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To cite this article: Raines, C. 2013. In-App Mobile Advertising: Investigating Consumer Attitudes Towards Pull-Based Mobile Advertising Amongst Young Adults in the UK. *Journal of Promotional Communications*, 1 (1), 125-148

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Callum Raines

In-App Mobile Advertising: Investigating Consumer Attitudes Towards Pull- Based Mobile Advertising Amongst Young Adults In the UK

Fuelled by the Smartphone's continued diffusion, the mobile advertising market has experienced a revival. The discerning marketer now faces a plethora of advertising opportunities to choose from, although arguably In-App advertising has been positioned as the medium with the greatest potential. Far removed from the legacy of push-based mobile advertising formats the extant literature has addressed, there is little empirical research focused solely on in-app advertising. The present study sets to address this omission, investigating consumer attitudes specifically towards in-app advertising, the relationship between attitude and behaviour, and the factors influencing overall attitudes. The results of a survey revealed generally negative attitude towards in-app advertising, with the relationship between attitude and behaviour confirmed. Irritation and Entertainment are identified as the central drivers in attitude formation. Recommendations are proposed as to how marketers can best meet consumer requirements and drive positive attitude formation.

Keywords: Consumer attitudes, attitude towards advertising, mobile advertising, mobile apps, advertising effectiveness



Callum Reines, In-App Advertising, *Journal of Promotional Communications*, Issue 1, 125-149

INTRODUCTION

The International Telecommunication Union (2013) recently revealed the number of mobile subscriptions would exceed that of the global population by 2014. One of only a handful of consumer products to gain global acceptance within a relatively short time frame (Barnes and Scornavacca 2004), the mobile has achieved seamless integration within society. A ubiquitous entity with a plethora of unique attributes, the depiction of the mobile as the next great conduit between consumer and advertisers is self-explanatory (Barnes 2002; Wilken and Sinclair 2009). By virtue of their ubiquity and highly personalised nature, the mobile enables organisations to establish a pervasive presence alongside their customers anytime, anywhere (McStay 2010; Varnali and Toker 2010). Propelled by the aggressive growth in Smartphone ownership, industry analysts forecast mobile advertising's (m-advertising) annual worth at \$11.4bn in 2013,

up from \$9.6bn in 2012 (Gartner 2013). Within the UK alone, m-advertising revenue has tripled in one year, accounting for 10% of total digital spending and half of all digital advertising growth. Providing perspective, three years ago it was a mere 1.1% (Internet Advertising Bureau UK 2013). Fuelled by the Smartphone's technological advances marketers are presented with an increasing number of advertising opportunities to choose from. Yet despite the exponential growth witnessed there is currently scant academic literature that addresses consumers' attitudes towards advertising presented through this medium (Persaud and Azhar 2012).

Existing research on m-advertising is outdated, the majority of studies focused upon legacy formats such as SMS advertising (Tsang et al. 2004; Bauer et al. 2005; Chowdhury et al. 2006; Choi et al. 2008; Liu et al. 2012). One major difference between legacy and the next generation of m-advertising pertains to how the advertising is accessed. Legacy formats such as SMS and MMS are pushed towards the consumer, where as mobile web or in-app advertisements are typically initiated or pulled upon by the consumers themselves (Barnes 2002; Yang et al. 2012). The literature available is anecdotal at best, based on assumptions over actual assessment (Burns and Lutz 2006; Schlosser et al. 1999). Further research is needed to gain clearer insights into how consumers will react to the innovative marketing opportunities the Smartphone offers (Persaud and Azhar 2012; Okazaki et al. 2012).

Of the many new advertising opportunities available, the mobile app is perhaps most deserving of attention. A sociocultural and economical phenomenon, just five years into existence the app economy is thriving with Apple's (2013) App Store boasting nearly 50 billion downloads. Enabling the Smartphone to be continuously reconfigured and repurposed, app stores serve the individual user through their choice of downloadable apps and content (Persaud and Azhar; Watkins et al. 2012). The provision of in-app advertising offers organisations the opportunity to target consumers directly within their mobile apps. This is a potentially lucrative and responsive consumer base, spending on average two hours per day within apps (Khalaf 2013). Accounting for over 80% of their total phone usage apps are challenging incumbent media channels, television in terms of reach, and the Internet in terms of engagement (Farago 2011). In-app advertisements can be displayed via a series of banners, pop ups or full-screen interstitials. More akin to online advertising (Richard and Meuli 2013), in-app advertising provides a far richer experience than previously possible, given its interactive and multimedia features. However limited anecdotal evidence has indicated a lack of enthusiasm amongst UK consumers, just 17% of Smartphone users are favourable towards mobile ads, compared with 34% for online display (Millward Brown 2012). While polling studies should not be treated with certainty, this particular study raises the impetus for research to empirically assess attitudes towards in-app advertising as a medium.

The importance of measuring attitudes towards advertising has proven to be an essential component of advertising effectiveness, attitude demonstrated to influence consumers' exposure, attention, and reaction to individual ads (Schlosser et al. 1999; Cheng et al. 2009). In addition, the well-documented relationship between attitude and behaviour (Fisbein and Azjen 1975) has confirmed the importance of attitude as a predictor of desirable behaviour. Considering the exponential growth and consumption of apps combined with the unique advertising possibilities they provide, it is in both academic and managerial interest to assess attitudes. This paper aims to correct the current research deficit, investigating consumer attitudes towards in-app advertising, the relationship between attitude and behaviour, and the factors influencing overall attitudes towards m-advertising.

LITERATURE REVIEW

Led by the seminal work of both Barnes (2002) and Barwise and Strong (2002) an increasing body of literature is dedicated to the study of m-advertising. While there has been considerable inconsistency amongst academic and industry practitioners when defining m-advertising (Richard and Meuli 2013), the Mobile Marketing Association's (2013) definition has been operationalised:

“Mobile advertising is a type of advertising that is communicated to the consumer via a handset”.

This definition can be used across the two classifications of m-advertising that have frequently been discussed within the m-advertising literature; Push and Pull (Barnes 2002). Separating the two classifications the distinguishable difference pertains to the mode of access, push advertising involves the marketer actively pushing a message to the consumer. By contrast pull advertising is where the consumer voluntarily ‘pulls’ upon advertising content such as a banner ads.

Attitude

Perhaps the most indispensable concept in contemporary American social psychology (Allport 1968), few constructs have been as central to any discipline as attitude has been in both advertising and psychology (Clark et al. 1994). While there are numerous definitions, the author has opted to use the most frequently observed within the literature:

“Attitude is a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object”
(Fishbein and Azjen 1975, p.6).

Attitude has also formed a central component within the technology acceptance models, attitude used to predict likelihood of technology acceptance based on five main constructs, two of which are attitude and intention. On the same vein attitude alongside intention and behaviour partly form the Theory of Reasoned Action (TRA), the relationship between attitude and behaviour confirmed in numerous studies (Fishbein and Azjen 1975; Tsang et al 2004).

Attitude Towards Advertising

Since the end of WWII considerable research has sought to assess consumer attitude towards advertising (Ewing 2013), hereby conceptualized as a learned predisposition to respond in a consistently favourable or unfavourable manner to a particular advertising stimulus from a general advertising medium (such as online advertising) and not a specific individual advertisement (Mackenzie and Lutz 1989; Richard and Meuli 2013). One of the most prevalent and well-documented applications of attitudinal research, the rationale as to the continued assessment of public attitudes to advertising is relatively simple (O'Donohoe 1995). As a strong measure of advertising effectiveness (Greyser 1972 cited by Dutta-Bergman 2006), attitude toward advertising has been proven to influence consumer's exposure, attention and crucially reaction to individual ads (Alwitt and Prabhakar 1992; Schlosser et al. 1998). In turn, a consumer's attitude towards an individual ad (Aad) can lead to a number of desirable consumer outcomes, including: influencing attitude brand choice, attitude towards brand and even purchase intent (Lutz 1985 cited by Dutta-Bergman 2006). As such, both the academic and managerial importance of consumer attitude toward advertising can be inferred, with an increasing body of literature developed to deal with consumer attitudes towards advertising in general and specific media such as online and mobile advertising.

Attitude Towards Advertising in General

While public attitudes toward advertising were once found to be favourable (Gallup 1958 cited by Dutta-Bergman 2006), subsequent research has traced the progressively negative public attitudes towards advertising (Schlosser 1998).

Media specific attitudes have also been studied and compared (Mehta 2000; Alwitt and Prabhaker 1992; Alwitt and Prabhacker 1994; Elliot and Speck 1998 cited by Tsang et al. 2004), with attitudinal research increasingly turning towards investigating the structure and underlying factors that influence attitude (Schlosser et al. 1998). Typically perceptions towards both advertising in general, and specific media, has been assessed by investigating perception of advertising's trustworthiness, informativeness, as well as regulatory issues including sexual content and ethics (Schlosser et al. 1998; Mehta 2000).

Attitude Towards Online Advertising

Generally, attitude towards online advertising have been said to be more positive than traditional media (DuCoffe 1996; Schlosser 1998), more entertaining and informative, and less irritating. Brackett and Carr (2001) later adapted DuCoffe's (1996) web advertising model, increasing the overall explanatory power by integrating Mackenzie and Lutz's (1989) 'Credibility' construct as a positive attitudinal antecedent. Entertainment and Informativeness were also shown to positively influence consumer attitudes in line with DuCoffe (1996), but Irritation was subsequently established to exert a negative influence on attitude. Both studies are universally linked through their integration of Entertainment, Informativeness and Irritation, generally recognised as the most robust and potent content dimensions within media theory uses and gratification theory (Lou et al. 2002; Liu et al. 2012). This is of particular interest to the present study, not only because these content dimensions have been found to be universally applicable to traditional media but particularly for the Internet as evidenced by DuCoffe (1996) and Brackett and Carr (2001). Schlosser et al. (1998) also found the enjoyment of viewing advertising as the strongest predictor of attitude towards Internet advertising, further reassurance of these constructs relative strength.

The theoretical framework Wolin et al. (2002) introduced deserves explicit recognition, assessing consumer beliefs, attitude towards online advertising and crucially, reported behaviour. Several other studies had previously assessed the relationship between attitude and behaviour in the context of advertising (Assmus et al. 2002 cited by Wolin et al. 2002). However crucially Wolin et al. (2002) was one of the first studies to model the construct of attitude towards online advertising. A strong relationship was found between attitude and behaviour in this study, the more positive consumer attitudes were to online advertising the greater the likelihood they would respond favourably to ads. Wang and Sun (2010) added significantly to the work of Wolin et al. (2002), again highlighting attitude towards online advertising as a significant predictor of click through rate and frequency of online shopping.

Attitude Towards Mobile Advertising

Arguably, Tsang et al. (2004) was the first purely attitudinal study within m-advertising literature, a seminal publication still highly regarded within the field (Okazaki and Barwise 2011). Incorporating the framework Brackett and Carr (2001), Tsang et al. (2004) increased the theoretical value of the original model integrating a simplified version of Fishbein and Azjen's (1975) TRA. Findings demonstrated the robustness of the TRA within a mobile context, attitude positively related to intention to receive SMS advertising messages, with intention significantly affecting how and when respondents

chose to read their messages. Entertainment followed by Credibility and Irritation were the most significant factors affecting attitude, although it must be noted attitudes were generally very negative on the whole. Since the seminal publication of Tsang et al. (2004), a number of additional studies have also confirmed the relationship between attitude and behaviour (Bauer et al. 2005; Xu 2006; Jun and Lee 2007; Xu et al. 2009; Ünal et al. 2011). In addition, consumer attitudes towards mobile advertising are generally low, with the majority of attitudinal studies detailing both poor perceptions and attitudinal scores (Chowdhury et al. 2006; Jun and Lee 2007; Choi et al. 2008; Ma et al. 2009).

As the majority of studies predominantly focused on the attitudes and underlying structure rather than behaviour, there is a comprehensive body of literature detailing factors that influence attitudes. Commonly, informativeness and entertainment are depicted as the central drivers in attitude formation (Okazaki 2004; Bauer et al. 2005). By contrast irritation has continually been shown to negatively influence consumer overall attitude (Tsang et al. 2004, Choi et al. 2008). Perceptions of Irritation are usually subordinate in overall influence though, when compared with Entertainment and Informativeness (Okazaki 2004; Haghirian et al. 2005; Ünal et al. 2011). Credibility has also been identified as key factor in influencing attitudes, originally featured within Bracket and Carr's (2001) integrated web advertising framework. Unlike Irritation it has also been proven to rival the central drivers of attitude, Entertainment and Informativeness, both Liu et al. (2012) and Ünal et al. (2011) research revealing credibility as the key influential variable.

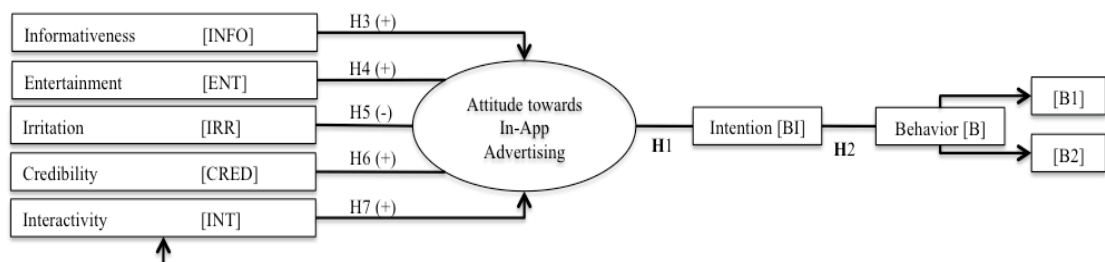
However while insight on attitude structure is useful, the considerable ambivalence of consumer attitudes must be considered. This can easily be observed from a variety of studies that have shown entertainment to be more influential than informativeness (Tsang et al. 2004; Haghirian et al. 2005; Choi et al. 2008), and an equivalent number that have proved vice versa (Cheng et al. 2009; Ünal et al. 2011). As such it is somewhat disappointing to see only a few authors attempting to test additional factors that may influence consumer attitudes, although Xu's (2006), Jun and Lee's (2007) and Choi et al. (2008) provision of 'personalization' and a basic scale of interactivity are notable exceptions. Interactivity is one such measure that should rightfully be included; the exploratory work of Liu (2003) and Gao et al. (2009) demonstrating perception of interactivity could be strong predictors of positive attitudes. However it must be highlighted, as critique of the overall m-advertising research field that there is an observable disproportion in research that focused solely on attitude, rather than attitude toward advertising. Not to detract away from the significant contribution purely attitudinal studies have provided, one must reflect upon their individual worth as a broad measure of advertising effectiveness (Dutta-Bergman 2006; MacKenzie and Lutz 1989). However the predictive power attitude affords upon making the conceptual linkage between attitude and behaviour is particularly important within this study's context.

As a form of pull-based advertising in-App advertising is reliant on the individual, they themselves must activate the advertisements. The burden of interaction is placed upon the individual, their choice as to whether they view or tap upon the in-app banner. Thus assessing consumer attitudes, intention and behavioural is an essential requirement to further common goals of advertising effectiveness within an app context, predominantly click through and exposure. For while a consumers overall attitude can influence individuals ads, arguably and as per Preston (1985 cited by Jun and Lee 2007), the best way to measure advertising effectiveness is through actual behaviour.

Theoretical Framework

As the extant literature across online and m-advertising has shown, attitudes toward advertising can be viewed as a strong measure of advertising effectiveness due to the pivotal role the construct holds through influencing consumer response to individual adverts (Alwitt and Prabhakar 1992; Schlosser et al. 1998). In addition, it has also been shown in studies by Wolin et al (2002), Wang and Sun (2010), Tsang et al. (2004) and Bauer et al. (2005) that the construct attitude towards advertising, whether mobile or online, could successfully predict desirable market behaviour such as a click through. In addition, the relationship between attitude, behaviour and intention have been confirmed numerously throughout the broad field of Social Sciences (Tsang et al. 2004). Finally the review of the literature identified four of the most prevalent factors in influencing attitudes, Entertainment, Irritation, and Credibility generally identified as positive attitudinal factors with Irritation holding a negative influence. In addition and considering the highly interactive nature of in-app advertising a brief discussion of the role interactivity plays in attitude formation was briefly discussed, the fifth and final factor to be added to proposed framework (see fig.1). The integrated in-app advertising model, is based on an adapted version of Tsang et al. (2004) m-advertising model, and includes the aforementioned variables. This will enable the investigation of consumer attitudes towards in-app advertising, the relationship between attitude and behaviour, and factors influencing overall attitudes.

Figure 1- Integrated In-App Advertising Mode



The following hypotheses are presented:

H₁: Attitude towards in-app advertising will affect intention to interact with in-app advertising.

H₂: Intention to interact will affect consumer behaviour [Close Attention (B1) or Click Through (B2)] towards in-app advertisements upon exposure.

H₃₋₇: Perceptions of Informativeness, Entertainment, Credibility and Interactivity will positively influence attitude towards in-app advertising, with Irritation exerting a negative influence.

METHODS

Setting

In order to assess consumer attitudes and behaviour a field study was carried out between March and April 2013 within the United Kingdom. An important research setting, the UK has been somewhat neglected within the existing research (Okazaki and Barwise 2011) despite over two thirds of the population owning a Smartphone (Internet

Advertising Bureau UK 2013). In addition UK citizens consume more data on their phones than any other nation (Ofcom 2012), with advertisers spending more per mobile Internet user than any other country in the world (eMarketer 2013).

Sample

University students were selected as the primary research population, appropriate upon consideration of their basic demographic profile and high level of Smartphone adoption (Pew Internet 2011; Ofcom 2012). Furthermore as the success of innovative marketing instruments can only be ensured if consumers continuously use them (Bauer et al. 2005), an essential prerequisite is for the chosen sample to have sufficient previous exposure of mobile apps. Students are classified as high usage users, both in terms of downloads but also time spent within mobile apps (Pew Internet 2011). While there has been considerable academic opposition to the selection of student samples or so-called study of the sophomore (Jones and Sonner 2001), this opposition is arguably of less significance within this type of attitudinal research. Reflecting the paper's deductive research principles, the selection of a student sample replicates other sampling methods observed within the existing literature. As per Okazaki and Barwise (2011), 41% (n=7) of studies used student samples, with the remaining samples General Consumer 47% (n=8) and Private Samples 11% (n=2). A non-probability convenience sampling method was adopted. Sample size was determined upon the recommendations of Gorsuch (1983 cited by Ryu and Jackson 2005) and Hatcher (1994 cited by Ryu and Jackson 2005), a 5.1 ratio of subjects to item deemed appropriate. With 31 attitudinal items, a reverse engineered sample size of 155 respondents was arrived at. Not dissimilar to the existing research, in recent years samples have generally become smaller in size and less nationally representative (Shavitt et al. 1998). Due to the modest sample size and sampling method, the ability for the results to be generalised is significantly reduced (Shavitt et al. 1998). However upon considering the virgin territory the current study is attempting to address, the insight afforded as a result of the research should be prioritised as it will likely outweigh the limitations of the sampling procedure (Wolin et al. 2002; Shavitt et al 1998).

Data Collection

In line with the majority of the extant literature the method of data collection was a voluntary, online, anonymous and self-administered survey. Online surveys are particular apt for this study ensuring all respondents were of some technical proficiency (Richard and Meuli 2013). In addition for studies that necessitate measurement of attitude and behaviour, surveys are typically regarded as the most desirable data collection method (Saunders et al. 2009; Davis 1993 cited by Okazaki 2007a). The survey was pretested on twenty individuals between 22-26 March 2013 in order to identify and eliminate problems (Malhotra and Birks 2005), respondents were purposively sampled to ensure an accurate representation of the final survey population (Saunders et al. 2009). On the basis of their feedback the questionnaire was revised and distributed 27th March to 7th April 2013. In total, 132 responses were collated, of which 29 responses were excluded due to sample externality (n=22) and partial data records (n=7). Leaving 103 responses suitable for data analysis a response rate of 83.7% was established.

Questionnaire Design

The questionnaire consisted of three sections (**S1-3**). **S1** collated basic demographic information to profile respondents while also assessing university status, a sample qualification measure. **S2** collected data on respondent's mobile device, documenting

typical usage and previous exposure to m-advertising as per Okazaki's (2007b) recommendations. Mobile operating systems were also recorded in an attempt to identify and account for any difference in behaviour across mobile platforms, a pattern regularly observed in industry reports (Jones 2013; Travis 2013). S3 contained questions pertaining to the major constructs identified in the theoretical framework.

Scale Development

While a variety of attitude assessment methods currently exist the most prominent and widespread strategy remains to be the attitude scale (Tavsancil 2006 cited by Narli 2010), where respondents rate a series of statements concerning m-advertising. A total of 31 items measured respondent's perceptions, attitudes and behaviour towards the medium, each construct assessed using a multi-item five-point likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5). Both behavioural acts [B1,B2] were assessed on a five-point scale ranked from Never (1) to Always (5). All scales featured within the survey were adapted from the extant literature, modified only to ensure sufficient fit between item and medium. The scales measuring perceptions of Informativeness, Entertainment, and Credibility were adapted from Wang and Sun's (2010) attitudinal study into online advertising and Irritation from Tsang et al. (2004). Perceptions of Interactivity were measured using Liu's (2003) scale for assessing website interactivity, which was chosen due to the relative simplicity compared to mobile specific scales. Attitude was measured using Yang et al. (2012) scales. A minimum of three items was specified for each scale. This multi-item approach averaging out the specificity inherent with single item measures, increased reliability while reducing measurement error (Churchill 1979). For each construct scale items were averaged to create an index, however for Interactivity the three dimensions were averaged independently before consolidating into one construct. For a summary of the operationalised constructs refer to Table 1.

Table 1- Loaded Items, Descriptive Statistics and Internal Reliability

	I feel In-App Mobile Advertisements...	N	Mean	SD	Cronbach's αs
INFO	are a good source of product information	103	2.36	1.06	
	supply information that is relevant to me	103	2.15	0.99	
	provide timely information	103	2.19	1.01	
	Informativeness		2.23	0.86	
ENT	are enjoyable	102	1.56	0.65	
	are entertaining	103	1.66	0.77	
	are pleasant	103	1.76	0.83	
	are interesting	103	1.84	0.89	
	Entertainment		1.70	0.71	0.92
IRR	are irritating	103	4.45	0.72	
	are almost everywhere	103	3.78	1.04	
	are often annoying	103	4.19	0.81	
	Irritation		4.14	0.69	
CRED	are credible	103	2.52	1.02	
	are trustworthy	103	2.34	0.88	

	are believable	103	2.45	1.02	
	Credibility		2.44	0.90	0.91
AC (INT)	incorporate your actions to decide the kind of experience you get	103	2.84	0.87	
	let me control the overall viewing experience	103	2.33	0.93	
	let you choose freely what you'd like to see	103	2.12	0.84	
	Active Control		2.43	0.69	0.68
TWAY (INT)	are effective in providing an opportunity for me to give feedback	101	2.22	1.07	
	make me feel the brand wants to listen to me as the consumer	102	2.07	0.96	
	are effective in providing the smart phone owner an opportunity to respond.	102	2.29	1.04	
	Two Way Relationship		2.19	0.92	0.88
SYNC (INT)	content is very fast	103	3.02	1.10	
	provide the information you want without any delay.	103	2.67	0.97	
	provide you receive instantaneous information upon a click.	103	2.99	1.07	
	Synchronicity		2.89	0.93	0.86
INT	Interactivity		2.51	0.62	0.81
ATT	I am favorable towards In-App Mobile Advertising	103	1.88	0.88	
	I like In-App Mobile Advertising	103	1.77	0.78	
	I am satisfied with In-App Mobile Advertising	103	2.03	0.99	
	Overall In-App Mobile Advertising is Positive.	103	2.01	0.82	
	Attitude towards In-App Advertising		1.92	0.77	0.91
BI	I am willing to voluntarily interact with In-App Mobile Advertisements.	103	1.80	0.91	
B1	When I see an ad in	103	1.81	0.79	

	a mobile app, I pay close attention to it.				
B2	When I see an ad in a mobile app, I tap on the advertisement to find more information	103	1.50	0.62	

Reliability and Validity

Upon conducting any research involving psychometric scales it is fundamental to address the issues of reliability and validity of the measures (Ghiselli, Campbell, and Zedeck, 1981 cited by Ryu and Jackson 2006). As per Churchill (1979) Coefficient Alpha was the first measure used to test the quality of the instrument, the basic statistic for determining the reliability of a measure based on internal consistency. As can be observed from Table 1 all of the constructs resulting alphas were above the well-accepted level of 0.70 (Nunally 1978). When considering research validity three types correspond to psychological scale development; content, criterion-related and construct validity (DeVillis, 1991 cited by Ryu and Jackon 2006). A significant degree of content validity can be inferred; all scales adapted from journals currently indexed in the SSCI indexes of the ISI Journal Citation Report (ISI 2011) with 5-year impact factors ranging from 1.57-2.42. Additionally no respondents reported comprehension issues during the pre-test period, inferring face validity.

Due to the considerable limitations of this study, mainly technical proficiency and sample size, criterion and construct validity cannot be fully tested. However, the use of scales previously published infers they would have previously been tested on large and well-defined populations, factor analysed to assess structure, tested for internal reliability and checked for various forms of validity (Schrauf and Navarro 2005). As such the data reliability and validity requirement of this study are sufficiently satisfied.

FINDINGS AND ANALYSIS

Final Sample

The final sample consisted of 103 student respondents, the ratio of response favoring females (67%) over males (33%). The majority of respondents were enrolled on Undergraduate degree programs (92%), of which 63% were in their final year of study. As a young age demographic was previously identified as the strongest predictor of mobile application usage,

	N	%
<i>Gender</i>		
Male	34	33
Female	69	67
<i>Age</i>		
<20	18	18
<23	76	74
<25	04	04
<28	01	01
>29	04	04
<i>Degree Program</i>		
Undergraduate	92	89.3
Y1	10	9.7
Y2	10	9.7
Y3	63	61.2
P/Y	09	8.7
Postgraduate	09	8.7
Other	02	1.9
<i>Device Ownership</i>		
Featurephone	4	04
Smartphone	104	96
<i>Mobile O.S.</i>		
Android	32	31
Blackberry OS	09	09
iOS	56	54
Windows Phone	02	02
Other	05	05

the current studies sample is particularly appropriate, 91.3% of students aged 18-24 (Pew Internet 2011). Additional descriptive statistics can be observed in Table 2.

Hypotheses Testing

In order to successfully assess if attitude towards in-app advertising influenced behavioural intent (**H₁**), and whether intention predicts behaviour (**H₂**) a Pearson's bivariate correlation analysis was performed. **H₃** to **H₇** were similarly tested using Pearson's correlation analysis, before a stepwise regression analysis was implemented in order to determine the five-attitudinal antecedents individual contribution to overall attitude. Both correlation and multiple regression analysis assume that the variables in the analysis must satisfy the assumptions of normality, linearity and homoscedasticity (Grace-Martin 2008; Laerd Statistics 2013). As such the data went through a screening process to ensure it satisfied these statistical assumptions, thereby increasing the present study's transparency (Freese 2007). Linearity was assessed using an ANOVA analysis, the relationship between the dependent and each of the independent variables revealing the deviation of linearity to be statistically insignificant ($p > 0.05$) across all variables and thus confirming linearity. In addition both the Breush-pagan ($\chi^2=3.853$, $p > 0.05$) and Koenker test ($\chi^2=3.894$, $p > 0.05$) satisfied the assumption of homoscedasticity.

The Shapiro-Wilk test was used to assess for normality and revealed the data did not exhibit a normal distribution. Admittedly the extent of non-normality was as the author expected, considering the data collection method. A generally acknowledged fact that the assumptions of data normality will not be observed when using likert scales (Wu 2007) and as such one must reflect on Norman's (2010, p.8) frequently cited review of behavioural sciences likert usage. He proved that the analysis of likert data using advanced parametric tests could be utilised without concern, even if a non-normal distribution was observed. Therefore it was deemed the data set was suitable for parametric testing, meeting all four of the requirements specified.

Attitude towards In-App Advertising

As shown in Table 3 data from the sample respondents shows a significantly negative attitude towards in-app advertising, the mean attitude score considerably below the anchoring point at 1.92 ($n=103$). In line with the previous research within this field, Tsang et al. (2004), Xu (2006), Jun and Lee (2007), Choi et al. (2008) and Ma et al. (2009) also reported considerably negative attitudes towards m-advertising albeit push based SMS advertisements. Crucially these findings also mirror the negative attitudes Okazaki (2004, 2007a) found in his study into pull based i-Mode advertisements. This is of particular importance upon considering the close resemblance between in-app and i-Mode advertisements, both content rich, interactive and voluntarily initiated by the user. Upon initial analysis it would appear the richer content experience of m-advertising can afford does little to reverse the sample respondents negative evaluations of the medium. This contradicts a number of academics that alluded, if not explicitly recommended, the positive affect rich content m-advertising formats would exert on consumer attitudes (Jun and Lee 2007).

Relationship between Attitude and Intention

In order to address **H₂** and establish whether attitude towards in-app advertising affects intention to interact with in-app advertising, respondents were asked to indicate their willingness to voluntarily interact (click/tap) upon exposure to an in-app advertising banner. This approach had previously been observed from the more sophisticated

attitudinal studies focused on an online mediated environment, and was adapted from the study Wang and Sun (2010). Considering the negative attitudes already identified, and in accordance with the well-established links between attitude and intention within the extant literature (Tsang et al. 2004; Bauer et al. 2005; Jun and Lee 2007; Xu et al. 2009), it would be reasonable to postulate a general lack of willingness to interact amongst the sample. Confirming the author’s assumption respondent’s intention to interact with in-app advertising was predictably low ($M= 1.80, SD = .911$).

	N	Mean	Standard Deviation	
Variance				
Overall Attitude	103	1.92	.76938	.592

The majority of responses were negatively skewed, with almost an equal number of responses split across the strongly disagree ($N=45, 43.7%$) and disagree response options ($N=43, 41.7%$). A modest minority of respondents were willing to voluntarily interact ($N=8, 7.8%$), while an equal number provided a neutral response inferring they held a weak evaluation of their own intention to act ($N=8, 7.8%$). Subsequent correlation analysis confirmed the strong relationship between attitude and intention, one of high statistical significance ($r(101) = .687, p < .01$). Upon consideration of the now proven affect attitude exerts on intention, there is now a growing case for the assessment of consumer attitudes within an in-app advertising context. Of course, in order to fully affirm an attitudes importance it is necessary to assess the construct influence on reported behaviour.

Relationship between Intention and Behaviour

With a strong indication of respondent’s general lack of willingness to voluntarily interact with in-app advertising, H_1 in essence a priori, attention can turn to H_2 and the assessment of whether respondent’s intention will affect their reported behaviour. As the majority of m-advertising literature that has focused upon attitudes and behaviour has been based upon SMS advertising, behavioural items such as reading or deleting a message are largely irrelevant to this study. Again the author turned to the research design featured in an online attitudinal study (Wolin *et al.* 2002), recognising the similarities between online and in-app advertising and the strength a combination of behavioural items could provide over a singular one. As such the first item [B1] assessed respondents’ behaviour upon exposure to an in-app advert and specifically whether they paid ‘close attention’. The second item [B2] integrated the most commonly used measure of advertising effectiveness within a online environment, assessing respondents behaviour upon exposure to an in-app advert, specifically whether they clicked through for more information. A bivariate correlation analysis revealed respondent’s behavioural intention did exert a moderate to strong affect on both behavioural acts. Intention was shown to exert the strongest correlation with B2, the act of tapping upon on an in-app banner ($r(101) = .579, p < .01$). B1, the act of paying close attention to an in-app banner, had a slightly weaker correlation ($r(101) = .501, p < .01$), but not substantially so that it moved the correlation outside the realms of acceptability.

Satisfying H_2 , within this present study behavioural intention has been demonstrated to significantly influence respondents’ behaviours, both click/tap through and attention paid to in-app advertising. As previously discussed, attitudinal data can be

Table 4: Results of correlation analysis.

	Informativene ss	Entertainme nt	Irritation	Credibility	Interactivity
ENT	.681**				
IRR	-.549**	-.612**			
CRED	.489**	.386**	-.417**		
INT	.612**	.546**	-.407**	.355	
ATT	.631**	.680**	-.689**	.522**	.558**

** . Correlation is significant at the 0.01 level (2-tailed).

used both as an overall measure of advertising effectiveness but as just demonstrated it can also be used as a predictor of desirable behaviour such as click through or prolonged exposure (Greyser 1978 cited by Dutta-Bergman 2006). However, while the relationship between behavioural intention and reported behaviour was successfully confirmed, according to sample data respondents rarely chose to pay attention towards in-app adverts ($M=1.81, SD= .793$), with even less expressing a desire to obtain further information through tapping on the individual advert ($M=1.50, SD= .793$). This fits with the anecdotal evidence surrounding the current medium, and should act as a warning sign for advertisers to work towards improving attitudes, particularly as this research has shown their ability to predict desirable behaviour.

In terms of the most desirable of the two behaviours, one should avoid prioritising the click through [B2] over a consumer who specifically elected to view an in-app banner. One should instead reflect on the recent advances in online advertising research, noting the positive latent affect online advertising has been demonstrated to hold. A recent study conducted by the Internet Advertising Bureau UK (2012) found that while consumers who viewed online advertising may not act always act immediately, banner adverts still had a positive affect increasing their awareness of the brand and likelihood to engage in the future. It can be inferred, when considering the similarities between online and in-app advertising (Richard and Meuli 2013), that a similar effect is possible when consumers voluntarily make the conscious act to view an in-app advert. This further justifies the inclusion of behavioural act one within the study, but more broadly speaking the role attitude assessment has in predicting desirable behaviour beyond click through.

Factors affecting Attitudes

H₃ to H₇ predicted that five attitudinal antecedent would both positively [INFO, ENT, CRED, INT] and negatively [IRR] affect consumers overall attitude towards in-app mobile advertisements. In order to satisfy the hypotheses a bivariate correlation analysis was conducted to assess the relationship between the five attitudinal antecedents and the respondents overall attitude towards in-app m-advertising. As can be seen from Table 4 all five of the attitudinal antecedents were significantly related to the overall attitude towards in-app m-advertising, although the strength, degree and direction of the relationship varied considerably across the constructs.

Entertainment, Informativeness, Credibility and Interactivity were all positively correlated with respondents' overall attitude, while irritation was negatively correlated. As the five constructs are themselves significantly correlated, and as per the recommendations of Tsang et al. (2004), a stepwise regression analysis was implemented to better differentiate between each construct's individual contribution towards the overall attitude. The results of the stepwise regression can be seen in Table

5. The regression analysis revealed Irritation to be the most significant construct in predicting sample respondents' overall attitude towards in-app m-advertising, explaining 47% of the total variance in attitude. Entertainment contributed an

Table 5: Results of Regression Analysis.

Factor	β	R^2	ΔR^2	t	P
IRR	-.772	.475	.470	-9.55	0.000**
ENT	.446	.581	.573	5.05	0.000**
CRED	.194	.622	.611	3.27	0.001**
INT	.233	.646	.632	2.58	0.011***

** p < 0.001 *** p < 0.05

Table 6: Confirmation of Hypotheses

H_x	Path	Relationship	Confirmed
H ₃	INFO > OA	Positive (+)	(X)
H ₄	ENT > OA	Positive (+)	(✓)
H ₅	IRR > OA	Negative (-)	(✓)
H ₆	CRED > OA	Positive (+)	(✓)
H ₇	INT > OA	Positive (+)	(✓)

additional 11%, with Credibility (4%) and Interactivity (2%) contributing the final 6% percent. In total the present study's model accounted for 62.3% of the total variance in consumer attitudes, with a high level of statistical significance (p < 0.05). Surprisingly Informativeness was found to have a statistically insignificant influence on overall attitudes. As such H₃ was rejected upon the results of the regression analysis, with H₄ to H₇ confirmed as originally postulated and observed in Table 6.

H₃ Informativeness

As the first attitudinal antecedent derived from Use's & Gratifications theory Informativeness was found to be statistically insignificant. While there was a strong correlation with overall attitude in the basic correlation analysis ($r(101) = .631, p < .01$), the independent variable was automatically removed from the regression analysis due to a inferior level of significance.

Confirming the null hypothesis, it has originally been postulated that respondents perceptions of in-App m-advertising as an Informative medium would have had a significant influence on global attitudes. This has been based upon the construct prevalence within the extant literature on attitude towards m-advertising, and the generally accepted consensus that Informativeness is one of the most important and robust elements of U&G theory within any media context (Okazaki 2004; Liu 2012), and a central driver of attitudes within a mobile one (Bauer et al. 2005). In addition with the large screen sizes, high speed connectivity and provision for located based information academics have alluded to the growing role of Informativeness with the rise of smart phones (Xu 2006).

Respondent's views clearly differed, their perceptions of the medium as good source of relevant and timely information was somewhat negative with a mean score of 2.23 (n=103). Admittedly not as extreme as the values across both Irritation and Entertainment constructs, but the lack of a statistically significant relationship with overall attitude is of some concern. Crucially as a construct attitude towards advertising

is a function of affective and cognitive components (Lutz 1985), both affective (Entertainment, Irritation) and cognitive (Informativeness) experiences with advertising contribute to an individual's judgment of advertising (DuCoffee 1996; Schlosser et al. 1999; Wang and Sun 2010). Thus, as the core cognitive attitudinal antecedent, Informativeness has a distinct advantage in attitude formation as the central route of processing differs to that of Irritation and Entertainment – both peripheral. While operating simultaneously, in recent studies cognitive processing has been shown to be more significant to the attitude formation process than affective (Hwang et al. 2011). As such, the importance of the Informativeness construct is identified as an area requiring further research to ascertain the cause for low perceptions.

H₄ Entertainment

As a construct, Entertainment proved to hold the strongest *positive* correlation with overall attitude ($r(101) = .680, p < .01$), explaining 11% of the total variance in respondents' overall attitude. As already outlined Irritation proved to be the strongest predictor of attitude and somewhat explaining as to why perceptions of entertainment value were lower than expected, Entertainment usually being one of the central drivers of attitude (Tsang et al. 2004, Bauer et al. 2005; Haghirian et al. 2005; Choi et al. 2008). Given the magnitude of the negatively correlated construct of Irritation, one would expect that an irritating ad would produce a dampening effect on its entertainment potential (Bracket and Carr 2001).

Advertising practitioners must initially address the current negative perceptions surrounding in-app advertising as a irritating medium. However as a key attitudinal antecedent Entertainment should not be discounted, the relative difference in correlation and statistical weighting between Irritation is of miniscule proportion ($r(101) = -.689, p < .01$). Crucially, and in line with the findings of Tsang et al. (2004), Okazaki (2004), Bauer et al. (2005) and Choi et al. (2008), within the present study the construct has still been identified as the most potent antecedent in shaping positive attitudes. As such enhancing the perceived Entertainment of m-advertising should be of paramount importance, sample respondents currently perceive the medium as offering little entertainment value. In fact, such were the negative evaluation, as can be observed from the individual and aggregate summary of the perceptual statements in Table 1, Entertainment has the lowest aggregate mean value across all construct items. Of considerable concern, the more consumers perceive in-app advertising to be enjoyable, pleasing, fun to use and interesting, the formation of positive attitudes will ensue and crucially their behavioural intention to interact will strengthen (Richard and Meuli 2013). The same linkage cannot be said for Irritation even if successful mitigation strategies were implemented.

H₅ Irritation

In line with the previous literature, as a construct Irritation was hypothesised to hold a negative influence on respondents' overall attitude towards in-app m-advertising. The results of the analysis subsequently confirmed the hypothesis, Irritation identified as the most potent attitudinal antecedent within the correlation and regression analysis ($r(101) = -.689, p < .01$). These results deviate considerably from the previous attitudinal studies both within a mobile domain (Tsang et al. 2004; Xu 2007; Choi et al. 2008; Richard and Meuli 2013; Liu et al. 2012), and the broader field of online advertising (DuCoffee 1996; Oh and Xu 2003 cited by Richard and Meuli 2013). Whilst irritation has historically been identified as statistically significant factor towards consumer overall attitude, as an attitudinal antecedent the influence of perceived irritation has typically

always been subordinate to the other attitudinal antecedents such as Entertainment and Informativeness (Vantanparast 2007). In contrast, these findings establish Irritation as the most significant independent variable, holding a marginally stronger correlation with overall attitude than Entertainment, and crucially explaining the majority of variance in respondents' attitudes within the regression analysis.

Clearly in-app advertising is perceived as a highly irritating form of communication, respondents' evaluations establishing Irritation as the construct with the highest and thus most negative overall mean score of 4.13 (n=103). Perhaps, providing some understanding as to the cause of irritation, previous research has shown that the addition of multimedia elements within m-advertising can significantly increase perceptions of irritation (Xu et al. 2009). As in-app advertisements are by definition a rich media-advertising format it is feasible that the level of irritation would be considerably higher than revealed in the studies that were based upon legacy advertising formats. Furthermore as the focus of the past studies has often centered upon attitude towards permission based commercial messages, in theory the level of Irritation should be relatively low since messages are delivered with prior consent (Xu et al. 2009; Tsang et al. 2004). Pull based form of communication, such as in-app mobile advertisements, require no prior consent and thus their presence throughout the apps respondents use may create an element of irritation. Okazaki's (2004, 2007a) studies into pull based mobile banner advertisements adds credence to the following findings: Irritation is a significant factor in forming consumer overall attitudes and only marginally below Entertainment and Informativeness.

H₆ Credibility

The credibility of in-app mobile advertisements was deemed to have a positive correlation on overall attitude ($r(101) = .522, p < .01$), while explaining an additional 4% of respondents' overall variance and thus confirming the hypothesis. Respondents didn't perceive IA-MA as an especially credible medium, although the overall evaluation wasn't as extreme, the mean score 2.4 (n=103) and just below the central anchoring point. Of more intrigue, Credibility's correlation against the previous discussed variable Irritation. As a negative predictor of overall attitude, Credibility has a negative but reduced correlation towards Irritation. This suggests that the perceived credibility of the medium can actively reduce the perceptions of perceived Irritation; in essence Credibility can potentially act as a tool for mitigation. Considering the significant affect Irritation currently holds, credibility should not be discounted as the weakest relationship but instead optimised for its mitigating potential.

H₇ Interactivity

Across all media Interactivity has been constructed as a generally desirable attribute (Liu 2003). The present study provides further justification for the constructs inclusion within mobile specific attitudinal studies, as respondents' perceptions of Interactivity positively correlated with overall attitude. Building upon the work of Gao et al. (2009) and Cheng et al. (2009) who also found the construct to influence overall attitude, these findings prove the robustness of Liu et al. (2002) three measures of interactivity; Active Control [AC], Two-Way Communication [TWAY] and Synchronicity [SYNC]. Beyond confirmation of the constructs deserved place within attitudinal research, considerable insight can be afforded upon assessing the individual measures of Interactivity and the evaluation respondents assigned to them respectively.

As can be seen from Table 7 all sub-scales were statistically significant, AC [$r(101) = .317, p < .01$], TWAY [$r(101) = .466, p < .01$], and SYNC [$r(101) = .426, p < .01$],

but TWAY communication has the strongest correlation with Interactivity but also attitude towards in-app advertising. However as an independent scale TWAY also holds the weakest perceptual evaluation, respondents generally disagree with in-app advertising's ability to facilitate two-way communication between brand and consumer. Optimising respondents' perception towards this individual component of Interactivity is thus a necessity, considering the potential of TWAY as both an independent and collective variable. In short, to successfully increase the influence of perceived interactivity on consumer's global attitude, the weak perceptual evaluations of TWAY must be reversed. By contrast any efforts to improve perceptions of AC and SYNC would be somewhat futile, given AC's weak correlation and the already satisfactory perceptions of SYNC - TWAY is by far the component advertisers should seek to improve.

Table 7: Results of Correlation Analysis; Interactivity Construct and sub-scales.

	INT	AC	TWAY	SYNC
AC	.691**			
TWAY	.777**	.390**		
SYNC	.731**	.260**	.283**	
ATT	.558**	.317**	.466**	.426**

** . Correlation is significant at the 0.01 level (2-tailed).

CONCLUSION

The purpose of this research was to investigate consumer attitudes towards in-app advertising, the relationship between attitude and behaviour, and to establish the factors influencing overall attitude. This was achieved by adapting an existing theoretical framework (Tsang et al. 2004), turning to contemporary online attitudinal studies to modify the framework so as to integrate Interactivity and behavioural acts most pertinent to in-app advertising (Wolin et al. 2002; Wang and Sun 2010). Findings indicated generally negative attitudes towards in-app advertising, attitude successfully demonstrated to influence behaviour as postulated and supporting the existing literature on consumer behaviour and attitude towards advertising. Perception of Irritation and Entertainment were identified as the central drivers in attitude formation, although Credibility and Interactivity also made a marginal contribution. Somewhat concerning for the industry, weak perceptions were recorded across all the factors demonstrated to positively influence attitudes towards in-app advertising: Entertainment, Credibility and Interactivity.

Within the present study attitude towards in-app advertising has been found to influence desirable consumer behaviour acts within an in-app context, behaviour that may hold the potential to have a brand building affect (B1) but also initiate the sales conversion process via a campaign click through (B2) – both key measures of effectiveness. In addition, the rich vein of attitudinal literature has established the pivotal role consumer attitudes towards advertising holds in influencing attitude towards an individual ad, attitude hereby established as a universal measure of advertising effectiveness (Greyser 1972 cited by Dutta-Bergman 2006). As such a reversal of the negative attitudes consumers hold towards in-app advertising is of vital importance, positive attitude formation a fundamental priority. Advertising networks, agencies and marketers as a collective community must first address perceptions of Irritation as the strongest predictor of attitudes. Unfortunately no specific mitigating

strategies can be provided from this study, Irritation can refer to any offending effect that goes against what the consumer values (DuCoffee 1996). Campaigns should aim to avoid using techniques that can annoy, offend or are overly manipulative for these will instigate higher perception of Irritation (Xu 2006). In addition manufacturers must ensure they meet the affective needs of their consumers, embodying m-advertising so it conveys entertaining qualities, perceived as enjoyable, interesting and pleasing to use. The present study is well positioned within the m-advertising literature, to the author's knowledge the first study to specifically address attitudes towards in-app advertising. In addition this study parallels other influential work in the field (Tsang et al. 2004; Bauer et al. 2005), the relative worth of contribution arguably greater than studies that solely investigated attitudes without behaviour. Proving the robustness of Tsang et al. (2004) theoretical framework, originally designed for push based SMS m-advertising, the model explained 62% of the variance in attitudes. While this doesn't prove universal applicability to all pull-based m-advertising, academics should note the frameworks originated as part of DuCoffes (1996) and Bracket and Carr's (2001) web-advertising models. Considering the similarities between modern advertising formats and those featured online, future researchers should have a further degree of confidence when applying the present study's framework to new m-advertising opportunities. The strength of the conceptual linkage between online and mobile has already been evidenced in this study; the addition of Interactivity and new behavioural acts extracted from online advertising literature (Liu 2003; Wolin et al. 2002; Wang and Sun 2010). Perhaps this is the greatest contribution to the literature, confirming the existence of a model already suitable for new research contexts allowing researchers to focus on study rather than model development. As per King (1975, p.3):

"What we need is not a wholly comprehensive theory of advertising...just a slightly more advanced one...a framework for thinking how different advertisements might work for different people, in different media, in different circumstances."

Due to the student sample and convenience based sampling method the present results cannot be generalised to the entire student population, or consumers as a collective group (Saunders et al. 2009). A larger sample with a broader demographic would significantly compliment this study. Furthermore while the importance of assessing consumer attitudes was confirmed, the relationship between attitudes and behaviour is ultimately not a linear journey. Instead a sufficient gap exists between attitude and actual behaviour (Wang and Sun 2010; Liu et al. 2012), additional research that observes actual over reported behaviour would be necessary (Varnali et al. 2012).

In addition further research to investigate the root cause of irritation is a key priority, enabling more sophisticated mitigating strategies than can be currently provided. Attention can then focus upon identifying whether the various advertising formats available within apps affect individual attitudes separately, building upon Burns and Lutz (2006) pioneering study into online banner advertising. Finally as with any attitudinal study, a longitudinal research design could provide greater insight in how attitudes change over time.

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