conditions?

- That the advertisement does not appear too many times
- Ad is relevant to me and my interests
- Ad offers me a discount/ upgrade / Free points (or lives in the app if it's a game)
- Ad content is creative
- Other, specify: ----------

Q8: What are you most likely to do when you receive a mobile ad while using an app?

- 1. Ignore it completely
- 2. Read it/ Click on it right away
- 3. Read it/ Click on it after it appears more than once.
- 3. Read/ Click on it directly if it interests me
- 4. Read/ Click on it if it interests me & it appears more than once

Q9: While using a certain type of app (example: an online shopping app like HiCart.com), a random advertisement pops out about any type of product/or service (the ad is not targeted to you). Kindly rate the below statements:

1. I would be interested in this ad
2. I would most probably click on this ad
3. I would click on the ad only if it interests me
4. I would tell my friend about this new advertised product/service only if the product interests me

Q10: While using a certain type of application (example: an online shopping application like HiCart.com), a targeted ad related to the app you are using pops out (example: if you are checking earphones on HiCart.com, an ad appears featuring earphones on discount on another e-shopping website or app). Kindly rate the below statements:

1. I would be interested in this ad
2. I would most probably click on this ad
3. I would skip this ad even if it is related to the application I am using
4. I would tell my friend about this new advertised product/service/ application
5. I would download and try the new advertised app

Q11: Would you like to receive ads that are related to the applications you are using? (Example: Receive ads about a new restaurant or a food service, while you are on a food app? Or receive an ad about a new football application while you are playing a sports game on a mobile application)?

1. Yes
2. No

Q12: Please rate how the below statements describe you the most: (From highly agree – agree – neutral – disagree – highly disagree):

1. I am annoyed or irritated when receiving irrelevant ads during mobile app usage
2. I am less annoyed or irritated when receiving ads that interest me during mobile app usage
3. I feel that advertisements ruin my mobile application usage experience
4. I do not mind receiving ads during mobile app usage, only if these ads are targeted towards my interests.
5. I think that advertisements within mobile apps are a great idea if they are properly targeted.

Q13: If you are exposed to a targeted ad featuring a product/service that interests you while using any application, please rate the following statements: (from highly agree – agree – neutral – disagree – highly – disagree):

1. I feel happy to have received this ad that is targeted for me (maybe offering me a special deal or a product I really am interested in, or informing me about an application that fits my needs).
2. I feel interested in reading this ad to see what information is provides**.**
3. I am always annoyed or irritated when receiving ads while using an app, even if the ad is well targeted to me.
4. I am willing to click on an ad that is targeted to my interests while I am using an app.
5. I always skip ads when I see them in-app.
6. I look at the ad only if it interests me, when a non-skippable ad appears.

Q14: Would you like to receive ads that offer you discounts?

1. Yes
2. No
3. Yes, if the discount is on a product or a brand that is relevant to my interests.

Q15: Have you ever clicked on an in-app advertising that offers a discount? (Ex: Hi-cart discount ads?)

1. Yes
2. No

Q16: Would you like to receive location-targeted in-app ads? (ex: New movie release ad, while you are nearby the cinema theaters / or ad about the new collection (or sale promotion) from a clothing store you like while you are shopping at the mall where this shop is located?)

1. Yes
2. No

Q17: Would you share your location info while using an application if the app asks your permission to use your location?

1. Yes
2. No

Q18: Are you aware that applications request your location once accessing app to send you ads relevant to your location?

1. Yes
2. No

Q19: If No, would you still share your location with apps, knowing that they will send you ads relevant to your location?

1. Yes
2. No

Q20: While using an application, a targeted ad that you like appears. Please rate below statements. (Very Likely – Likely – Neutral – Unlikely – Very unlikely)

- Feel positive toward this ad because it targets me (attitude)
- Feel neutral toward this ad (attitude)
- Feel negative even if the ad is interesting to me (attitude)
- Have the intention to read the advertisement (behavioral intention)
- Have the intention to click the ad(behavioral intention)
- I click on the ad (behavior)
- I read the ad (behavior)
- I skip the ad (behavior)

Q21: Do you think if you saw less ads in an application, you would enjoy the application experience more?

1. Yes
2. No

Q22: Do you think that high frequency of an ad (how many times advert appears when you are using an app) negatively affects your application experience?

1. Yes
2. No
3. This is related to the type of App I am using

Q23: In which kind of application do you think ads are more/less annoying? Rate 1 (less annoying) to 4 (more annoying): (Use semantic differential scale)

- Social media apps Less annoying O O O O More annoying
- Gaming apps Less annoying O O O O More annoying

- Online shopping apps	Less annoying	O	O	O	O More annoying
- Food apps	Less annoying	O	O	O	O More annoying
- News apps	Less annoying	O	O	O	O More annoying
- Editing apps	Less annoying	O	O	O	O More annoying

Q24: Please rate the below statement: (1 highly Agree – 2 Agree – 3 Neutral – 4 Disagree – 5 highly Disagree)

- The higher the ad frequency the higher my dissatisfaction with my app experience
- The higher the ad frequency the more I am annoyed during application usage
- I might stop using an app, because of its high ad frequency

Q25: Do you think if you see an ad a higher number of times during your app usage, you (Very Likely – Likely – Neutral – Unlikely – Very unlikely)

- Are more likely to click on the Ad
- Are more likely to click on the Ad, only if the ad interests you
- Are as much likely to click on the ad as if it appears just 1 time

Q26: If an ad that interests you pops out while you are using an application, when is it probable that you click on it?

1. First time I see the ad
2. Second time I see the ad
3. Third time I see the ad
4. When I see the ad more than 3 times

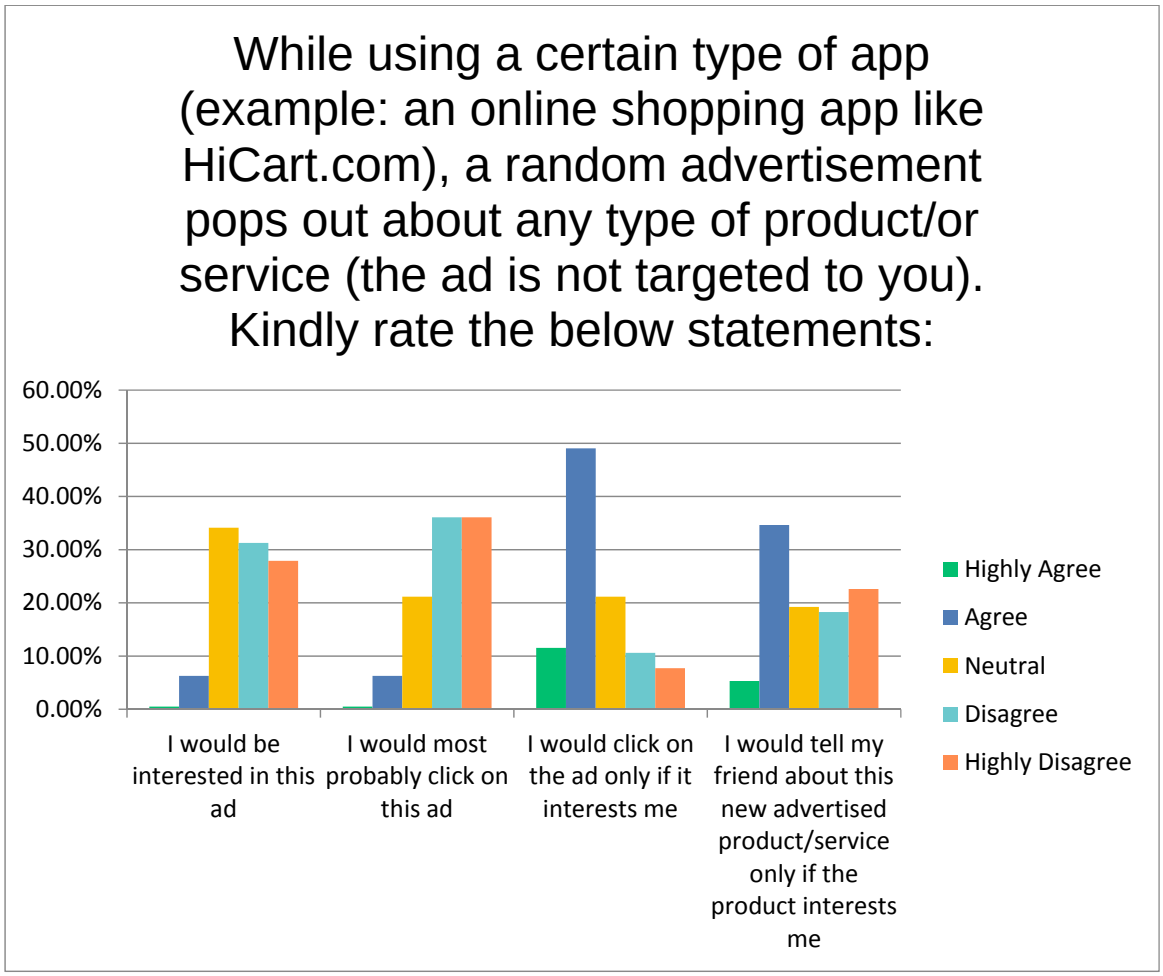
Q27: What do you think should be the frequency (# of times you see the ad while you are using the app) of an advertisement in an application?

- Every 1 minute
- Every 2 minutes
- Every 3 minutes
- Every 4 minutes
- More than 4 minutes

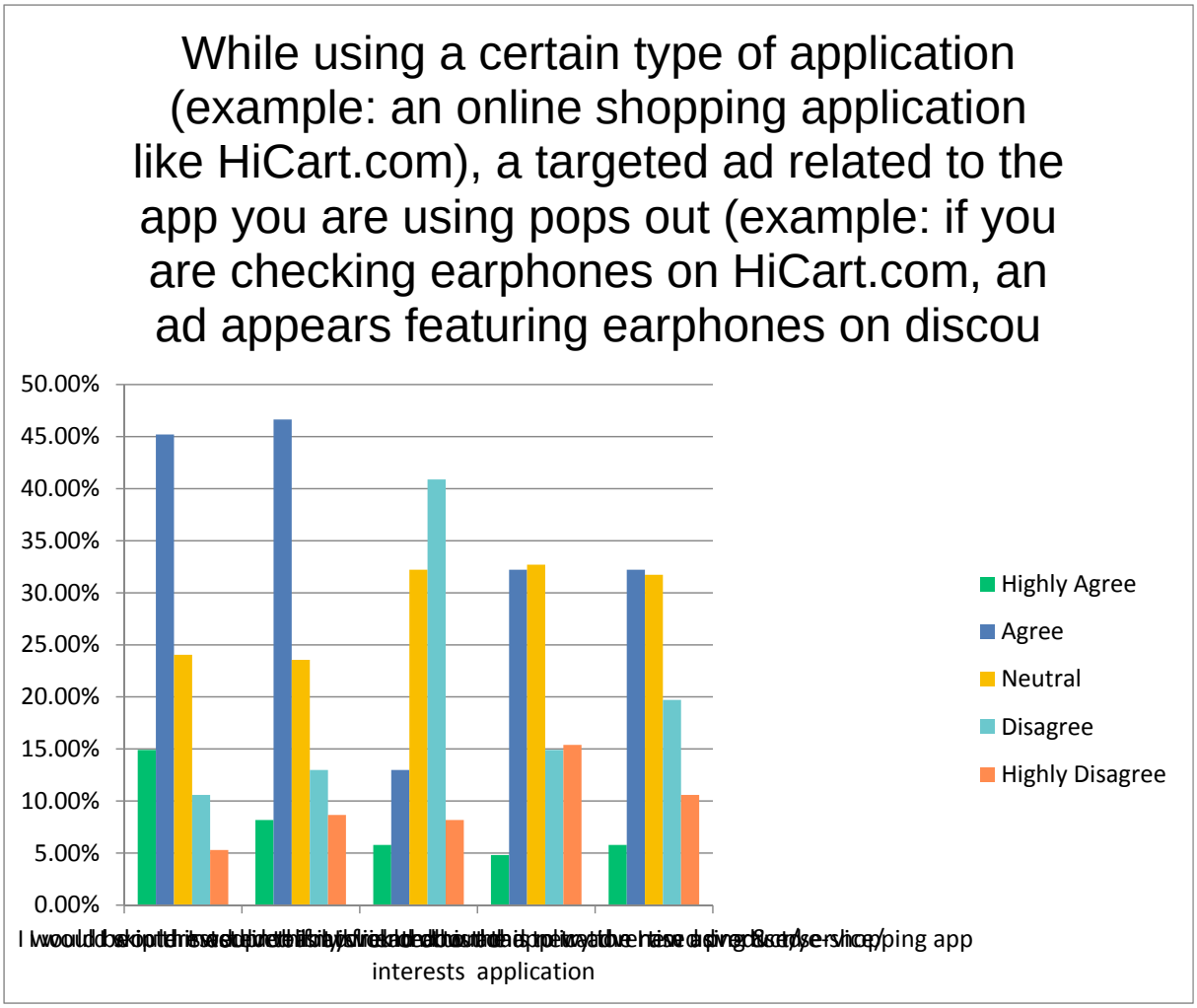
Q28: How many times out of 10 do you skip and ad while using an application?

1. 1/10
2. 2/10
3. 3/10
4. 4/10
5. 5/10
6. 6/10
7. 7/10
8. 8/10
9. 9/10
10. 10/10

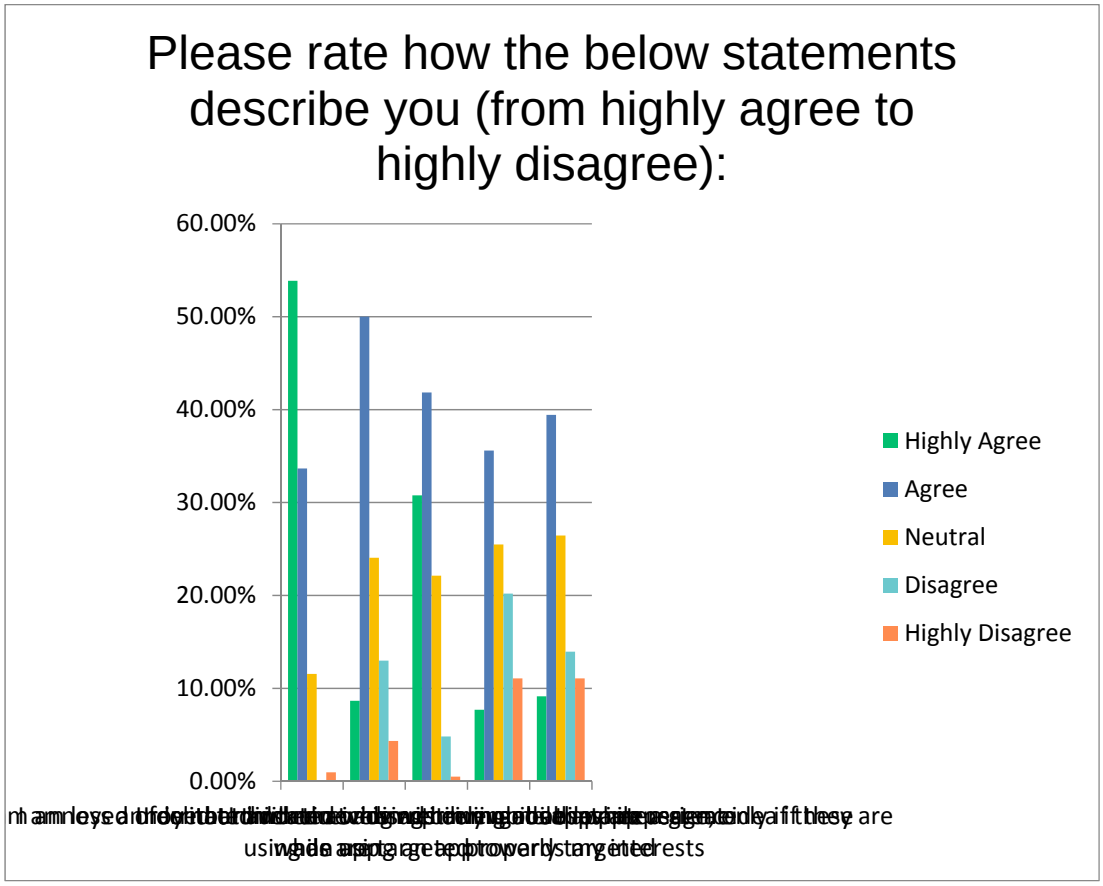
Appendix 2: Ad Impact within untargeted ad placement



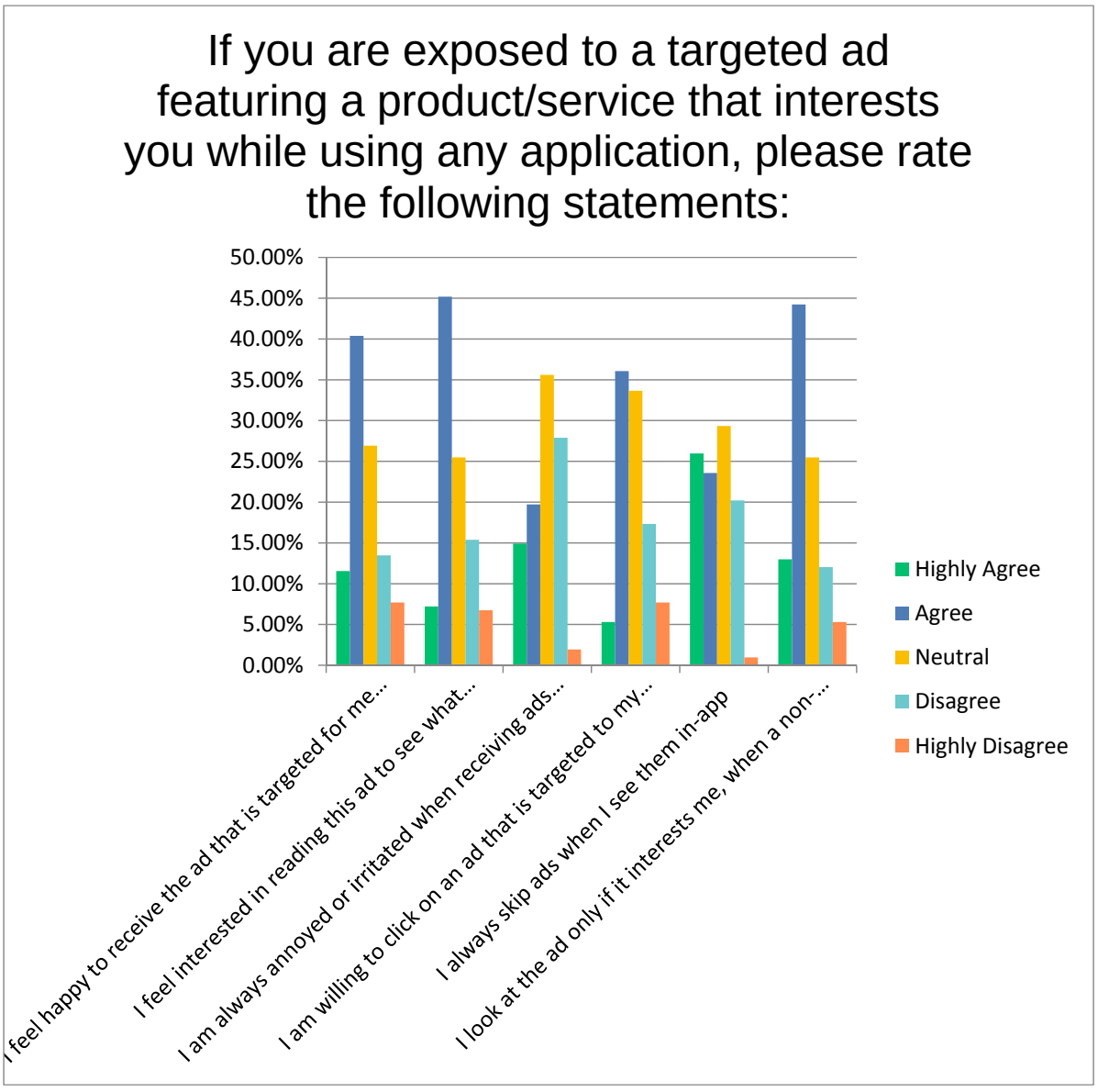
Appendix 3: Ad Impact within targeted ad placement



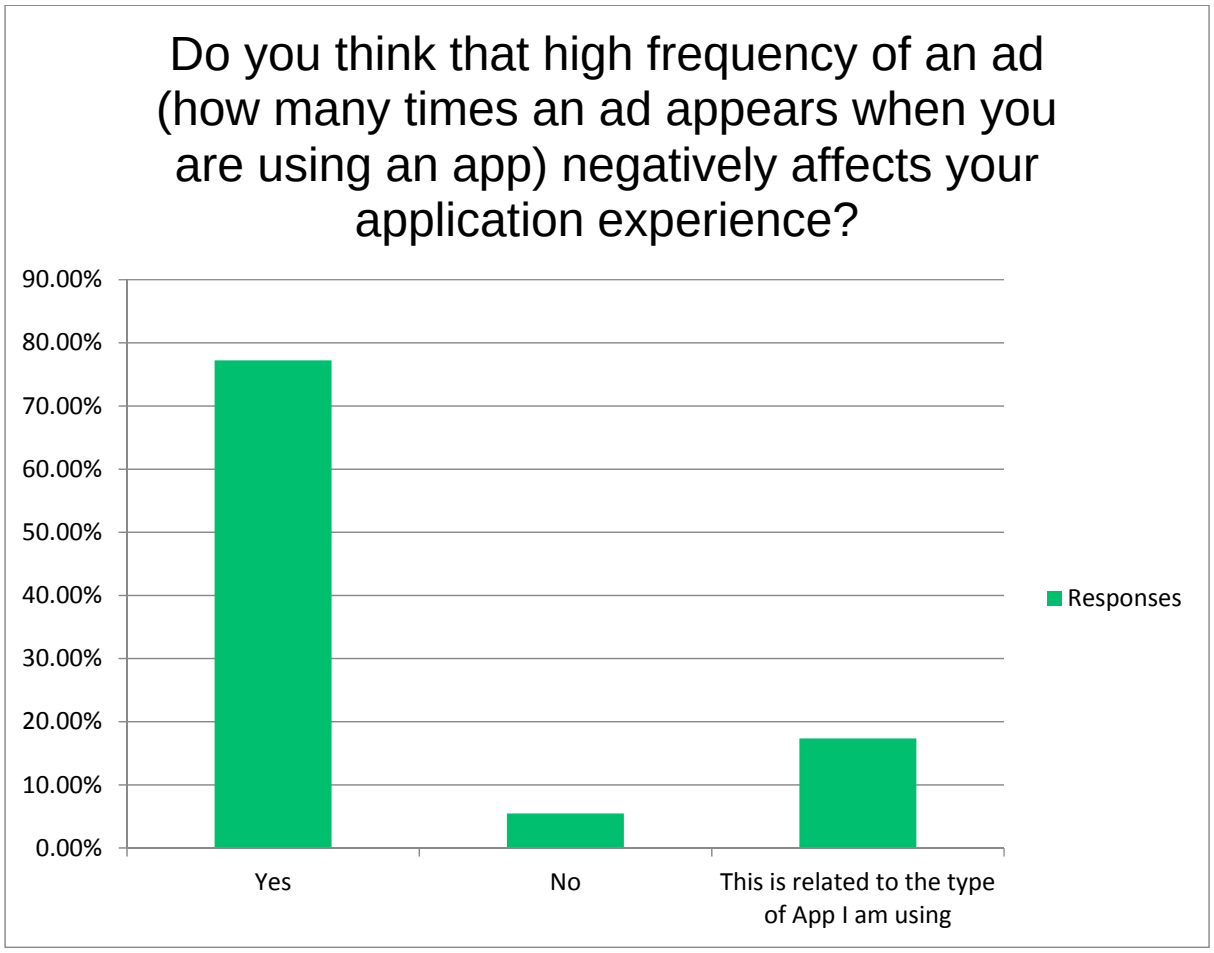
Appendix 4: Advertising Intrusiveness



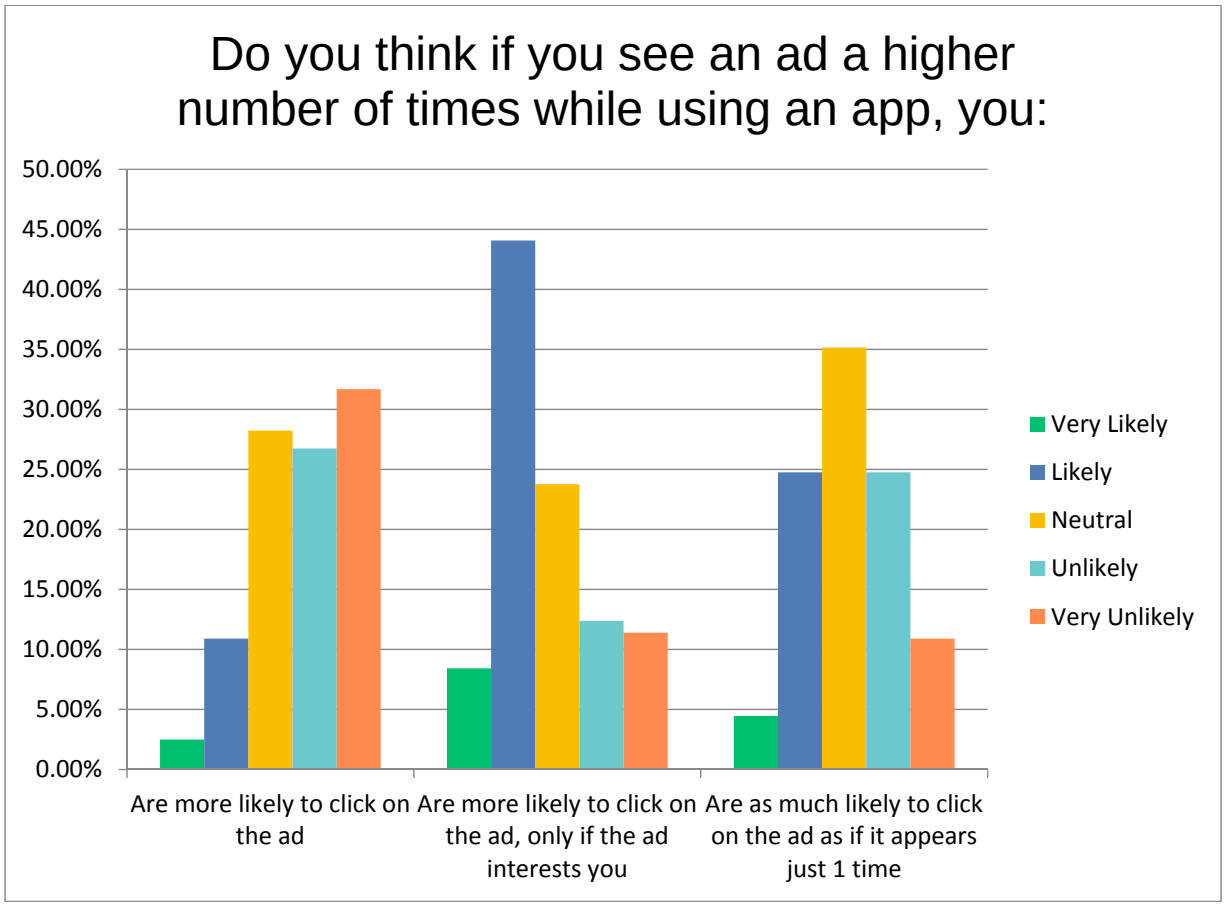
Appendix 5: Targeting, Attitude, and Behavior



Appendix 6: In-app Ad Frequency & App experience



Appendix 7: In-app Ad Frequency & CTR



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