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When It Doesn't Look Right:

How Attachment to Mobile Discourages Consumer Engagement

JURY

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L'université n'entend donner aucune approbation ni improbation aux opinions émises dans les thèses : ces opinions doivent être considérés comme propre à leurs

Abstract

En Français :

Les résultats de trois expériences contrôlées et d'une étude sur le terrain montrent que plus les consommateurs sont attachés à leur mobile, moins ils sont susceptibles d'interagir avec le contenu publicitaire mobile sur les réseaux sociaux. Dans le contexte de la publicité sur le changement climatique, cet attachement au mobile modifie légèrement la perception de la distance psychologique au changement climatique et la crédibilité de la publicité, et par conséquent, les dissuadant de s'y engager publiquement. L'auteur montre qu'en modifiant l'aspect abstrait ou concret de la publicité, nous pouvons partiellement annuler cet effet préjudiciable et améliorer l'efficacité de la publicité. La compréhension de ce mécanisme entraîne plusieurs implications marketing importantes, notamment comment créer un contenu approprié pour attirer un engagement positif des consommateurs sur smartphone, ainsi que comment adapter les principales plateformes publicitaires pour valider la théorie. L'auteur explore comment ces résultats peuvent être exploités par les universitaires et les gestionnaires afin de les généraliser à d'autres contextes de recherche et de publicité.

Mots clefs : *distance psychologique, mobile, publication, attachement du mobile, engagement*

In English :

Results from three controlled experiment and one field study show that the more consumers attached to their mobile the less likely they are going to engage with mobile advertising content on social media. In the climate change advertising context, this attachment to mobile slightly changes perception of psychological distance to climate change and the advertisement's credibility, dissuading them to engage with it publicly. The author shows that by altering how abstract or concrete the advertisement appears, we can partly negate such detrimental effect and improve advertising effectiveness. Understanding such mechanism yields several important marketing implications, including how to create suitable content to attract consumers positive engagement on smartphone as well as how to adapt majors advertising platforms to validate theory. The author explores how these findings can be leveraged by academics and managers in order to generalize these to other research and advertising contexts.

Keywords: *mobile, advertising, psychological distance, attachment to mobile, engagement*

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Je dédie cette thèse à ma petite fille Chau, qui me rendre pleins des heureux et m'a donnée des nuits tranquilles pour travailler.

Chapter 1 – General Introduction

Chapter Overview

The scene is familiar. Adults are sitting around a lovely table in a trendy coffee shop at a prime location. Some occasionally sip their hot cappuccino. Others mumble unrecognizable words in a low voice. However, all the eyes are glued onto their smartphone screens. And their fingers waltz on the screen. People do all kinds of things on mobile, from shopping, watching a movie, listening to music to socializing. And they spend much time on their mobile. For the French, 94% of the young population in the 15-29 age bracket own a smartphone (Insee, 2022). They spent 3.5 hours every day, on average (Press-citron.net, 2022), a 22% increase since 2019 quarter-to-quarter. The mobile has a far-reaching role and consequence in mind and the behaviors of the consumers. Some feel anxious when not having their mobile (Cheever et al., 2014). Other feel reassured with the presence of it (Melumad and Pham, 2020). Many like to keep the mobile always close to them (Vincent, 2006) to the point it becomes an essential item to maintaining day-to-day life and social contact (Vincent and Harper, 2003). Nowadays, it is more awkward not to have a mobile rather than having one. This provides opportunities for reaching consumers at the scale and richness never seen before. Smartphones outsold the feature phone (sometimes called dumb phones) for the first time in 2013 (Gartner, 2013). And it so happened that smartphone has dominated the market and the consumption scape ever since. In this dissertation, the term mobile refers directly to the smartphone in general and not the old function phone. The two terms are used interchangeably.

1. Digital Advertising and The Empowered Consumers

Global digital advertising spending rises to 491 billion dollars in 2021 and is projected to reach over 800 billion in value in 2026 (Statista[1], 2022). In which, we observe the

increasing popularity of social media advertising. By 2026, social media platforms will account for nearly half of all digital advertising spending, and nearly 70% of total spending will be on mobile, with the key social media advertiser being Facebook, Instagram, Tiktok, and Wechat (Statista[2], 2022). Within this emerging context of digital advertising, the previous approaches to online advertising and internet advertising are losing their relevance because of their lack of conceptualization of consumers behaviors using digital mediums like smartphone, computer, or social network (Lee and Cho, 2019). Consumers stay online from the moment they wake up until they go to bed. They are occupied with various online activities (from leisure, social connection and work) and increasingly participating in the co-creation of content online (Thompson and Malayviya, 2013).

The advertising industry inevitably departs from their approach to the traditionally passive consumers, who were under the control of the advertisers in terms of where and when they are exposed to advertising. The "old" advertising is filled with strategies to force feed consumers with content, such as pop-up ads, large size banners or clutter. This forced exposure tends to lead to a feeling of irritation and ad avoidance (Edwards et al., 2002). The modern consumers are no longer the passive recipients of ads, but an active contributor/distributor to the whole advertising scene. They are in full control of what they want to be exposed and actively interact with the advertising content. If the advertisement is seen as clutter, related to similar negative experience, or perceived as irrelevant, they would actively avoid those (Cho & Chen, 2004). And an increasing and significant number of Internet users have employed ad-blockers to control their exposure to advertising when they are online (Todril, 2020). Or more simply, many consumers scroll past the content in the case of Facebook, click the skip ad button in Youtube, or just ignore the advertisement altogether.

Rather than fighting against this tendency, the advertising industry are increasingly embracing the choice of the consumers. The new advertising paradigm now is no longer one-directional communication targeted to a passive audience, like how TV viewers are

exposed to advertisement during their viewing time. Instead, advertising is encouraging its audience to engage as it shifts toward a support of greater customer empowerment, which allows consumers to take control of many variables that traditionally pre-determined by marketers (Cova and Place, 2006, p.1090). And interactions between consumers and advertising content becomes the key attributes of digital advertising (Truong, McColl and Kitchen, 2010). Consumer can approach, or even expand the communication process via various interactive behaviors, from like, comment, to sharing the ad through their social network. This engagement is not limited in specific interactive behavior but also extend to viewing time of the ad. Spending time watching a skippable ad is also engaging, which is a sign of users willing ness to strengthen their relationship with the brand (Belanche et al., 2019). In this sense, consumer empowerment also might increase word of mouth and influence other behaviors (Acar and Puntoni, 2016; Boyd, Mcgarry, and Clarke, 2015). These voluntary engagements, in turn, contribute further to the profitability of the advertised firms (Harmeling, et al., 2016; Kumar et al., 2010, p. 298).

As a result, previous approach to digital advertising is increasingly becoming obsolete (Lee and Cho, 2019). Interacting with the ad bring about new measurements of advertising effectiveness, which is more accurate and reliable. Especially when the traditional measurements of effectiveness, such as brand recall, attitude, might lose some relevant for social media user, who no longer need to remember the brand name to react positively to ad (Belanche et al., 2019). Advertising platforms nowadays build their business around the consumers' willingness to engage (Hofacker and Belanche, 2016). Facebook Advertising distributed the advertising content not on separate and distinguishable form like the traditional ad banner but spread them as a normal user-generated platforms, with the full feature of engagement functions, like, share, comments, emotions, etc… Other major platforms, such as Youtube or Tiktok, make it easier for the audience to share the video ads that are posted, should they feel that interesting. A satisfactory ad experience also tends to lead towards an immediate like or share, which enhances the impact of the campaign in

terms of its diffusion to other and potential effect on purchase behaviors (Belanche, et al., 2019).

Amid this emerging importance and relevance of digital advertising, the mobile stands out as the catalyst. In a Covid-19 locked-down world where movement is restricted, it is mind-boggling to see mobile usage blooms. In 2020, consumers spent 25% more on mobile apps, more time on shopping apps, and see 70% more mobile ads than the previous year (Forbes, 2020). The mobile is no longer about being "mobile" but rather a social device to maintain daily activities (Vincent and Harper, 2003). Therefore, the mobile is an advertising context that deserves special examination.

2. The Mobile, a New Advertising Context Like No Other

The mobile is set to overtake the number one digital platform spot. In 2008, Eric Schmidt, then CEO of Google, advised businesses to prioritize mobile in designing web experience as consumers smartphone usage surged. Thirteen years later, mobile devices account for more than 50% of global website traffic (Statista, 2021). And mobile penetration rate reaches all time high at 38% of the world population owning at least one, with no projection of slowing down. In developed countries like France, this figure is even more impressive. Keolis (2019)'s survey suggests that nine out of ten French consumers own a mobile, which is used frequently for social media and public transport. Ericsson (2020) expect that mobile data traffic would increase by nearly five time in 2026, propelled by rising smartphone ownership and more intense data usage. In other word, consumers are relying more on their mobile to fulfill their needs, either business or personal. This shift to mobile is also driven and accommodated by big players in digital advertising industry. Google and Facebook dominated the digital ad market, often called the duopoly with each claiming a lion share of over 22% market (eMarketer, 2021). Google's Mobile First index forces many businesses to modify their website to provide a better mobile experience to avoid being punished on Google's search service. Consumers overwhelmingly search for information

on their mobile before their actual purchase (Mercanti-Guérin & Vincent, 2016). So businesses cannot afford to lose touch with the current marketplace. On the other hands, Facebook's application on mobile launched an entirely new advertising format to take advantage of the available functionalities. Facebook Advertising is immersive. Mobile ad is blended entirely into the application as a native content, which is very different from the usual intrusive banner ads. Nowadays many mobile ads come with interactive features from the simple photo scrolling to a more complex minigame. This renders the exposure-effect approach in studying mobile ad obsolete and invites modern methods.

The mobile ad spending is also very resilience to external changes, even during Covid-19 lockdowns. Consumers see more ad and spend more time on their mobile than even before the pandemic (Forbes, 2020). These observations have very clear implication for advertising industry: jumping on the mobile. Mobile ad spending is catching up to desktop ad spending. It is expected to account for half of total spending by 2021 and outpace desktop by 2022, exceeding $100 billion in revenue (Statista, 2019). And even though Covid-19 pandemic wreaked havoc on the economy and caused a sharp decrease in all ad spending category, mobile ad spends still fared better than most (eMarketer, 2020).

While digital advertising industry rushes to accommodate the mobile, the mobile's own characteristics also change how consumers perceive these ads. Digital advertising seems to evolve with the device (Mercanti-Guérin & Vincent, 2016). Mobile is different from older platforms because it has a smaller screen (Ghose, Goldfarb and Han (2013). Smaller space means there is only enough space for a single ad to be displaced at a time, without any competition for consumers' attention like in other devices (Grewal et al., 2016). Having a narrower view does, to some extent, alter the consumers decision making (Barque-Durant et al., 2017). A small screen is also equal to a handheld size, which lets the consumers to hold the mobile in their hands and carry it along. Therefore, the surrounding of the consumers has great influence on the outcome of mobile ad, such that commuters are more likely to purchase after seeing the ad when they are in a crowded subway

(Andrews et al., 2015). Or that mobile advertising adjusted to the contexts does perform much better (Luo et al., 2014).

However, the form factor and the surrounding do not make the mobile special as these characteristics do not belong to the mobile alone. Tablet and smart devices are also small and portable, providing the same set of functions as the smartphone, if not greater. The touch screen, once being exclusive to the mobile now appears in almost every category of digital devices, including the desktop. The distinct feature of the mobile reveals itself not as a physical form or a usage situation but rather in the interaction between the device and its users. The mobile is a very personal device as it gets carried around all day (Osinga et al., 2019). And consumers seem to be more involved when processing information on mobile (Grewal et al., 2016). Moreover, many consumers develop an emotional relationship to their mobile in the same way an infant attached to their parents (Konok et al., 2016). Vincent (2006) observed that consumers invest heavily in their mobile, convert it into a highly personal device but are not bounded by any hardware. Such relationship can be still transferred to a new mobile, as long as they maintain the existing social connections. Notably, this phenomenon is not observed on other portable devices such as tablet or laptop. There is a convoluted literature addressing the consumer-mobile relationship, ranging from healthy attachment to dysfunctional behaviors and addiction. But there are no such terms as tablet addiction or smartwatch dependent. Even when mobile may be seen as somewhat lack in security compared to other devices (Osinga et al., 2019), extensive interaction occurs first on mobile and not on desktop or tablet.

In short, the uniqueness of the mobile comes from a combination of its functionalities and the bond it has with its users. The proliferation of mobile opens a new frontier for the advertisers to capture their audience. The technologies embedded in the mobile change both how digital advertising is delivered and perceived. Mobile ad of today is no longer the intrusive banner that obstructs the consumer's experience like in the past (e.g., Goldfarb and Oppenheimer, 2000; Barts et al., 2014). Instead, they are delivered subtly in the form

of search words or native content, suggesting improved effectiveness. The functionalities of the mobile also influence how consumers perceive information, be it the smaller screen or the handheld form. Empowered by these technologies, many consumers developed a bond with their mobile. While still largely unknown, current empirical evidence does imply a significant influence, such as a higher level of receptiveness to the ad or a tendency of sharing private information (Kolsaker & Drakatos, 2009; Melumad & Meyer, 2020). This sets the mobile apart from other channels as a promising medium to reach consumers.

3. Research Problem

Despite the increasing importance of the mobile, existing digital advertising research still look at the mobile as a device having different physical form and distinct usage situations. Or more precisely, a "not fixed to a location" and "have access to timely information" device (Ghose et al., 2013, p.1). Because of this, mobile ad effectiveness is often attributed to either its form factors or its surroundings (e.g., Barts et al., 2014; Grewal et al., 2016). For instance, mobile's smaller screen allows for only one ad to be displayed at a time, eliminating many elements competing for consumer attention (Grewal et al., 2016). Also, mobile consumers' surroundings, such as crowdedness (Andrews et al, 2016), and the host applications (Grewal et al., 2016) have a significant influence on the outcome of the mobile ad.

If mobile is a mere object of situation, then it should be dropped when the situation changes. However, it is not always the case. The Covid-19 pandemic has revealed that when consumers' movement was restricted, mobile use actually increased (Forbes, 2020). People opened their mobile more and saw more mobile ad than ever. **What might account for such a strong drive to engage with their mobile?** The mobile is the omnipotent device that does everything from providing basic communication functions, satisfying emotional needs (Melumad and Pham, 2020), to facilitating social exchanges (Vincent, 2006). People depends on it for emotional support (Hoffner and Lee, 2015), social relation (Vincent,

2006) to the point of having separation anxiety (Cheever et al, 2014; Konok et al, 2017). Available empirical evidence seems to suggest that those attached to their mobile tend to keep their mobile with them all the time (Vincent, 2006), be more receptive to mobile ad (Kolsaker and Drakatos, 2009) or feel more comfortable holding a mobile (Melumad and Pham, 2020). Given that the 2019 pandemic was a hard time for everyone involved, an emotional relationship with the mobile may as well be the driving force to increased engagement. Unfortunately, we lack decisive evidence.

If attachment to mobile is the reason of this increased mobile activity, then how exactly such relationship asserts its influence on consumer behaviors? Attachment to mobile research traditionally focused on proving its existence (Cheever et al., 2014; Konok et al, 2017) while following a blackbox approach to its mechanism. Consequently, we have a strong understanding of attachment to mobile's behavioral consequences (e.g., Melumad and Meyer, 2020; Kolsaker and Drakatos, 2009) but much less of the path leading to such outcome. To explain mobile advertising, which is the focus of this study, it is logical to adapt previous advertising persuasion theories like that of Chaiken (1980) or Petty and Cacioppo (1986). These classic persuasion theories generally propose two modes of processing, cognitively and heuristically, to predict behavioral or attitudinal outcomes. However, studies based on these models have limited success in mobile advertising, such as when it failed to correctly predict the outcome of mobile ad featuring high-involvement product (Bart et al., 2014; Grewal et al., 2016). The mechanism of mobile ad processing, hence, is still a huge gap in the advertising literature.

We propose and find across several experiments and one field test that attached to mobile consumers are more likely to engage with the abstract ad message due to them perceiving it as further away psychologically and more credible. For example, describing climate change message with fact induces more engagement behaviors from the audience due to them thinking the phenomenon is closer psychotically and the message is more credible.

4. Potential Contributions

In addressing these questions, the current dissertation contributes in three main domains: theoretical, methodology, and managerial contributions, respectively:

4.1. Theoretical Contributions:

From the extant literature, we know that consumers do have different behaviors and perceptions when they use mobile vs. another device (e.g., Hoffner et al., 2016; Konok et al., 2017; Barque-Durant et al., 2017). But most studies so far focus on the negative effect of losing the mobile (Konok et al., 2016, Hoffner et al., 2016) while paying less attention to the process leading to such outcome. This is the key to understand many mobile related phenomena, such as the high level of involvement of mobile users (Grewal et al., 2016) or increase usage of mobile in immobility situations (Forbes, 2020).

We seek to fill this knowledge gap by investigating the effect of Attachment to Mobile to consumers' engagement behaviors on mobile. That is, we examine whether the tendency to engage with the mobile ad changes accordingly with their level of attachment to the mobile. More importantly, we investigate the mechanism under which the level of attachment to mobile would influence the perceived psychological distance between the consumers and the ad.

Many factors influencing the outcome of Attachment to Mobile have been examined in previous studies, such as personal traits (e.g., Konok et al., 2016) or device type (Melumad and Pham, 2020). While they are often presented together in normal circumstances, they are observed separately. Therefore, we aim to validate these factors in a single model and their combined influence on the participants' perception of psychological distance.

4.2. Methodological Contributions

Unlike PC, whose screens are large enough to accommodate similar content, the mobile has a distinct small physical form. Mobile like the iPhone or Samsung Galaxy features a display as large as 6.5 inches diagonally. This size is only a fraction of what the PC can offer. This is not to mention that because the mobile is small, the consumers can actually fondle the device while using it. PC, on the other hand, must be used in a more conventional position. For experimentation, this contextual different adds to the problem of internal validity when comparing mobile users and PC users. The current research adopts and refine the existing measurements in the context of mobile use.

More specifically, we employ the psychological distance measurement devised for climate change studies and Attachment to Mobile scale developed by Konok et al. (2017). Since its first construction by Spence et al. (2012), the scale has been going through dramatic transformations, from partial adaptation (Chu and Yang, 2019) to complete reconstruction (Wang et al., 2019). The Attachment to Mobile scale also went through several iterations before its current version. Both measurements have not been validated externally and thus, their validity is still a question mark. This concern is especially worth-considering given their confirmatory studies were administered not on mobile but in paper form (Konok et al., 2017) and PC (Wang et al., 2019). We aim to further refine these measurements in several consecutive studies.

Furthermore, we seek to examine the consumers in their natural environment. The laboratory has the advantage of better control and measurement. However, sitting under close observation and supervision for an extended period is hardly how consumers usually consume the ads. Thus, we plan to validate a part of our proposed model via field testing using real-life advertising metrics on a major social media site. So far, this work is the first one to apply Facebook's experimental function to test the effect of Attachment to Mobile.

4.3. Managerial Contributions

From a managerial perspective, this dissertation offers a new perspective in approaching mobile communication. Nowadays, a successful advertising campaign cannot be achieved without including the mobile as consumers spend more and more time on their mobile, even in conditions where mobility is not a factor (Forbes, 2020). This implies that mobile plays an increasingly important role in their daily routines and replacing other devices. For the advertisers, this research hopes to respond to their demand for a complete vision of how consumers perceive during their daily routines. More importantly, advertisers would find this study more relevant with the use of actual advertising output metrics in our field test. These metrics are not popular in the advertising literature. Their rarity exhibits the apparent gap between advertising practitioners and researchers. Our dissertation takes a step further in filling that gap.

5. Research Plan

After setting the primary objectives, this doctoral research began by reviewing the relevant literature to identify the characteristics of Attachment to Mobile that manifest through the extant literature. In all, we discussed the Attachment Theory (Bowlby, 1969) and Construal Level Theory (Trope and Liberman, 2010) in both their development and application in advertising research. From this review, we proposed an initial theoretical model and several hypotheses that address our research questions. Several empirical studies were conducted to examines these hypotheses and validate the theoretical model.

Study 1 tests the main effect between Attachment to Mobile and Customer Engagement (CE). This effect is moderated by different type of mobile ad. Study 2 introduces the Psychological Distance and Credibility as the mechanism capable of explaining the main effect of Attachment to Mobile on Customer Engagement. Since the measurement scale of Psychological Distance and Credibility went through several iterations during their

development, we prefer to launch a separate study to look closer to their relationship as well as to examine the validity of these scales before working on the full model. We tested the whole model in Study 3. Finally, to enhance our external validity and to prove that our theoretical model is perfectly capable of predicting real-world advertising outcome, we conducted a field experiment using Facebook's advertising platform. In other words, we predict that a sample of similar characteristics with those of Study 3 will have the expected outcomes, as indicated by the theoretical model. Considering the high ecological validity of Facebook and its massive reach, the results show strong support for our proposed hypotheses. The results were discussed in close comparison with Study 3's outputs and its limitations.

Aside from Study 1, most of our empirical studies were conducted online. The principal reason for this was that the sanitary problems related to Covid-19 during the data collection period posed a threat to the traditional laboratory experimentations. Should we follow that approach, then the procedures would have required our participants to gather in a confined space and touch the same mobile. Furthermore, since Study 1 confirmed the main effect with strict control, replicating such results online pose little validating issue. Online experiments resolved our problems with acceptable drawbacks.

The downside was that we had limited control over the device, the proximity, and the exposure time of each participant in the experiments. As Konok et al. (2017) suggested, having any mobile in view was enough to weaken the impact of separation from the mobile. All our empirical studies suffer from this problem. However, the upside was plenty. Firstly, our participants operated in their natural environment in all four experiments, and even more so in the field test. This allowed them to avoid the unwanted stress related to laboratory testing. Secondly, online experiments allowed us to administrate a greater number of participants. From two major survey platforms, Mturk and Prolific, we recruited over 900 respondents. And the ads in our field test were shown to over 9000 Facebook users, resulting in 1500 engagements to the materials. Finally, our research's output was

organized and presented in this current dissertation. Its structure will be presented in the next section.

6. Dissertation Structure

This dissertation was structured in five chapters, as shown in Table 1.1. below. Chapter 1 addressed the general introduction of the whole dissertation. The following two chapters contained the literature review (Chapter 2) and the Research Methodology (Chapter 3). Chapter 2 went through the development and relevance of the two leading theories in mobile advertising research. And in Chapter 3, we discussed our epistemology position and explained our approach for methodology. In the second half of our dissertation - Chapter 4 – Empirical Studies, we presented our empirical findings in three online experiments and one field test. In each study, we described the experimental procedures and discussed the findings as well as their limitations. Our results were critically examined and discussed together as they progressed from the first online study to the final field test. The last Chapter 5 was dedicated to the general discussion section, where we discuss our contributions and limitations. We reevaluated our final outputs vis-à-vis the initial research questions and proposed suggestions for subsequent studies in the future.

Table 1 Dissertation Structure

Chapter 1 – General Introduction
1. General Context
2. Research Problems
3. Potential Contribution
4. Research Plan
5. Dissertation Structure

⇩

Chapter 2 – Literature Review
1. Attachment Theory
2. Construal Level Theory
3. Ad Credibility
4. Consumer Engagement
5. Hypothesis Development
6. Summary

⇩

Chapter 3 – Research Methodology
1. Research Design
2. Experimental Design
3. Research Strategy
4. Summary

⇩

Chapter 4 – Empirical studies
1. Study 1 – Main Effect
2. Study 2 – Examining the role of Psychological Distance and Credibility
3. Study 3 – Whole Model
4. Study 4 – Field Test with Facebook A/B Testing

⇩

Chapter 5 – General Conclusion
1. General Discussions
2. Theoretical Contributions
3. Managerial Contributions
4. Limitations And Suggestion for Future Studies

Chapter 2 – Literature Review

Chapter Overview

The increasing use of mobile is often described negatively as addictive or problematic (Parent et al., 2020; Konok et al., 2017). And the extensive possession of material objects, such as the digital devices, is also depicted in a bad light in marketing literature. For instance, materialism suggests that obsession with physical objects' possession usually leads to decreased well-being and other detriments (Dittmar et al., 2014). In fact, attachment to an object is rarely studied as a healthy behavior (Konok et al., 2016). However, there are evidents suggesting that attachment to a precious object is a healthy and normal function (Vincent, 2006; Konok et al., 2016). The modern consumers seem to be glued to their mobile in many ways. Consumers are getting closer to mobile and at all times of the day (Srivastava, Guglielmo, & Beer, 2010). Their memories and exchanges are largely stored on mobile (Vincent, 2006). And many are constantly connected to their social circles through mobile, defying geographical and temporal limits (Norman et al., 2016). This reliance is so intense that some consumers express strong anxiety when separated from their device (e.g., Clayton et al., 2015). And being with the mobile provides benefits, such as stress relief (George, 2013) or psychological comfort (Melumad and Pham, 2020).

Attachment theory seems to provide a relevant framework to explain all facets of extensive use and possession of material and even immaterial objects within a social context. Although the theory was initially developed to explain the infant attachment to its caretaker, it is now extended to include many other social behaviors, "from the cradle to the grave" (Bowlby, 1979, p. 129), such as friendship (Markiewicz, Lawford, Doyle, Haggart 2006), love (Fraey, Brumbaughm & Marks, 2005) and mobile use (Konok et al.,

2017). The similarity between mobile-users relationship and parent-infant interaction suggests that attachment theory works better than other theoretical frameworks in explaining the phenomenon. Under the Bowlbian attachment lens, Konok et al. (2016) found that the mobile maintained the social relationship of the users by providing a sense of security and substituting for social connections. The theory also works well under experimental data (Konok et al., 2017; Melumad and Pham, 2020).

While the literature has shown that attachment theory excels in predicting behaviors, these outcomes are mostly described on the surface, such as urge to reach the phone (Clayton et al., 2015) or tendency to stay in close proximity (Konok et al., 2017). Few studies (e.g., Kolsaker and Drakatos, 2009; Melumad and Pham, 2020) attempted to examine the underlying mechanism of the behavior. On the other hand, CLT represents a strong research tradition that works on how behaviors and perception various across distance. These kinds of circumstances are abundant in the mobile context. For example, mobile technology allows communication to occur instantly across a long physical distance and for us to look back in time thanks to the online archives (Turkle, 2006). The hyper accessibility of mobile reduces the felt distance between individuals separated by geographical space (Katz and Byrne, 2013) or time (Norman et al., 2016). Research utilizing CTL has shown that perceived distance influences the effectiveness of the message, such as in the time of epidemic (Van Lent et al., 2017), teamwork (Wilson et al., 2013), or in social media (Lim et al., 2012). Norman et al. (2016) contends that CLT can explain the underlying psychological mechanism of mobile communication. More importantly, CLT is suitable as a theoretical framework and fits with the mobile's abilities to measure and manipulate distance (Katz et al., 2013). For instance, the mobile geographical location function helps Van Lent et al. (2016) measure the spatial and social distance from the respondents to the epidemic.

This chapter discusses the elements included in our theoretical model in depth with a focus on two theories: Attachment theory and Construal Level theory (CLT). At the end of this

review, we formulate several hypotheses and propose a theoretical model of our doctoral research.

1. Attachment Theory

While attachment theory (Bowlby, 1969) was orginally developed to explain the behaviors of children towards their parents, it has been applied in consumer research with great success. This section discusses the basic foundation of the theory and its extension to mobile consumers' behaviors.

1.1. Development of Attachment Theory

The Attachment Theory was initially proposed by Bowlby (1969) in his work "Attachment" to explain infant's behaviors of seeking and maintaining proximity to their significant others. In his work, attachment is defined as an enduring emotional bond that connects one person to another. More specifically, this relationship is "a motional-laden parent-infant bond (Bowlby, 1979) that lasts "from the cradle to the grave (p. 129). The attachment first occurs between babies and parents in a dynamic called "reciprocal interchange." The children use the parents, or main caregivers, as a base to safely exploring their surroundings and to return when feeling threatened. On the other hand, the attached parent reciprocates this behavior and thus reinforces the attachment feeling. As a result, both parties manifest intense pleasure during each other's company. According to Bowlby (1969), attachment is the mean for the infant to survive by attaching to the caregiver. This is important not only in terms of physical wellbeing but also mental and emotional conditions as well.

A previous study by Bowlby and James Robertson (1952) showed that the infant experiences distress when separated from the mother. They identified three stages of

response after separation: protest (separation anxiety), despair (grief and mourning), and denial (repression behavior). They pointed out that separation anxiety occurred as an instinctual response when the attachment figure was unavailable. These findings found the ground to his series of papers focusing on the attachment behavior of an infant to its mother in 1958 (The Nature of the Child's Tie to His Mother), 1959 (Separation Anxiety), and 1960 (Grief and Mourning in Infancy and Early Childhood).

It was important to mention that the work of Bowlby until 1979, especially the reformulation of attachment theory (Bowlby, 1969), heavily influenced, as well as was influenced itself, by Ainsworth's contribution on infant-mother interaction (1967) (Bretheton, 1992). Ainsworth's study on mother-infant interaction actually started several years before the publication of Bowlby's first works on attachment theory (1958, 1959, 1960) and resulted in her publication in 1967. Both of these articles had a great impact on Bowlby (1969) and the subsequent development of attachment theory. In these two works, Ainsworth interviewed women in child-care in Uganda for several years. She found several patterns of how children behaved around their mothers. Securely attached infants were more calmed and confident when they are with their mothers. The insecurely attached infants were often disturbed and restrained from exploring, even when their mothers were present. Non-attached infants, on the other hand, showed no difference in behavior with or without the mothers. She also found that how mothers provided care for their children had a great impact on whether the children were attached to them or not.

1.2. The Attachment Theory

The first full formulation of attachment theory by Bowlby was published in 1969 under the name "Attachment." It was followed by two subsequence works, Separation in 1973 and Loss in 1980, making a trilogy. Nevertheless, it was the first volume that set the foundation for the success of attachment theory. In this work, Bowlby (1969) suggested the existence

of innate behavioral systems that are "goal-corrected" and continuously adjusted. The behaviors regulated by such systems are not complexed but essential for survival and procreation. They tended to be organized by different developmental periods, in which only certain behaviors are activated. And even though they could adapt to many environmental changes, it was only to a certain degree. If the systems failed after a drastic change in the environment, then pathological functioning would have followed. To Bowlby, many human behaviors still resembled those of hunter-gatherer societies. Among those behavioral systems were the two most important and central of attachment theory: attachment and exploration. These ideas were applied to mother-infant interaction.

Bowlby (1969) defined attachment behaviors as the predictable behaviors promoting proximity around the attachment figure, with the purpose of protecting the infant from danger. These behaviors were motivated and separated from mating and feeding systems. On the other hand, exploration systems were meant to send the infant further away from the attached figure and towards the surrounding to learn about the environment and its danger. The normal development would create a balance between attachment and exploration, where the infants explore the environment with the caregiver in proximity providing protection. The main goal of this system would be to strengthen the sense of security, where the infant is perceived as safe so that it could safely engage and explore the environment without fears. In this situation, the caregivers acted as a "secure base" for the infant (Ainsworth et al., 1978, p.22). When the infant encountered danger or the attachment figure was not in proximity, attachment behaviors became more salient (Bowlby, 1969). The infant would then try to re-establish the proximity to an attachment figure, or in the terminology of attachment theory, "activation of the attachment system." Notable proximity maintaining behaviors are engaged as the infants perceive a threat, such as a stranger or an unfamiliar noise. It included both nonverbal (e.g., crying, crawling, reaching) and verbal forms (e.g., pleading, calling) (Ainsworth et al., 1978). When the proximity was restored, normal activities would resume calmly. The quality of this attachment relationship depended on the quality of interaction between the caregiver and the infant. In

this aspect, Bowlby (1969) was influenced greatly by the works of Ainsworth in her Ganda studies and Baltimore projects (Bretheton, 1992). Drawing from their findings, Bowlby (1969) asserted that the mother-infant attachment relationship could result in anxiety or stress when one side rejected the other. Both sides craved proximity and affective interaction while feeling hurt from distance and rejection.

Bowlby (1969) suggested that infants form working models to generalize the details of mother-infant interaction in respect to their expectation of the responsiveness, availability, and feedback from the attached figure. These workings models would later influence the behavior of the infant during the presence or missing of the attachment figure.

As the infant grows up, the behavioral attachment system reorganizes to reflect the changes in caregiver-infant interaction, a process dubbed "corrected partnership" by Bowlby (1969). Bowlby suggested that a new attachment relationship can change the attachment patterns in a later developmental period. The attachment relationships were hierarchical. The primary attachment figure, who served as the main source of security and comfort, stood at the top. Under the primary attachment figure are the alternatives meant to temporarily replace it when unavailable (Hazan & Shaver, 1994). But this structure was not permanent. Bowlby (1969) suggested that the arrangement of attachment figures would change as the infant grown up, with different figures added or removed.

Bowlby expanded the active behavioral control systems in her two publications (1969, 1973) and proposed a more hierarchical system called the central nervous system. Its objective was to scan arriving information and sort them into long-term or short-term memory, depending on its relevancy. During this process, information distortion seemed to be the norm (Bowlby 1980). Only when there was interference from the defensive mechanism that the integrity of the internal working models was damaged. He suggested that the defensive process excluded information from the awareness. The objective was to protect the individual from negative psychological consequences such as pain, anxiety, or

conflict by interfering with the internal working models in charge. In some cases, it led to external reality. Some studies found that defensive exclusion of information split internal working models into several distinct parts (Bretheton, 1992). When the two incoming information flows, one built from actual experience and the other taken from others, were highly contradictory, psychological conflicts were bound to happen, and the defensive exclusion kicked in to hold the negative parts from the actual experience (Bowlby, 1980).

1.3. Extension of Attachment Theory

Attachment theory was originally devised to describe infants' behavior during separation and reunion with their caregiver (Bowlby, 1969; Ainsworth et al., 1973). According to Bowlby (1969), infants' attachment behaviors are guided by the behavioral attachment system, whose purpose is to protect the child from both psychological and physiological threats. Being an integral part of human behaviors "from the cradle to the grave" (Bowlby, 1979), the core principle of attachment remains throughout our life span. This system also adapts to the child's experience, which is cumulated in the child's internal working model and forms the basis for a relationship later (Bowlby, 1973; Pedeliento, 2018).

Eventhough Bowlby (1973) did suggest that attachment behaviors in childhood could influence other relationships later in adulthood, Hazan and Shaver (1987) were the first to adapt attachment theory into adult relationship context. They described attachment as a process that differed from individuals to individuals due to their unique attachment histories (p.511). This process, as explained by Bowlby (1973), reflects the personal attachment history in childhood into the current relationship in adulthood and leads to psychological and behavioral consequences. Their results not only confirmed Bowlby's ideas but also those of Ainsworth et al. (1978) in attachment patterns. Their study opened up a new stream of research on attachment in various contexts (e.g., Brennan et al., 1988, Ge, 2014, Melumed and Pham, 2020), mostly thanks to their pioneering works in the self-

report measurement of attachment. Results from the subsequent studies show that the core principle of attachment behaviors remains the same while pointing out several important differences in attachment between adult and infancy.

Firstly, attachment behaviors in adulthood are reciprocal. Unlike adults, infants' attachment behaviors are in a one-way relationship. The caregivers in infancy, which happens to be mostly parents (Ainsworth 1967; Bowlby, 1969), primarily provide care to the children and receive none back. For adults, the participants in the relationships are both givers and receivers (Hazan and Shaver, 1987). Their roles are not fixated but rather shifted depending on the situation (Crowell et al., 1999). Secondly, attachment behaviors in adults have a far deeper impact than those in infancy. Children's proximity-retaining behaviors serve primarily as a survival tool. The child needs the physical presence of its attached figure for a "felt security" (Ainsworth, 1967). Attachment is then activated when the attached figure is missing or when the child senses a threat, such as an unfamiliar person or a strange noise. At the same time, adults' attachment behaviors concern the psychological and physical well-being of the caregiver and the receiver (e.g., Hazan and Shaver, 1987; Hoffner et al., 2015; Melumad and Pham, 2020). As such, their influence encompasses a much wider area, such as romantic relationship (Hazan and Shaver, 1987; Fraley, Brumbaugh, & Marks, 2005) or friendships (Markiewicz, Lawford, Doyle, & Haggart, 2006), social media (Vanmeter et al., 2015) and mobiles (Konok et al., 2016). The behavioral and psychological outcomes also varied greatly. For example, adults, who have often ignored attachment demands during infancy, tend to have difficulty in establishing a social relationship (Bowlby, 1973). And childhood-traumatized individuals risk having disorders such as addiction (Ge, 2014) or hoarding (Medard and Kellet, 2014).

Furthermore, the attachment figures are not necessarily the parents as in infancy (Bowlby, 1969). Many studies, though not based on Bowlby's attachment theory, suggest a similar phenomenon. For example, Belk (1988) pointed out that consumers tend to attach to their possessions and have a strong emotional link to them. Slater (2000) observed item

collectors and also found strong emotional attachment to the simplest objects like Cocacola Barbie dolls. Vincent (2006) suggested that consumers could form an intimate relationship with their mobile. Likewise, there are four common characteristics in all attachment relationships, either human or non-human, that can be founded in attachment theory (Ainsworth, 1985). Firstly, attached individuals will try to remain in proximity with the attached figure. Secondly, the attached figure is used as a safe haven to protect the individual against perceived threats, either physiological or psychological. Thirdly, the presence of the attached figure promotes a feeling of security and confidence. And finally, separation from the attached figure prompts an increased level of anxiety and causes the individuals to find a way to retain its proximity. These four characteristics are described in all above-mentioned emotion attachment relationships, even though they are not grounded on Bowlby's theory.

Ainsworth (1985), based on the groundwork laid by Bowldy (1969), suggests that attachment relationships can occur with other tangible objects and intangible subjects, carrying the same distinct characteristics of parent-infant interactions. When infants are separated from their primary caregiver, they express strong separation anxiety and negative behavioral outcomes, such as crying or pleading (Ainsworth, 1967). When the primary caregiver was not available, the child could form a second attachment to another attachment figure, such as another person on an object that responses to their demand and remains in proximity (Bowlby, 1969). For the children, this relationship is thought to be only temporary and cannot be considered equivalent to that with the primary caregiver (Bowlby, 1973). Keefer et al. (2014) found that children could and did establish a form of attachment to their toys or surrounding objects. These objects have the same function as their caregivers, which is to provide a sense of security when their parents are unavailable

Hazan and Shaver (1987), in support of Bowlby (1969), pointed out that attachment's internal working models are continually updated via perception and expectation about the behaviors of others toward them during all lifespan. Thanks to the hierarchical structure of

attachment figures, it can include non-human figures as well (Bowlby, 1969), such as social media (Vanmeter et al., 2015, 2018) or mobile (Konok et al., 2016). The variations of working models, which depends on the availability and responsiveness of the attachment figures at the time of activation (Bowlby, 1988) allowed the existent of a secondary class of attachment figure. When the primary figure was unavailable, individuals adopted the "secondary attachment strategies" (Ainsworth et al., 1974) to avoid the distress from proximity-seeking efforts, douts, and insecurity (Shaver & Mikulincer, 2009). In the same direction, Keefer et al. (2014) 's results also suggest that adults are also able to form an attachment to objects, both tangible and intangible. Those can include religious practices, fictional characters, pets, or destinations.

There is a common perception that secondary attachment is a form of the disorder. To be fair, addiction, disorder, and attachment are often found related to each other (e.g., Ge, 2014; Medard and Kellet, 2014). Considering the adaptive nature of attachment behavioral control systems, whose damage can lead to trauma and negative behavioral consequences later in life (Bowlby, 1969), this is not a wrong perspective. However, empirical evidence suggests otherwise. Healthy and functioning adults can develop a significant emotional attachment to objects. For instance, Slatter (2000) reports important attachment-related behaviors on Cocacola collectors of brand name collectibles. Vanmeter et al. (2018) 's respondents, who are very emotionally attached to their social media, are normal university students without any disorder symptoms. Possessing these objects, similar to how attachment theory is explained, also results in various benefits, such as stress reduction (Melumad and Pham, 2000) or meaningful online behaviors (Vanmeter et al., 2018).

1.4. Attachment Styles

The two lines of researches about the pattern of attachment behaviors by Ainsworth (1967) and Bowlby (1969) started out independently but shared many common points between

their findings. Attachment theory indicates that the internal working models are formulated upon consolidating habitual behaviors and psychological needs (Bowlby, 1973). The different experiences from interpersonal relationships lead to different mental processes and behaviors within or across various relationships (Shaver and Mikulincer, 2009). These forms stable traits of behaviors or attachment styles (Ainsworth et al., 1978; Hazan and Shaver, 1987).

According to Bowlby (1969), interactions with available and responsive attachment figures facilitate the optimal functioning of the attachment system and promote a sense of attachment security in the child. However, when attachment figures are not reliably available and supportive, the child develops defensive secondary attachment strategies (Ainsworth et al., 1974) by deactivating or hyper activating the attachment system. These strategies are called attachment avoidance (maximizing autonomy and distance from others, avoiding intimacy) and attachment anxiety (compulsively seeking proximity and protection, hypersensitivity to signs of possible rejection or abandonment).

Hyperactivated strategies are what Bowlby (1962, 1982) referred to as "protest reactions" to demand the fulfillment of attachment needs. Protests occur in a relationship in which the attachment figure is sometimes responsive but in an unreliable manner. This encourages the attached individual to express energetic, strident, and noisy proximity-seeking behaviors. Because these attempts are met with occasional success, they tend to increase the insensitivity of usual proximity-seeking behaviors in the hope of getting the attention of the attachment figure and receive security support. These behaviors, as the name hyperactivated strategies imply, keep the attachment system on until their needs are fulfilled. Paradoxically, this leads to increased needs, frustration, and negative emotions.

On the other hand, deactivating strategies describe the effort to minimize the negative consequences of attachment figure's unavailability by avoiding or ignoring attachment needs. Bowlby (1962) suggested that these behaviors are the results of attachment figures

behaving in a way that rejects the attachment needs and leaves the children vulnerable. Thus, the attachment system is suppressed, and the attached individuals rely on themselves to face the danger. The goal of this behavior, similarly to hyper-activating strategies, is to minimize the negative emotions as well as physical consequences from an unreliable attachment figure. Sadly, it leads to problematic damages later in the child's development period, such as failure to establish a relationship or express emotions.

The concept of attachment pattern was first proposed by Aisnworth (1967) to categorize the pattern of infant-parent interaction during separation and reunion situations. Based on her Strange Situation procedure, infants were categorized into three main patterns (secure, anxious, and avoidant). A fourth pattern was added later by Main and Solomon (1990) (disorganized/disoriented), but it did not gain much academic attention. Infants in the secure category express distress when separated and recover quickly upon reunion with their mothers. The avoidance ones, on the other hand, do not show clear attachment behaviors. The authors observe little anxiety when they are separated from their mothers. They even avoid the mothers when they reunite. The last ones, anxious, are completely different. They react heavily both during separation and union, such as crying and resisting. And they face difficulty return to their normal condition.

These three patterns are confirmed in Hazan and Shaver (1987) 's study of adolescent and adult attachment orientation by the mean of self-report. While this is a significant contribution that expands the attachment theory beyond the context of the infant-caregiver relationship, adult self-reports and observation are not the same things. The former is the perception of the adults about the care given to them and, therefore, is entirely subjective. As for the latter, observation is made by the researchers without interference and thus, retains a larger degree of objective. Hazan and Shaver (1987) transform the infant attachment patterns into appropriate terms for an adult relationship. This approach has some limits. There is more than one aspect of the relationship in each statement. Thus, these descriptions may not fully reflect their feelings (Collin and Read, 1990). Especially

when the results from self-report measurement of attachment are not always equivalent to the observed attachment relationship (Feeney and Ryan, 1994, p.341).

Collin and Read (1990) break down Hazan and Shaver (1987) 's measure to reconstruct the original attachment patterns into three dimensions: Depend ("the extent to which an individual believes others can be depended on to be available when needed"), Close ("the extent to which an individual is comfortable with closeness and intimacy"), and anxiety ("the extent to which an individual feels anxious about such things as being abandoned or unloved"). These dimensions are checked to be similar to the three patterns of Ainsworth et al. (1978). Collin and Read (1990) name this the Adult Attachment Scale. From here, two styles of attachment are formulated based on the goal of attaining a "felt security," just like in the infant-parent relationship. Since Hazena and Shaver (1987) 's first attempt to measure attachment in a self-report, there are numerous contributions to measure the lower dimensions of attachment. However, research in attachment agrees on the notion that lurking under these concepts is only two dimensions: anxiety and avoidance (Mikulauner & Shaver, 2007, p.27; Levy et al., 2011, p. 194; Collins, 1996). The first style is made up of Anxiety and Depend dimensions and reflects the expectation that the caregiver will be available and responsive when needed. The other, measured by the Close dimension, shows the desire and the response for close contact. Collins (1996), in examining adult attachment in a relationship using the Adult Attachment Scale (Collins and Read, 1990), found that Close and Depend subscales correlate strongly with each other, while both correlate negatively with anxiety. The two attachment styles eventually gain traction in subsequent studies (e.g., Brennan et al., 1988; Konok et al., 2016), thanks to its self-report nature and consistency with the original concepts of Ainsworth et al. (1978).

In short, avoidance people need more independence and would rather be separated, while anxious people are more dependent (Konok et al., 2016). Anxiety attachment style is also described as insecure and constantly in search of connection and relationship reassurance (Mikulincer & Shaver, 2007). People with anxiety attachment style assume the caregiver

to be unresponsive and unavailable. Thus, they are hypersensitive to signs of rejection or abandonment (Konok et al., 2016). The perception of unavailability tends to trigger the secondary attachment strategy (Ainsworth et al., 1974), which leads to increased attachment to a secondary attachment figure and high motivation to remain in proximity (Keefer et al., 2012). Consequently, people with high attachment anxiety tend to notice and express their emotions (Ge, 2014). They are also suggested to be more attached to other attachment figures, such as objects (Konok et al., 2016; Medard & Kellett, 2014) or romantic relationships (Mende et al., 2018).

On the other hand, avoidance style people maintaining independence and emotional distance from others to avoid rejection (Mikulincer & Shaver, 2007). Consumers in this category have a very negative view of relationships in general, which could lead to a self-perception of unvalued and abandoned (Collins, 1996). However, they are usually depicted as very high in self-esteem and self-reliance (Bartholomew, 1990). This dilemma can be solved by actively distancing themselves from others, as demonstrated by a non-significant between emotion and separation (Collins, 1996). Thus, avoidant consumers are less favorable towards romance-related consumption, while anxious ones use it to satisfy their need for security (Mende et al., 2018). They also have no association with addiction (Ge, 2014) and prefer to use less intimate means of communication like email and avoid texting and phone call (Morey & Gentzler, 2013).

1.5. Attachment to Mobile Phone

Traditionally, attached objects are considered as alternatives for attachment figures during their absence (Bowlby, 1969). The children establish a short or long-term attachment relationship with an object when their parents are away. And this relationship tends to be diminished once the parents return. Thus, the object serves as a substitute for the unavailable social connection, either temporarily or permanently. In this line, subsequent

research on object attachment has been focusing on objects as an alternative to the missing social relationship in various contexts, such as old furniture (Cipriani et al., 2009) or collected item (Slatter, 2000).

Attachment to mobile shares the same characteristics as with these above-mentioned objects. The mobile provides psychological comfort and safety to its attached users. Like a child when he/she is attached to the parents, attached mobile users feel relieved and free of stress (Melumad and Pham, 2020). They also invest much to personalize their device (Vincent, 2006) and prefer to keep the mobile in proximity (Konok et al., 2016). Physical separation from the mobile often results in severe psychological consequences, such as anxiety and stress (e.g., Keefer et al., 2012; Hoffner & Lee., 2015; Konok et al., 2016). This evokes negative emotions (Chu and Yang, 2019) and drives the attached mobile users to fix their proximity with the device (Meschtscherjakov et al., 2014; Konok et al., 2017). The mobile is also a relationship maintaining tool (Konok et al., 2016). Vincent (2006) argues that mobile users feel attached not to their device but to the social relationship to which the mobile embodies. The mobile houses its users' text messages, call history, photos, and video, which are the stimuli for their social relationship. Consumers rely on the phone for communication and to stay connected to loved ones and acquaintances (Cheever et al., 2014). In some cases, consumers reported that they felt lonely when not being able to constantly stay connected to their friends via the mobile (Vincent, 2006). However, communication is of less significance in the attachment relationship. Participants in Cheever et al. (2014)'s study showed a higher anxiety level when they were separated physically with the phone than when their communication was cut. Konok et al.'s (2016)'s results also suggested that the need to contact is independent of the urge to remain in proximity with the mobile. These studies reject Vincent (2006)'s idea that Attachment to Mobile is linked directly with the embedded social connection. They instead support the subsequent findings of Konok et al. (2017), in which Attachment to Mobile concerns more the mobile itself, so much that even the sight of another mobile would be enough to ease attachment anxiety of separated individuals.

On the other hand, the mobile goes far beyond an ordinary attachment object, thanks to its embedded technology. The mobile enables the consumers to stay connected 24/7 in a state of "hyperaccessbility" and modified perceptions and behaviors (Norman et al., 2016; Turkle, 2006). Vincent (2005) describes the space surrounding the mobile and its users as "intimate." The interaction with the mobile is nothing like other objects. It is fondled with, cared for, and invested in. The mobile is loaded with personal information like birthdate, photos, or diary and personalized modifications such as ringtones, wallpapers, and protective cases. The mobile also involves in social practices and is referred to by using emotional terms meant for people (Vincent, 2006). For instance, consumers use phrases such as the battery is dead or the mobile is missing. Because of this emotional relationship, certain researchers have considered the mobile as an extended self of its owner (Hoffner et al., 2016). Truly, consumers attached to their mobile have been suggested to invest in personalizing their device (Vincent, 2005). And it can be used to validate their emotions (Katz and Byrne, 2013) as well as regulate negative emotions (Hoffner & Lee, 2015).

Furthermore, the mobile is capable of providing information to its owner and is not a static object. Firstly, its various functions such as app, SMS, or phone call make it the link between the consumers and their social connection (Vincent, 2006). Consumers actively maintain their relationships via mobile by receiving messages, reading posts, or sending feedbacks. Compared to the attachment object in the traditional sense, such as a solider home's souvenir, which is rather in the receiving end, the mobile also participates in giving back information. Thus, the mobile is a very vital link in their social life. So important that not having the phone causes some to feel lonely (Vincent, 2006), ignites an urge to staying near it (Konok et al., 2016), and increases stress level (Hoffner & Lee, 2015).

Because the mobile plays an important role in how consumers receiving information, the device has some degree of influence on its users' perception as well. In advertising, attached to mobile people are in general more open to mobile ads than non-attached ones.

For instance, attached consumers are more receptive to mobile ads (Kosalker et al., 2009). Though this effect is only lukewarm at best and does not suggest any drastic difference, it is still statistically significant. Similarly, Sultan, Rohm, and Gao (2009) studied teenagers and also found that a higher level of Attachment to Mobile would lead to more favorable attitudes toward mobile advertising. Still, their findings did not address how attachment to mobile influences the formation of such a positive attitude. Van Berlo et al. (2020) contribute to this gap by suggesting that attached mobile consumers, in general, have a better understanding of mobile ad content. They argue that attached to mobile consumers are more familiar with the content in mobile, and thus they would be more fluent in processing such information.

1.6. Summary

This section reviews the development and application of attachment theory in explaining the attachment behaviors of consumers toward a specific attached figure. Originally developed to examine the infant-parent relationship (Bowlby, 1969; Ainsworth et al., 1978), attachment theory has been extended to the interactions between humans and objects (e.g., Bowlby, 1969; Slatter, 2000; Vanmeter et al., 2018). The extant literature of attachment suggests that mobile users may form an emotional attachment to their mobile. This relationship is similar to how attachment theory describes the attachment between infant and their primary caregivers (Bowlby, 1969). Notably, the majority of Attachment to Mobile studies are based on the work of Vincent (2005; 2006) on the emotional attachment to mobile. Konok et al. (2016) 's experimentations are the first attempt to apply attachment theory (Bowlby, 1969) and Vincent's conceptualization (2005; 2006) to prove the causal effect of Attachment to Mobile. Before that, attachment to mobile was only utilized as a complement to another theoretical framework, such as the extension of self (Hoffner et al., 2016) or Processing Capacity (Van Berlo et al., 2020).

But unlike a static object, the mobile and its embedded technology and connectivity allow for several differences in the attachment relationship between the mobile and its users compared to a general human-object relationship (e.g., Bowlby, 1969; Slatter, 2000). While the attached objects are mainly at the receiving end of the relationship (e.g., Slatter, 2000), the mobile participate actively in both giving feedback and taking in information. For instance, mobile users can validate their feelings via exchange on social networks (Norman et al., 2016; Hoffner et al., 2015), be flexible in viewing events from different angles (Katz and Byrne, 2013), or regulate their emotions.

That being said, Vincent's emotional attachment (2005; 2006) is very similar to Bowlby's (1969) and Ainsworth et al. (1978) 's attachment theory. They both describe an emotional relationship in which the attached individuals rely on the attachment figure/object for comfort. For example, attached consumers are more at ease with the mobile (Melumad and Pham, 2020) and more welcoming to the information coming from the mobile (Sultan et al., 2009; Kolsaker et al., 2009). Separation from the mobile would lead to negative psychological and behavioral consequences like stress (Konok et al., 2016), proximity urge toward the mobile (Konok et al., 2017), or feeling lonely (Vincent, 2006).

2. Construal Level Theory of Psychological Distance - CLT

Our perception is often limited by time and space. We cannot directly experience the distant phenomenon that is not here and now, such as the like future events or alternative reality. Yet our daily life is often filled with imagining tomorrow, hypothesizing an outcome, or placing themselves in others' shoes. Construal Level Theory of Psychological Distance, or usually referred to as Construal Level Theory or CLT, was developed by Trop & Liberman (2010) to explain how people react to distant phenomenon indirectly through forming mental representation that transcend the said distance. Due to its remarkable capability, it has been adopted extensively to explain consumers' decision-making in many

different contexts, such as moral decision (Barque-Durant et al., 2017), advertising (Theodoraki et al., 2018), or perception (Lee et al., 2014). In this section, we discuss the foundations of CLT as well as its relevance in explaining mobile consumer behaviors.

2.1. Basic Assumptions of CLT

The Construal Level Theory of Psychological Distance (thereafter referred as Construal Level Theory or CLT) (Trope and Liberman, 2010) describes how abstract an object or an event is represented mentally in the recipient's mind. When a consumer sees an object or event, they conjure a mental image called a construal. This mental representation of proximal objects or events is more concrete while the distant ones are more abstract. Abstract construal is structured around the core attribute of the objects/events. On the other hand, concrete construal is detail-specific and contextual (Trope and Liberman, 2010). In CLT terminology, abstract and concrete construal are usually referred to as low-level and high-level construal, respectively. The level of abstractness of these mental images is not fixed. Rather, an object/event can be perceived as a different level of construal. For instance, "writing a dissertation" can be construed abstractly as the achievement of expertise in one's field (i.e., low-level. abstract construal), or it can be seen concretely as typing words into a document (i.e., concrete construal). This has a profound impact on the consumers' behaviors (Maglio, 2019), such as decision making (Trop & Liberman, 2010), and emotion (De Valent et al., 2017)

The construal level is determined based on the psychological distance between the consumer and the object/event (Trope & Liberman, 2010). The psychologically close object/event is represented in low-level construal, which contains concrete information of the features and the contexts. The distant object/event psychologically appears high-level construal, with abstract and general information, such as pattern, direction, or goal. Increasing the psychological distance between consumers to the target would result in greater activation of high-level construal than low-level construal (Liberman, Sagristano

& Trope, 2002). The reference point for this psychological distance is usually the self at present (Trope & Liberman, 2010).

For example, an image of a person named John can be very different between two people with distinct social relations with him. To his family, which is socially close, their descriptions of John would contain a lot of specific details. On the other hand, John's image would be vaguer and more general in the mind of a work colleague, who is not close to John socially. Another example is when asking about an event, and we would always get more specific details of a recent one than an occasion that occurs a long time ago. Knowledge and experience of such events or objects can be attributed to the relationship between high/low-level construal and psychological distance (Trope, Liberman & Wakslak, 2007). The mental representation can be constructed as low-level only when one has sufficient knowledge, hence the detailed and concrete description. Lack of knowledge and/or experience would lead to an abstract and general description since there is not enough information to fill in. In short, the way consumers perceive the world around them is determined largely by the psychological distance between them and their surroundings (Liberman and Trope, 2008).

While the psychological distance is very straight forward in its conceptualization, it is important to remind that psychological distance is based on subjective experience (Trope and Liberman, 2010). This subjectivity leaves way for different interpretations of the same phenomenon. For instance, winning a lottery could be seen as either a future event or a hypothesized outcome, depending on the personal perspective of the observer. Or two different people can have distinct distance from the same object, with one having a much closer social distance due to his personal relationship with the said object. Moreover, the psychological distance tends to be accessed automatically, even in un-intended situations (Bar-Anan et al., 2007). These different interpretations are even entangled (Zhang and Wang, 2009), which hinted towards a rather complex meaning of the whole phenomenon. Treating psychological distance as a single entity risk losing these important layers of

meaning. Therefore, psychological distance is often treated as a multitude of different dimensions to best reflect the perception of the consumers. We discuss these different dimensions of psychological distance in the next section.

2.2. Psychological Distance

The original psychological distance was temporal, which was described in Trope and Liberman earlier work (2003). Further development of Construal Level Theory added three more types of distance: spatial, social and hypothetical. Although there have been attempts to introduce more types of psychological distance, such as the information distance (Fiedler, 2007), they were largely unsuccessful. The first four distances by Trope and Liberman (2010) are still recognized as the most fundamental of CLT. In this section, we discuss the four psychological distances within the Construal Level Theory: Spatial, Temporal, Hypothetical and Social.

2.2.1. Spatial Distance

Spatial distance refers to how far away something is in space. The further away something is geographical, the more abstract our representation of that item (or place, or person, or event) is. Spatial distance has been shown to influence how the behaviors of other people are interpreted; reading the exact description of a person who is supposedly at the participant's university versus someone from the same university but who is studying abroad for a semester in Florence changes the nature of impressions formed of the person (Rim, Uleman & Trope, 2009). While more trait inferences were made for psychologically distant targets (i.e., targets studying in Florence), more complex and context-dependent impressions were formed for psychologically proximal targets.

Similarly, other research (Henderson, Fujita, Trope, & Liberman, 2006) has shown that people are more likely to attribute spatially distant targets' behaviors to their dispositional

attributes, while spatially proximal targets' behaviors are thought to be more dependent on the situation. In other words, the increased spatial distance was related to the tendency to make dispositional attributions and neglect the context of others' behaviors (Gilbert & Malone, 1995). Henderson and colleagues (2006) also found that specific events (such as the likelihood that students would sleep an average of 6.2 hours per night) were considered more likely in spatially distant locations than spatially close locations. Conversely, atypical events (such as the likelihood that a forecasted temperature would be several degrees below normal) were considered more likely for spatially close locations than spatially distant. These two findings combine to support the idea that spatially distant events are construed more abstractly and coherently; that is, minor variation is expected across spatially distant events.

2.2.2. Temporal Distance

Temporal distance refers to how far something is away in time. Immediate events are construed more concretely, whereas events in the past or future are construed more abstractly. Ledgerwood, Trope, and Chaiken (2010) showed that people's attitudes about future events are more consistent, while attitudes about immediate events are more flexible and context dependent. In one study, participants read a message ostensibly written by a co-participant either for or against a policy that was to go into effect "next week" or "next year." When the policy was to go into effect in the near future, it was more temporally close to the participants, which led to a lower level, more context-dependent construal. This led participants to shift their attitudes to become more similar to their peers' attitudes in the same study. However, when the policy was to go into effect in the distant future, participants' construal levels were more abstract, and their attitudes were not correlated with those of their co-participants. Temporal distance also influences choices: temporally near decisions are more likely to be based on the feasibility of an outcome, whereas temporally distant decisions are based more on the desirability of an outcome (Liberman & Trope, 1998).

2.2.3. Social Distance

Social Distance refers to the degree of similarity between a person and a target. According to Construal Level Theory, the more similar two people are, the closer their social distance, and the more detailed and concrete their construal levels will be. The empirical literature on how people perceive in-groups and out-groups differently provides support for this idea. Out-groups are believed to be more homogenous and described in more abstract terms, while in-groups are considered more diverse and have unique attributes (e.g., Jones, Wood, & Quattrone, 1981). Nan (2007) showed that participants were more likely to be persuaded by a message when taking the perspective of a socially distant other (i.e., the average college student) than a socially proximal other (i.e., a participant's best friend). In another study, imagining a close relationship versus a formal relationship with a target influenced perceptual processes and responses to the letter task designed by Navon in 1977 (Liberman & Förster, 2009). Participants who had a "socially proximal" mindset focused more on the "local" letters (i.e., the small letters) of each figure, whereas participants who had a "socially distant" mindset focused more on the "global" letter (i.e., the "big picture").

2.2.4. Hypothetical Distance

The hypothetical distance can be thought of much in the same way as "abstractness" or "concreteness." The more hypothetical or imagined an event is, the more distant it is considered from the self. For example, describing an event in terms of "if" instead of "when" it will happen, can lead to a more abstract view of the event (Trope & Liberman, 2010). Similarly, an event that has a low likelihood of taking place is seen more abstractly than an event that has a higher likelihood of happening. For example, winning the lottery is very unlikely to happen to the average person, so it might be construed in abstract terms as being the cause of happiness or living a carefree life. On the other hand, buying a lottery ticket is very likely for the average person to experience, and thus it can be construed more

concretely as picking out numbers, scratching off circles, or paying the store clerk. While hypotheticality influences the construal level, the reverse is true as well. In one study, Wakslack and Trope (2009) showed that participants with an abstract (high construal level) mindset rated events as less likely to take place than those with a concrete (low construal level) mindset. In other words, as their construal levels increased, so did the perceived possibility of events.

2.3. Interaction between Psychological Distances

Although each of these different types of psychological distance has been shown to be associated with higher construal levels and more abstract representations of the world, it is important to note that they are all associated with each other as well. The associations between the dimensions of psychological distance and the level of construal are automatic. Bar-Anan, Liberman, and Trope (2006) showed that participants responded faster when a high-level construal was paired with greater psychological distance (e.g., "abstract" with "long ago") but responded more slowly when a high-level construal was paired with psychological proximity (e.g., "universal" with "real"). Similarly, Bar-Anan, Liberman, Trope and Algom (2007) showed that participants had faster responses when the spatial distance of a word matched its psychological distance (e.g., when the word appeared at the forefront of the computer screen, participants responded faster to "friend" than to "enemy"). At the level of downstream judgment and decision making, the mind prefers matched distances as well. People have greater confidence in and indicate greater willingness to bet on underdogs (i.e., unlikely winners) when the outcome is determined in a spatially distant location (Wakslak, 2012), and consumers are more strongly persuaded by recommendations from distant others when considering distant future purchases because those opinions seem more relevant (Zhao & Xie, 2011).

Also, thinking about one type of psychological distance or abstraction activates other types of psychological distance (Bar-Anan et al., 2007), but this effect is rather asymmetrical, given the concerned distance remains unrelated (Zhang and Wang, 2009). People have structured their metaphorical understanding of other, indirect distances in spatial terms (Boroditsky, 2000; Casasanto & Boroditsky, 2008). And priming spatial distance leads people to assume that a target is equally distant on each of the other dimensions (Zhang and Wang, 2009). For instance, spatial distances on sundials have historically been used to represent time and measure temporal distances. The dial is marked with lines, and as the sun moves, the shadow of the central post moves between the lines. The spatial distances between the lines on the dial represent different temporal distances like an hour or a day. Similarly, a year is represented by how long it takes for the earth to go around the sun, and a month is represented by how long it takes for the moon to go around the earth. Therefore, temporal distances are essentially units devised to measure changes in spatial distance. Similarly, the social distance between two individuals and the distance in probabilities are also often construed and manipulated in terms of spatial distance. This is because the more tangible and directly experienced spatial distance is the tool people used to make sense of other types of intangibles (Zhang and Wang, 2009). Within the advertising context, this suggests that if a vacation destination is farther away, consumers will be more likely to consider it as occurring in the distant future. On the contrary, a vacation plan for the distant future does not necessarily result in a plan for a destination far away. However, if the communication message, or even the media context that is unrelated to the message, draws consumers' attention to relations and connections between different concepts, then a consumer planning for a vacation for the distant future is more likely to choose a destination that is farther away.

This asymmetry only holds as long as the conceptual difference between the psychological distances is recognized by the viewers (Zhang and Wang, 2009). Theoretically, there are two ways to eliminate this difference. First is by carryover effect coming from subsequent judgment in a related task in which the similarities between all dimensions are reduced to

a minimum due to relational processing. Another is to make the intangible dimensions tangible. For example, using a physical and related object to present time, such as a calendar, renders the temporal distance more tangible and thus resulting in a symmetrical priming effect on spatial-temporal judgments.

However, Maglio, Trope, and Liberman (2013) found the symmetrical effect in the cross-distance effect, in which temporal distance affects spatial distance as much as the reversed. This effect is mediated by the respondents' subjective magnitude of said distance. Research on construal level theory has established that the introduction of distance causes incidental or contextual aspects of targets to be discounted (Trope & Liberman, 2010). And studies have shown that distance causes (further) distance to be discounted, it seems that psychological distance is itself an incidental, low-level aspect of a situation, so if the distance is somehow introduced as high-level, it would probably be magnified rather than diminished (Maglio, Trope and Liberman, 2013). Perhaps in the case of Zhang and Wang (2009) 's study, the primacy of space as the only tangible distance, and thus making it high-level. This implies the importance of expressing other psychological distances in terms of spatial forms. Following this line of argument, closing in the distance to the destination would make the consumer more likely to consider purchasing it rather than dismiss it as a distant event.

2.4. Antecedents of Psychological Distance

The previous sections describe the fundamental of construal level theory and the dynamic of several types of psychological distance. Moreover, the conceptualization of psychological distance draws the line between the psychologically far and the psychologically near but ultimately lacks a response to when the object of interest will be seen accordingly. The response of this question is of great relevant to researchers hoping

to understand the psychological distance phenomenon. In the case of this dissertation, we question the ability to alter perception of the mobile, therefore the knowledge of manipulating psychological distance is indispensable. This section discusses the various factors that influence when and how people perceive an object as psychologically distant or psychologically proximal. We categorize them into two main groups: environmental factors and consumer-related factors.

2.4.1. Environmental Factors

Natural boundary is one way to categorize the psychological distance from the self to the object. Between physical spaces exists an obvious separation line that serves to tell them apart. Things on the other side of such boundaries seem psychological further away (Burris & Branscombe, 2005) and have a different set of behaviors (Zhao, Lee and Soman, 2012). Similarly, people are motivated to behave differently when they look forward to a future temporal point (Dai, Milkman & Riis, 2014; Dai, Milkman & Riis, 2015).

Nevertheless, the line between far and near is not always very well defined. For instance, the self can be used as the basis for prosocial behaviors between strangers and friends (Rachlin & Jones, 2008). Logically, the social distance between the self and a friend is closer to a stranger on the street. The level of generosity decreases not proportional to the increase in social distance between maker and recipient but in hyperbolic shape (Rachlin & Jones, 2008). Its characteristics also vary. Social discount behaviors are influenced by risk but remain stable at the two extreme poles of the social distance to the recipients (Jin, Pei & Ma, 2017). It is essential to remind that the nature of this proximity is always subjective to the reference point and is not, in any case, an objective near or faraway psychological distance. For instance, Perceived Psychological distance may change drastically across different contexts. Digital communication can reduce the felt spatial distance in comparison to non-digital one (Turkle, 2006). Technologies such as video calls can bridge people from remote locations together in the same space, albeit a virtual one.

There are also variations between different forms of digital. Barque-Durant et al. (2017)'s examination of mobile and desktop environments suggests that the former's psychological distance is shorter than in the latter. Even though the mobile's usage pattern is supposed to shorten the distance felt by its users (Norman et al., 2016), that can change depending on other situational factors, such as when people resolve to mobile texting while sitting in the same room (Turkle, 2006).

Since an objective distance is not effective in determining psychological distance proximity, it falls to the consumers' own initiative to form a boundary (Maglio, 2019). In the examples of Turkle (2006), Social distance between two individuals differs greatly depending on how they choose to communicate with each other. Mobile users can feel closer to people staying miles away but distanced from the one sitting in the same physical room with them. When determining temporal distance, consumers subjectively set their own boundary between their present and future (Hershfield & Maglio, 2019). They tend to rely on their own temporal landmarks to navigate their positions in relation to the future or past events (Peetz & Wilson, 2013). As a result, the sense of time can differ greatly from case to case. One's present can last for months, but others' are only several minutes. More importantly, this choice is consequential to their behaviors as picking a more distant future decrease the likelihood of compromise (Khan et al., 2011). The sense of proximity also differs between different types of distance. De Valent et al. (2017) found that Twitter users are more receptive to the threat coming from social-close regions. Not until this social boundary is crossed that their reactions intensify and that the issue is perceived as imminent.

External factors play an important role in determining the boundary between far and close. For instance, consumers' estimation of distance is higher when questioned with large measurement units and vice versa (LeBoeuf & Shafir, 2009). This effect is subconscious and cannot be observed directly, but it disappears when consumers are warned of insufficient estimation. Changing the surrounding environment also has the same effect.

The lack of lighting allows consumers to loosen their social obligation and to act more authentically. But this effect is diminished once this social link is reintroduced. In other words, social distance between individuals increases in ambient darkness and decreases with the brightness (Huang, Dong, and Labroo 2018). On the other hand, some external factors do not set a boundary but sketch the perceived distance. A Time-pressuring condition was suggested to lower the perceived psychological distance to the subjects (Barque-Durant et al., 2017). The rush of time forces the consumers to concentrate on a single object and underweights the surrounding. This increases the distance between them and gives rise to high-level construal representation of such objects.

Evidently, because of the complex nature of psychological distance boundary as stated above, it is much more practical to examine the two extreme poles of very near and very far away. This approach has been adopted by a vehemently huge number of researchers (Maglio, 2019), and consequently, it leaves a big gap in the middle spectrum. The question is obviously how consumers' behaviors change when their perceived distance moves gradually between a moderately near and a moderately far psychological distance. As shown by Rachlin & Jones (2018), the effect of changing psychological distance cannot be felt in the two extreme poles of distance.

2.4.2. Consumer-Related Factors

As shown in the above section, psychological distance is not perceived as is but depends on its boundary. And such boundaries can be manipulated to a certain extent. In light of the consequences of psychological distance, marketers and researchers have been trying to increase or reduce the psychological distance to meet their desired outcomes.

Via interaction between different psychological distance

Since the four types of psychological distances share a foundational meaning (Maglio, 2019), a manipulation on one distance with be felt on the others automatically (Bar-Anan, Liberman, Trope, & Algom, 2007). In other words, trying to influence one psychological distance will have an effect not only on that targeted distance but also on others. This effect is not symmetric. Because spatial terms are often employed to express temporal, hypothetical, and social meaning, a spatial distance change will lead to greater change in the other three kinds of distance (Zhang & Wang, 2009). It is needed to note that this effect disappears when differences between distances are removed using relational processing or when the three intangible distances are supported by tangible cues (Zhang & Wang, 2009). In any case, spatial distance is the target of manipulation in many studies because of its tangible characteristic. For example, Kim, Zauberman, and Bettman (2012) manipulate respondents' hypothetical spatial position on the map to measure their temporal distance between present and future. Those who are more distant spatially perceive a longer waiting time and vice versa.

However, spatial distance is not the primary manipulated variable in the literature. The distant future is usually associated with distal social distance (Stephan, Liberman & Trope 2011), an unlikely event (Wakslak, 2012). Mackinnon, Jordan, & Wilson (2011) manipulate respondents' physical appearance to determine their social distance from each other. They found that people in proximal distance tend to remain in close spatial distance, measures in the distance between people's seating. Park, Young, and Eastwick (2015) use a hypothetical scenario to set the respondents' social distance to their dating targets. By manipulating the profiles shown to the respondents, Park and his colleagues effectively increase or reduce the social distance between them.

Dynamic distance between the object and the perceiver

Initial investigation on psychological distance focused on the subject in terms of its temporal distance (Trope and Liberman, 1998). In other word, an event is perceived as

psychological near when it is placed in the present time. And it can be felt as psychologically further away when it is from the distant past or future. However, a subject's placement is not always static, as is our judgments. For example, our temporal distance to a specific event is always changing. If such event is placed in the future, then the distance shortens as time passes. Then, this event is transitioned to the past, and the distance to that subject will keep increasing. As a consequence, our brain learns to adapt and incorporate the past and possible changes to our judgment (Markma & Guenther, 2007) Recent investigations of psychological distance have parted way from this old point of view and approach the notion of a constantly moving object (Maglio, 2019). In Spatial distance, an object would be closer psychologically for those moving towards it, and further psychologically for the ones moving away from it (Maglio & Polman, 2014). In the same logic, Caruso, Van Boven, Chin and Ward (2013) found that the same temporal distance did not have the same impact on consumers' perception of distance. The event in the future would be seen as closer than the one in the past because the latter is moving away while the former approaches.

This perception is quite subjective and depends on the subject-matter. Because the phenomena of psychological distance is attached closely to the objective distance (Van Boven et al., 2010), some psychological distance dimensions can be more relevant than others in certain contexts. Climate change, for instance, depends on consumers' level of concern for environment (Wang et al., 2019). Non-concerned consumers tend to disregard the climate-related consequences and see them less of an immediate threat. On the other hand, Van Lent et al. (2017), observed consumers' reaction to Ebola virus' spread and found that their concern increased as the virus approached in terms of social distance rather than spatial distance. A geographically close location does not appear to be as immediate as a familiar country in the other side of the Earth.

The dynamic psychological distance between consumers and the subject has important impacts on judgments and decisions. When the subject is moving closer, the consumers

tend to focus on its salient values. For instance, Davis, Gross and Oschsner (2011) found that negative movie scene is described more intensively when it is moving towards the audience than when it is moving away. Some highlights the potential shortcomings of the subject (Eyal et al., 2004) and perceive it more negatively (Hsee, Tu, Lu and Ruan, 2014). This dymanic applies to even the imagined objects such as in the case of a virus pandemic, consumers would see it as more threatening and more dangerous as it approaches their habitation zone (Van Lent et al., 2017).

Physical Contact

Obviously, touching an object means the distance to the consumers is zero. In terms of psychological distance, physical contact can reduce the felt distance to the object, via a feeling of control (Wakslak & Kim, 2015). This contact does not need to be directly link with the subject and can be associated with the mobile's touch screen (Maglio, 2019). For instance, consumers interacting with the touch screen tend to lose self-control and are more likely to make short-terms benefits (Shen, Zhang & Krishna, 2016) Or utilitarian choice when facing moral dilemma (Barque-Durant et al., 2017). This contact does not need to be physical. Simply imagining touching the products seem to produce the same feeling of ownership (Peck, Barger & Webb, 2013). More importantly, this logic applies only to the senses that requires physical interaction in real life, such as touch or taste, while those that do not require proximity (i.e., hearing, sight) (Elder et al., 2017). In other word, touching an object produces a more psychological proximal experience than seeing one. And a congruency in perceived psychological distance between different senses lead to positive behavioral outcome (Zhao & Xi, 2011).

2.5. Consequences of Psychological Distance

Psychological Distance has numerous influences on consumer behaviors, such as perception, thought or decision (Trope and Liberman, 2010). With attachment to mobile

being the premise of this doctoral research, this section would not cover every examined consequence but rather focus on those that are strongly related to attachment. Since attached to mobile consumers have been observed to express positive reception towards ads (Kolsaker & Drakatos, 2009) or has a different behavior when using their mobile (Melumad & Pham, 2020), attitude, preference, and behaviors are arguably the most relevant subjects.

2.5.1. Attitude

The formation of attitudes and preferences are essential aspects in the field of consumer psychology, both in a theoretical as well as in a practical sense (e.g., Slovic, 1995). Advertising and marketing efforts ultimately aim to influence consumer preferences and their product choices. Marketing campaigns such as price promotions or brand advertisements are based on the expectation of being able to have an impact on consumer preferences. Preference changes have also been examined by using construal level and psychological distance manipulations: Many of these research studies have shown the influence of psychological distance and construal on attitude change and preference formation. CLT plays an important role not only in preference formation but also when reevaluating products after a period of time.

Fujita and colleagues (2015) provide an overview of the various research studies that have shown the influence of psychological distance and construal on attitude change and preference formation. One comprehensive study on how to influence attitudes towards distant and near objects is particularly interesting (Fujita et al., 2008): Participants were exposed to either weak or strong arguments for preserving wildlife in a specific area. Those arguments either mentioned a high-level, superordinate category of an attitude object (e.g., orcas). Or they referred to a low-level, subordinate, specific exemplar of the attitude object (e.g., Simon, an orca). Fujita and colleagues (2008) found that when the arguments referred to the superordinate category, attitudes are more affected by strong arguments when the

attitude object was temporally distant as compared to temporally close, whereas when the arguments mentioned a subordinate exemplar, the effect reversed. In this case, attitudes are more affected by strong arguments when the attitude object was close as compared to when it was distant.

In judgment situations, consumers often come to a decision by weighing all the pros and cons. Interestingly, Eyal and colleagues found that for distant-future options, pros are more salient than cons, while for near-future actions, cons are more salient than pros (Eyal et al., 2004). In a similar vein, Herzog, Hansen, and Wänke (2007) demonstrated that participants found it easier to generate cons if an action concerned the near rather than the distant future. The reverse holds true for pro arguments; participants find it easier to generate pros for the distance as compared to the near future. They proposed that "it is not the number of arguments generated per se, but the associated ease of retrieval that drives the changes in attitudes" (p. 484). When people hold more positive attitudes, it is easier for them to generate pros, and it is harder to generate cons (Wänke & Bless, 2000; Wänke, Bless, & Biller, 1996). For distant-future actions, the number of pro arguments relative to the sum of all pros and cons are higher as compared to near-future actions, and vice versa for con arguments. Accordingly, it is easier to generate pros about distant-future actions as compared to near-future actions.

In order to understand and forecast attitudes and preferences, it is important to know both what comes to one's mind and how it comes to one's mind. Herzog and colleagues (2007) mention speculations about ease of retrieval not being the only meta-cognitive experience that is altered by psychological distance, mediating the effect on attitudes. Meta-cognitive experiences like perceived familiarity (e.g., Whittlesea, 1993) or implicit knowledge might be similarly affected by psychological distance.

Even in situations in which psychological distance is absent, mental construal can affect and alter attitudes. For example, different studies found that individuals seem to have

different inclinations to use high and low-level construal, which reflects systematical differences in their decisions and choices (Vallacher & Wegner, 1989; Freitas et al., 2001). In addition to the individual tendency toward one or the other construal, these construal levels can also be actively primed. Prior experiences and contexts activate different mindsets, which are transferred to subsequent situations that are not related to the prime (Fujita et al., 2006; Freitas, Gollwitzer, & Trope, 2004).

Fujita and colleagues (2006) primed participants by asking them to generate either superordinate category labels (e.g., "animals") or subordinate examples (e.g., "shepherd") for a range of objects (e.g., "dog"). In a subsequent unrelated task, participants identified different actions rather in terms of superordinate end-states as compared to subordinate means when having been primed with a high-level construal by generating superordinate unrelated objects were more influenced by high as compared to low-level concerns.

2.5.2. Preference of Choice

Consumers are often confronted with multiple options before making any decision. A quick search on Amazon.fr would show thousands of products or any supermarket ail usually contains over ten types of products for each category. On the surface, certain consumer established a clear preferred choice, such as a large retail store to a small one or having more option than fewer (Chernev et al., 2015; Huffman and Kahn, 1998). However, such preference can be influenced by how the option are presented. For example, the preference of the consumers is systematically influenced by the psychological distance from the available options (Goodman and Malkoc, 2012). Or consumers lean towards utilitarian decisions when they are on mobile (Barque-Durant et al., 2017). CLT provides a mechanism to explain and predict how likely a decision will be chosen by the consumers. CLT predicts that different choices are made in high-distance and low-distance decision settings since consumers tend to focus on abstract aspects in distant-future events and concrete aspects for near-future events (Trope and Liberman, 2003). For instance,

consumers in a high-level construal tend to focus on desirability-related features, while consumers in a low-level construal tend to focus on feasibility-related features (Liberman & Trope, 1998; Trope & Liberman, 2003). Consequently, when psychological distance is high, consumers perceive different options in an assortment of products as more similar and exchangeable, hence their preference to shopping at larger store (Goodman and Malkoc, 2012). Xu and colleagues (2013) demonstrate that abstract mindsets help to choose from large assortments because, under high-level construal, different options are perceived as more similar, reducing the complexity of choice.

But the development of such preference depends on the evaluative context, or in other words, on consumer perception. A consumer's evaluation of a product or service under high or low distance is clearly defined by CLT. The feasibility of buying and using the product is more salient to a consumer now than in the future (Trope and Liberman, 2003). These initial judgements even influence their assessment when they reevaluate the same product (Kim, Park, and Wyer, 2009, p. 634): "Participants who reevaluated the product for future use based their judgments on desirability considerations regardless of when they had considered using it initially. However, participants who reevaluated the product for immediate use also based their judgments on desirability considerations unless they had initially considered immediate use as well".

Most consumer research has focused on consumer choices made across comparable alternatives. Kim, Khan, and Dhar (2008) looked at non-comparable alternatives: they showed that for non-comparable choices, an abstract construal level reduces rates for choice deferral and increases the consumers' satisfaction with the choice. In contrast, for comparable choices, the reverse is true: an abstract construal increases choice deferral and reduces satisfaction. Previous research by Dhar (2003) indicated that when individuals cannot compare between product attributes, they show a higher tendency to defer the choice or to not choose at all. In such a case, a high-level construal makes it easier to create general decision criteria, which in turn influences the ease of making a choice, while on

the other hand, looking at comparable choices with an abstract construal would hinder the ability to compare the alternatives on their low-level features (Förster, Liberman, & Kuschel, 2008). As Kim and colleagues put it: "Evaluating comparable products on an abstract level can make them look less distinct (e.g., the "usefulness" of two boxes of chocolate is likely to be more similar than the "number of pieces" in each box) and reduced differences between alternatives can lead to increased choice deferral" (p. 27).

In a study by Liberman and Trope (1998), students who were assigned to a research project in the distant future chose a project with an interesting topic, in the sense that they agreed to sacrifice ease of the project for the sake of their interest in the topic, whereas students assigned to a research project in the near future focused on the amount of work and time necessary to complete the project. This meant that students chose a fairly easy but less interesting project. Or when the convenience of shopping at a large store is highlighted, consumers' preference to go to there is strengthened (Goodman and Malkoc, 2012). While past studies show that these preferences often depend on consumers' natural responses, their development overcome by using mental simulations (picturing a situation in one's mind, Zhao et al., 2007): for familiar choices, process and outcome simulations can change the usual level at which people represent alternatives in time. In other words, process simulations can trigger a focus on concrete feasibility aspects in the distant future, whereas outcome simulations can trigger a focus on desirability in the near future. As a consequence, contrary to an individual's natural tendencies, process simulation for events in the distant future and outcome simulation for events in the near future result in preference consistency over time.

This means that once they have considered future use, the desirability considerations continue to be the salient evaluation criteria, even if the participants are asked to reevaluate the product for immediate consumption. In a similar vein, Bornemann and Homburg (2011) illustrate the effect of reevaluations in the context of product prelaunch advertisements. They state that consumers are inclined to think of a price as either a 'monetary sacrifice'

when a purchase is temporally close vs. a 'quality indicator' when a purchase is temporally distant. Accordingly, at the point of immediate consumption, participants are willing to pay more when product and price information is initially evaluated from a temporally distant perspective (181€ for an eBook reader), as compared to when price information is evaluated from a temporally close perspective for the first time (131€ for the same eBook reader). For that reason, price information should already be communicated at a temporally distant time (prelaunch product advertisements) in order to increase consumers' purchase intention when the product becomes available.

2.5.3. Decision

Consistent with how psychological distance would influence consumers' attitude and preference, it can be used to predict the likelihood of certain choices, ranging from purchasing products to making moral decisions (e.g., Kim et al., 2009; Barque-Durant et al., 2017). A choice need not be made immediately. Such behavior takes its root from a heightened intention to purchase. An intention to purchase a product is influenced by different external factors of the product (e.g., its features), internal factors of the consumer (e.g., self-control, uncertainty), and the interplay between external situational factors and internal factors of the consumer (e.g., stress). The key external factor that drives intention to purchase is the product itself. Its features are defining it, and they make it more or less appealing to consumers. The salience of specific features can already trigger a shift in mental construal, which in turn influences purchase intentions. The influence of construal level and psychological distance on purchase intent was the subject of the research of Thomas, Chandran, and Trope (2007). They investigated the impact of product feature enhancement measuring the consumers' intention to purchase the presented product. As mentioned before, a high-level construal is linked to a focus on desirability aspects, whereas a low-level construal goes along with focusing on feasibility aspects (Liberman & Trope, 1998). Thomas and colleagues (2007) manipulated the salience of desirability aspects (e.g., great extra features) vs. feasibility aspects (e.g., price) of a product. The

results show that purchase intention is higher when the Temporal distance (distant vs. near future) fits the construal level elicited through the product description (desirability vs. feasibility). Turning to the consumers' internal factors, the consumers' ability for self-control (e.g., Fujita et al., 2006) on the one hand and the consumers' perceived uncertainty about the product and their own preferences (e.g., Maier et al., 2015) on the other hand, have been shown to influence consumers' purchase intentions, moderated through construal level. In a similar vein, stress – linking external and internal factors – influences consumers, as reflected in their intention (Maier & Wilken, 2014).

Otherwise, when consumers are faced with a myriad of choices, psychological distance provides a mechanism for consumers to overcome the subsequent demotivation (Iyengar & Lepper, 2000). For decisions related to a psychological distant matter, consumers priorities gathering enough information to form recognizable patterns over making a quick decision over separated pieces of information (Maglio, 2019). Halamish and Liberman (2017) asked their participants to carefully look for information before making a decision. These participants ended up spending more time when this decision concerns people at a further social distance but chose to rely on a smaller batch of information for decisions targeting the self or their own social connections.

Psychological distance also reflects how a decision came to be. When consumers make their choice from a further psychological distance, they are more likely to rely on heuristics (Maglio, 2019). For instance, the higher retail price can be associated with superior quality. This association depends on the psychological distance from the consumers to the products. The inference of quality based on price is enhanced when made to another person rather than the self (Yan & Sengupta, 2011). Similar patterns were observed from a temporal distant perspective, that is, when quality inference is made for a past purchase (Borneman & Homburg, 2011). Though not strictly conceptualized as a heuristic, the environment is also a factor influencing the perceived psychological distance. Huang, Dong, and Labroo (2018) suggested that the lack of ambient lighting makes consumers feel disconnected and

increases the social distance from others. As a consequence, they are more likely to make a hedonic choice than a utilitarian choice. This choice is driven by the fact that a darker environment induces more intense emotions towards the stimuli (Xu & Labroo, 2014) and that emotion salient is related to greater perceived psychological distance (Van Boven et al., 2010). Not only the external factors but consumers' activities in an environment can also contribute to their perceived psychological distance towards the stimuli. On Mobile, the consumers tend to focus on a single task and ignore the surrounding factors (Ariely, 2016). This drives them to see the stimuli at a further psychological distance and induces utilitarian choice (Barque-Durant et al., 2017).

Psychological distance is also useful in explaining why certain choices are easier to make than others. Maglio (2019) showed that although consumers prefer taking more information before making a psychologically distant choice when the amounts of information become overwhelming, they only rely on what they consider essential. This explains how consumers process information so effectively for psychologically distant decisions (Fukukura, Ferguson & Fujita, 2013). Therefore, psychologically distant decisions seem easier to make than those are framed from a proximal distance perspective (Thomas & Tsai, 2012). In short, psychological distance is not only useful at predicting consumers' decisions but also is capable of explaining the mechanism through which these choices are made.

2.6. CLT in Consumer Research

When consumers are exposed to information, whether it is a vacation advertising, a warning, or an invitation, there exists a psychological distance between their mind and these stimuli, which is different from the physical gap to their body (Liberman, Trope, & Stephan, 2007; Maglio, Trope, & Liberman, 2013a). A vacation would induce a distant perception of time, while an invitation may trigger the social link between the sender and the recipient. Change in this psychological distance would lead to a change in the perceived

construal level, consequently influencing their motivation, attitude, or behaviors (Trope & Liberman 2010, Maglio, 2019). The psychological distance itself is also under the effect of other antecedents, both situational and environmental (Maglio, 2019). This fundamental principle makes CLT widely adopted in the consumer research literature as one of the major theories. Across the literature body, CLT has been successfully utilized to explain and predict consumers' judgment (Barque-Durant et al., 2017), persuasion (Kim & Song, 2011), choice preference (Hoang, Dong & Labroo, 2018), or intention (Darke et al., 2016). The below figure illustrates the relation of psychological distance with other factors within CLT in the literature.

Situational-Environmental antecedents

↓

Psychological Distance

↓

Construal level

↓

Outcomes

Figure 1 Psychological Distance's Related Position In Extant Literature
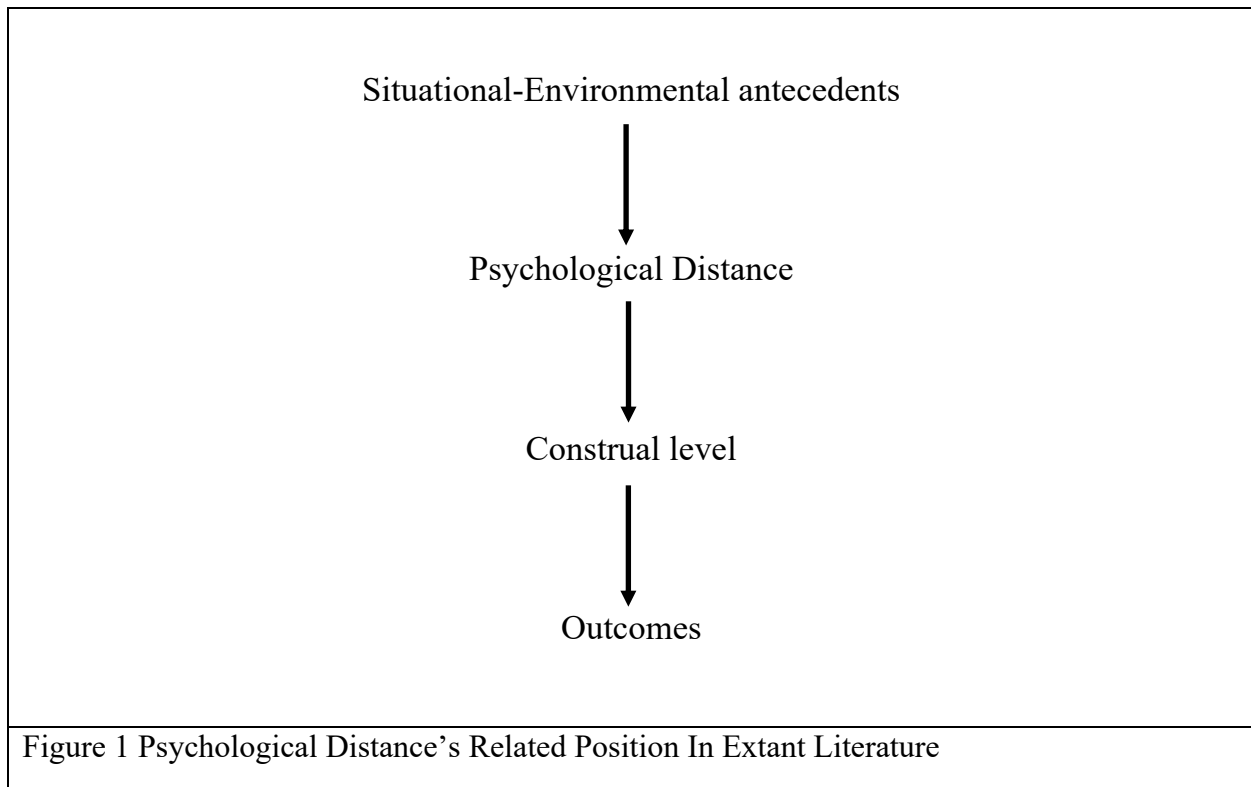
The following section will discuss how CLT has been adopted in various consumer research.

2.6.1. Psychological Distance in Digital Environment

In digital circumstances, the concept of physical distance does not exist. Email can cross the distance, which traditional post mail takes weeks in just a second. Video calling allows physically separated people to feel as if they are in the same space. Digital communication devices can increase and decrease the felt distance, depending on the situation (Norman et al., 2016; Turkle, 2006). For instance, social distance can be proximal between two physically separated persons using digital communication as the medium. For advertising context, this is important because recognizing the distance means that people are less likely to be persuaded by a distant party than by a nearby one (Bradner & Mark, 2002). Norman et al. (2016) as well as Katz and Byrde (2013), suggest that the digital environment can change the association between types of psychological distance. The experience of physical distance is not equivalent to that in the natural environment since information travels faster than transportation. Thus, the assumption of psychological distance in the offline environment may not hold online. Traditionally, it is assumed that all psychological distances go together (Norman et al., 2016; Trope and Liberman, 2010). This has many important implications, partly because when one distance activates, others are concerned as well. For example, an even further in the future will be described as high construal, using distant spatial terms. Thus, an object can be described by several types of distance, and those involved tend to be consistent in terms of construal level and distance. In this context, spatial distance has the profound function as the priming element to describe other distances (Maglio, Trope, Liberman, 2013; Zhang & Wang, 2019). However, online, social distance seems to have a far more important role than spatial. De Valent et al. (2017) found that online Twitter users react more to the threat in their socially proximate region, not in function of geographical closeness. More importantly, their reaction changes the moment the psychological boundary between these regions is crossed. While CLT (Trope & Liberman, 2010) suggest a more continual correlation, De Valent et al. (2017) 's results suggest that psychological distance's consequences are rather polarized.

The devices that people use in the digital environment are also influencing its users, especially the mobile phone. Different from other devices like computers or tablets,

consumers' behaviors on mobile is often characterized by its context (Barque-Durant et al., 2017). Mobile's physical form allows behaviors in conditions that cannot be done with PC, such as check the Internet on the go or listening to podcast and playing sport at the same time. Mobile is infiltrating our daily life to the point consumers are suggested to have emotional attachment to their phones (Vincent, 2006). To some, the mobile is inseparable and the first thing to check at the beginning of the day. This attachment serves to ease their anxiety, either to use the phone to avoid contact or to seek intimate feelings (Konok et al., 2016).

The use of mobile phones also has some unique influence on perceived psychological distance. Norman et al. (2016) argues that with the advance of the Internet and mobile technology, the consumer will reach a constant state of the connection (Turkle, 2006). In this state, people are able to express their emotions anytime they want. And they demand and expect to have their feeling validated in a short time. Moreover, the ability to always access information stored on the Internet enables consumers to reach for distant and past information easier. This serves as diminishing the usual distance associated with these temporal occasions. For instance, a person's life is composed of past and future events. With the popularization of social media like Facebook, their life will be eventually uploaded and stay available all the time. Rather than be associated with distant events, their availability will make the consumers perceive it as being proximal (Norman et al., 2016). Thus, the whole experience on mobile seems to occur in a shorter perceived distance than in other devices.

Perceived distance on mobile can be influenced by environmental factors too. Barque-Durant et al. (2017) found that perceived distance on mobile tends to increase due to time pressure. This is intriguing because, under normal circumstances, decisions under time constraints would usually rely on heuristic and be ontological (e.g., Petty & Cacioppo, 1986). Moreover, moral decisions were shown to be related to low-level construal and proximal psychological distance (Barque-Durant et al., 2017). The increase in distance was

made possible by an effect called the "narrowing effect," which channel consumers' thought toward the main task, focus on the goals, and ignore other immediate emotional impacts. The outcome is an increased construal level of the message and a bias toward a utilitarian decision (Ariely, 2016). Interestingly, this effect is only valid when the stimuli are emotional (Barque-Durant et al., 2017).

2.6.2. Psychological Distance in Advertising

Psychological distance, even though very versatile, has not been adopted widely in advertising literature. While CLT addresses a single relation between psychological distance and the construal level perceived (Trope & Liberman, 2010), in advertising, the advertisement comprises of multiple elements, each of which imposes a construal level. Advertising researchers, thus, have to face an agglomeration of stimulus. This complexity is the reason advertising problems merit has prevented CLT from proliferating in this field. Nevertheless, CLT has been adapted to examine the isolated effect of advertising elements (e.g., Kim and Song, 2019) as well as their combined effects (e.g., Choi et al., 2019; Sungur et al., 2019).

When exposed to a message, consumers use the distance cues in online messages to generalize a distance to the stimuli (Sungur, Koningsbruggen & Hartmann, 2019). But this relation requires a comparison of likelihood by the consumers. In case of incompatibility between the source location and the likelihood, the effect ceases to exist. These cues can be tricky. A piece of advertisement can contain texts or pictures, or both. Each of these elements has been suggested to have a different distance to the viewers, psychologically. For instance, pictures are preferred to words when communicating to socially close people (Amit, Wakslak, and Trope, 2013). Pictures also invoke concrete construal levels, unlike words, which cause people to think of more abstract features (Rim et al., 2014). Consumers usually rely on abstract features to interpret the uncertainty of their experiences in the real world, whether it is behavior or objects (Helzer and Edwards 2012). These abstract

features, in turn, are used by consumers to view the product of high/low purchase frequency and slow/rapid consumption (Trope and Liberman, 2003). In the durable/non-durable product category, their essences are used to construct their psychological distance to the consumers. For non-durable/durable products, since they are purchased more/less frequently, and their consumption outcomes are more /less certain, they are more likely to be construed as low-level/high level, respectively (Choi et al., 2019).

Aside from the basic components like texts or images, advertisers strategically choose the type and the presentation of featured products. Advertising effectiveness has been proved to be influenced by message appeal types, either concrete or holistic approach (Hernandez, Wright and Ferminiano Rodrigues, 2015). In accordance with the principle of CLT, people would react strongly to proximal events, either socially, hypothetically, or spatially (Trope and Liberman, 2010). Hence, the initial logic would be to place the advertisement as close as possible. But the extent to which consumers respond to these heuristics depends on the evoked psychological distance (Maglio, 2019). Numerous articles have adopted this principle to explain various advertising phenomena. For instance, the hedonic value implanted in the advertisement would naturally increase as the temporal distance to the viewers shrink (Li, Lehto, and Wei, 2014). Similarly, Kim and Song (2019) found that emotional appeal advertisements were more persuasive for individuals with strong brand experience, who relate to the brand in a more concrete and detailed way. Hence, a strong brand experience reduces psychological distance and construal level toward the brand. Using the same principle, taboo advertisement takes advantage of the distant emotion to mitigate the negative reaction to the ad but still retain its attention capturing nature by distancing the viewers from the taboo in terms of space (near/far) and social reference (self/other) (Theodorakis et al., 2018). It is interesting to note that brand experience felt by consumers in Kim and Song (2011) 's study contains mostly concrete and low-level emotion, thanks to their selection of local grocery context. High-level emotions, on the other hand, requires distance (Trope & Liberman, 2010). Thus, the advertising message, in this case, would have to increase its distance to the viewers to work. Truely, Wang and

Lehto (2019) found that to promote the hedonic benefit of tourism, it is better to construct the message in an abstract, high-level language.

Even with an agglomeration of elements, the advertisement ought to have an optimal configuration, albeit complex. The consensus of the literature seems to advocate for a congruency effect between the construal level of the advertisement's elements and that of the viewers (e.g., Kim et al. 2019; Choi et al. 2019; Lee, Keller and Sternhal, 2010; Zhao and Xie, 2011). Choi et al. (2019) compare textual and pictorial advertising formats in terms of their psychological distance to the viewers. They found that to get the most impact on attitude toward the brand and purchase intention, the construal levels of the advertisement's featured products and format have to be congruent. In other words, high-level products should be matched with high-level elements, such as words, and low-level products should be matched with low-level ones, like pictures. In the same direction, Lee, Keller, and Sternhal (2010) primed the respondents to think about either hope/aspiration or duty/obligation and managed to lead them to perceive the featured objects as high and low construal, respectively. In their study, attitude toward the advertised product increases when their regulatory orientation fits the advertisement's construal level. This is similar to Zhao and Xie (2011) 's finding of improved persuasion happens when all elements in the message share a common construal level. Their experiments on recommendation reveal that high-level/abstract message is more persuasive for a distant decision than a near-future decision. The abstract/concrete is not always very clear-cut. Showing a discount in dollar or percentage is enough to trigger different construal levels (Kim et al., 2019). Similarly, another research by Wang and Lehto (2019) on social media advertising shows that promoting certain aspects of a product activate different levels of construal. More precisely, concrete product attributes would invoke low-level construal, while more abstract product benefits. An advertisement featuring product attributes/benefits would work better for targeting near future/future consumption, respectively. The presentation of product features can also have an impact on the construal level. Kim et al. (2019) suggest that price discount displaying in the dollar would trigger low-level construal while

displaying in percentage would trigger high-level construal. Consequently, benefit appeal-percentage discount and attribute appeal-dollar discount matching were the most effective configuration.

It seems that a matching configuration of all low-level construal paired with proximal psychological distance or vice versa is the golden recipe for better advertising effectiveness. Apparently, processing information that is congruent with their mental state will result in viewers having a "right feeling," or also called processing fluency (Reber, Schwarz and Winkielman, 2004). This has a very significant impact on how consumers perceive information. For instance, inconsistent information to the mental state is less likely to catch viewers' attention (Petty and Wegener, 1998). And similar information is better and easier processed (Reber, Schwarz, and Winkielman, 2004). Similarly, matching construal levels at all levels generally produces better persuasion (Kim et al., 2019), more positive attitude, and intention (Lee, Keller and Sterhal, 2010, Choi et al., 2019). This effect is moderated by the perceived fluency between construal levels of message elements moderate this effect, as suggested by Tsai and McGill (2010). They found that consumers would have more confidence in their decision in the low-level matching only, while this fluency would deteriorate the confidence of the high-level decision. According to their results, the high-level decision would sync better with a feeling of difficulty, which, in turn, would improve the consumers' evaluation of their own decision.

2.7. Summary

This section reviewed the basic tenets of Construal Level Theory as well as its application in explaining consumers' behaviors in marketing research. In short, CLT describes how concrete or abstract an object appears in the consumers' mind. An abstract representation is further away in terms of psychological distance, and vice versa (Trope and Liberman, 2010). There are four interdependent dimensions of psychological distance, with Spatial distance being the dominant one due to our language tend to adopt spatial terms to describe

distance (Bar-Annan et al., 2006; Zhang & Wang, 2011). In consumer research, CLT is one of the primary theoretical foundation utilized to explain a vast number of behaviors, such as Twitter users' reaction (De Valent, 2017) or advertising reaction (e.g., Kim & Song, 2019; Choi et al., 2019). Moreover, CLT is especially potent in digital environment, where the concept of physical distance matters the least. Digital communication, such as video calling or social network, changes how consumers perceive distance (Norman et al., 2016). As De Valent et al. (2017) demonstrated, when a virus pandemic is approaching, social boundary is more influential than geographical distance in predicting consumers' reaction. Nevertheless, emerging digital devices, such as the mobile, are adding to the complexity of an already intriguing environment. Some studies have found that using mobile is associated with an increase in utilitarian decisions (Barque-Durant et al., 2017) and preference towards utilitarian products (Bart et al., 2014), which are related to a heightened psychological distance (Trope and Liberman, 2010). In another angle, holding a physical object seems to shorten the felt distance to the stimuli (Maglio, 2019; Shen, Zhang & Krisna, 2016). Moreover, the advance in mobile technology also allows consumers to stay connected constantly to the Internet, which potentially shortens the subjective distance to the stimuli (Norman et al., 2016; Turkle, 2006). These contradictions demand careful examination of the mobile under the lenses of CLT.

3. Ad Credibility

3.1. Advertising Effectiveness and Credibility

Credibility as a concept only truly captured the academic attention of communication researchers since the late 1980s. It was also the beginning of the information technology era that enabled communication to develop in an unprecedented way, notably with the advent of the Internet and, later, mobile. Consequently, communication-related fields such as advertising have been examined credibility from many different perspectives (e.g.,

Mackenzie and Lutz, 1989; Choi and Rifon, 2002; Goldsmith et al., 2000). Due to the complexity of the advertising context, there is no single conceptualization of the credibility of the ad. Ad credibility is the first attempt to conceptualize credibility in advertising, which dated back to 1989. It is defined as "the extent to which the audience perceives claims made about the brand in the ad to be truthful and believable" (Mackenzie and Lutz, 1989, p. 51). No study to date has challenged this definition, and this variable has been the centerpiece of all advertising credibility studies. In the early study of ad credibility, Mackenzie and Lutz (1989) proposed a model of advertising effectiveness focusing on the moderating role of Attitude toward the ads, with Ad credibility as one of the primary antecedents. Since then, the path from Ad Credibility to Attitude toward the Ads, Attitude toward the Brand, and purchasing intention has been the backbone of a large amount of credibility of advertising studies (e.g., Kim et al., 2012; Cian et al., 2020). Ad credibility has multiple antecedents, such as advertiser credibility (Mackenzie and Lutz, 1989) or corporate credibility (Goldsmith et al., 2000). In general, credibility in advertising grows into two main branches: antecedents and consequences, with Ad credibility being the main research variable.

Ad credibility's definition addresses the "claims made about the brand" (Mackenzie and Lutz, 1989, p.51). This is based on the conventional view of advertising as a tool to promote branded products. Therefore, researchers can take the view from either the brand (sponsor/advertiser) or the Ad itself. However, Ads can serve other communication purposes than just to promote a branded product, such as climate change (Wang et al., 2019) or politics. Past studies have successfully employed Ad credibility in communication situations without any brand (e.g., Dahlen et al., 2005; Scholsser, 2011). Therefore, this concept is much more versatile than its original definition. This drives the need to explore different factors that can lead to positively affect advertising effectiveness outcomes. There have been many additions to various aspects of credibility of the ad, such as endorser credibility, corporation credibility, or source credibility (e.g., Goldsmith et al., 2000; Kim et al., 2012; Choi and Rifon, 2002). So far, Ad credibility is the only credibility factor that

established a direct link to all advertising effectiveness variables, such as Attitude towards the Ads (Mackenzie and Lutz, 1989).

Ad credibility has three second-order constructs: perceived ad claim discrepancy, advertising credibility, and advertiser credibility (Mackenzie and Lutz, 1989). Ad claim discrepancy is the gap between the ads' claims and the perception of consumers about the brand. Advertising credibility is the consumers' perception of truthfulness and believability of advertising in general. And advertiser credibility is the perception of truthfulness and believability of consumers about the ad's sponsor. Though, Mackenzie and Lutz (1989) only established a significant relationship between advertiser credibility and ad credibility. The other two factors, instead, were suggested to link to others constructs.

The influence of credibility on advertising outcomes is well documented in the literature. As early as 1989, Mackenzie and Lutz found that ad credibility directly influences the Attitude towards the ad. In general, ad credibility enhances Attitude towards the ad and purchase intention (e.g., Kim and Hancock, 2017; Kim and Choi, 2012; Cian et al., 2020). But the path from credibility to persuasion is not straightforward. It depends on the consumers and the ad's own features. For instance, Cian and his colleagues (2020) found that describing consumers' progress to their desired goals in the ads would impair ad credibility and persuasion if they want to achieve such objectives with haste. This kind of goal-oriented thinking also leads the consumer to perceive the credibility of ads on various social media platform similarly, whereas credible ad positively affects purchase intention (Van-Tien Dao et al., 2014).

Secondly, ad credibility is perceived differently between ads on different platforms (Dahlen et al., 2005). They found that consumers evaluate ads on an obvious platform worse than when the same ads are posted creatively on a new platform. In other words, letting consumers borrow elements from the context to reach their own decision will lead to better persuasion (p. 95). This finding, in a sense, contradicts others' results (Kim and

Choi, 2012; Choi and Rifon, 2002), which found that consumers do not rely much on elements other than the ad content itself to form their Attitude toward the ad. For Choi and Rifon (2002), their study on online advertising suggests that consumers seem to ignore the credibility of the Web when determining Attitude toward the ads. Kim and Choi (2012), similarly, failed to show significant effects of Web reputation on credibility. Since both studies employed high-tech products like a laptop (Kim and Choi, 2012) or digital cameras (Choi and Rifon, 2002), the reason for this ineffectiveness could lie in the product category. For instance, Shamdasani et al. (2001) found that consumers rely much on website context to determine their Attitude toward the ads of low-involvement products while ignoring them when examining high-involvement products' ads. Considering that high-tech products are high value and periodical purchase, it is very likely the case here. But the Website is only an element within the consumers' overall experience. Online advertising effectiveness has been suggested to be better when no disruption is introduced during their Internet browsing. Having a credible ad helps attract consumers' attention, improve the experience, and boost advertising outcomes (Kim and Han, 2014). In the same line of thought, Kim, Youn and Yoon (2018) found that native ad leads to more positive advertising effectiveness because consumers are less likely to engage in critical thinking upon exposed to them. Because native ads blend better into the Web context, it appears more credible and gains more favorable Attitude towards the ad and brand.

3.2. Antecedents of Ad credibility.

Ad credibility is very fragile. An ad lost its credibility when consumers perceived a certain level of manipulative intention from it (Cotte et al., 2005; Harm et al., 2019). It is very complicated for advertisers to attempt to both convince the consumers but avoid being seen as manipulative at the same time. If consumers see the ads as credible, they would also be more likely to form a positive attitude to the ad and to the advertisers. But if they can sense manipulative intention from the advertiser, then they are likely to hold a negative view towards the advertisers and the ad even though the ad can still be seen as credible (Cotte et

al., 2005). It is even more so in a real-life context. Harm et al. (2019) compared banner and native ads using a mock website to mimic a realistic context, in which multiple ads were displayed together and compete for young consumers' attention. Their results indicate that whereas consumers can expose advertisers' hidden manipulation, as in the case with native ads, their perception of credibility plummet. Even though these differences in credibility perception tend to suggest some kind of ad format effect, it has been disproved by a previous study (Kavanoor et al., 1997).

Instead, the latest empirical evidence pointed towards how to present these ads (Kim et al., 2019; Sarofim and Cabano, 2018). It turned out that consumers prefer a straightforward approach to a subtle one when it comes to advertising. In another mock website experiment, Kim et al. (2019) examined the effectiveness of the banner ad and native ad in a competitive environment. They found that consumers expect to see salient information in an ad, and thus obvious advertisement types like banner ads are seen as more credible. Ads disguised as Website content like native ads were seen as manipulative and uncredible. On the other hand, it is not easy to recognize this manipulation intention because consumers need a reference point. In both Kim et al. (2019) and Harm et al. (2019), the native ads were revealed only because they were placed next to similar advertising content. When well-disguised ads stand alone, there is no difference in perceived credibility with normal ads (Kim et al., 2019).

In single placement, how the ad's content is presented can also affect its credibility. For example, advertisers can have mixed outcomes when wrongly associated the brands with irrelevant values. When a brand is introduced in a way that contradicts' its loyal consumers' knowledge, ad credibility suffers (Dahlen et al., 2005). But unexpectedly, attitude to the brand benefited from this because such incongruency makes the brand more multidimensional and complex. In the religious context, Ad credibility mediates the impact of religiosity and hope on consumers' willingness to try (Sarofim and Cabano, 2018). When an incompatible idea, such as materialism, is perceived from the ads, this effect

disappears. That being said, ad credibility can be reinforced by the merit of the ad's own content. Scholsser (2011) compared one-sided and two-sided arguments in advertising. He found that two-sided arguments are deemed more trustworthy because it disconfirms the expectation of the viewers. This only works when the communicator is revealed. But the study's peer-review context, where the communicator has little incentive to lie, seems to limit its external validity. A previous study of Kavanoor et al. (1997), however, failed to account for the moderating effect of ad credibility on comparative/non-comparative arguments– ad effectiveness relationship. Even though direct comparison ad consistently produces the most positive ad effectiveness variables in 3 separate surveys. In the same line of thought, Cian et al. (2020) examine how extra information showing progression improves advertising effectiveness. They found that consumers do judge progressive ads more credible than leaner ads.

3.3. Source Credibility and Ad Credibility

Ad credibility is not to be mistaken with the concept of source credibility (Hovland, Jannis, and Kelley, 1953). The term "source" refers to where the message comes from or is hosted on. Therefore, the validity of the ad message is entirely based on consumers' perception of the source. Hovland et al. (1953) define source credibility as "the extent to which individuals perceive the communicator to be willing and able to convey the truth." Even though a fair number of advertising credibility-related studies are aimed mainly at source credibility, source credibility does not directly affect other advertising effectiveness variables. Source credibility has multiple sub-categories, such as endorser credibility or corporate credibility (Goldsmith et al., 2000; Choi and Rifon, 2002). In the context of advertising, advertiser credibility is formed based on how consumers perceive the credibility of the ad by judging on the advertiser's credentials (Mackenzie and Lutz, 1989) or corporate credibility (Goldsmith et al., 2000). On the other hand, ad credibility describes how the ad message, and its components are perceived by its recipients, such as content

(Kim et al., 2017), presentation of information (Cian et al., 2020). It is the ad itself (rather than only the source) to determine if the claims it makes are true (Cotte et al., 2005).

In advertising literature, source credibility is sometimes used to measure ad credibility (e.g., Choi and Rifon, 2002; Kim and Choi, 2012; Bell et al., 2020). For instance, Bell et al. (2020) used the terms "advertising message credibility" and focused entirely on source credibility, with the advertiser as the source. Lou and Yuan (2018), when discussing social media messages posted by an influencer as a means of promotion, also used source credibility in their conceptualization. Other researchers, like Choi and Rifon (2002) or Kim and Choi (2012), took a more comprehensive approach when examining web advertising credibility. Their research model included both the source and the ad message. And the outcomes were the total effect of their interaction. While this increases the complexity of the model, Nevertheless, this approach is not without merit. The ad does not appear alone. It always comes with at least the medium on which the ad is displayed and the advertiser/sponsor whose name has to be visible by law (Bell et al., 2020).

The inclusion of "claim of the brand" in ad credibility's definition also lends ground to the misuse of source credibility to represent the credibility of the ad. Even though an ad's content may or may not contain explicit information about the brand, an advertisement is often required by law to disclose the sponsor (Bell et al., 2020). Advertiser credibility or source credibility will inevitably be taken into consideration.

Despite occasional misuses, ad credibility (Mackenzie and Lutz, 1989) is conceptually different from source credibility (Hovland et al., 1953). Source credibility refers to the perception of consumers to the truthfulness of the communicator (Hovland et al., 1953). Source credibility is formed by two components: competence and trustworthiness (Hovland et al., 1953), while ad credibility is about how truthful and believable the message is (Mackenzie and Lutz, 1989). Source credibility emphasizes the communicator, and ad credibility focuses on the visual and verbal content of the ad (Cotte et al., 2005). The

message is simply a claim, and thus it makes zero sense to assume that the ad has any degree of competence or worthiness. On the other hand, advertisers or sponsors are functioning individuals or organizations that are capable of acting upon something. An ad sponsor (for instance, a brand) is responsible for the claim they made, and consumers can verify their capacity. Similarly, web advertisers, like Youtube or Google, can be perceived by the consumers based on their experience in the past. The ads featured within these websites often benefit from the extension of their image of credibility over the relevant contents (Choi and Rifon, 2002). This leads to consumers having a more positive attitude towards the ads that bear assemble to a reputed Webs and to non-established Web (Shamdasani et al., 2001) as advertisers are often considered biased because of their conflict of interests with the advertised brand (Bell et al., 2020). Therefore, consumers can perceive a certain degree of capability and trustworthiness from them. In this sense, source credibility is closer to advertiser credibility than ad credibility and can be used interchangeably.

Past studies found that ad credibility is influenced directly by its sources, such as the hosting medium or the sponsor (e.g., Choi and Rifon, 2002; Shamdasani et al., 2001; Kim and Choi, 2012). In the early research of ad credibility by Mackenzie and Lutz (1985), advertiser credibility is the only confirmed factor that can assert an influence on ad credibility. On its own, the ad content is rarely examined by its viewers. For low involvement products, consumers tend to rely on the ads' surrounding as cues to judge the accuracy of the ad's claims while focusing more on the ad's content of high involvement products (Shamdasani et al., 2001). When deciding for a high-value item, the consumers also borrow cues from the context to help with their judgment (Kim and Choi, 2012).

Convention logic would dictate that high credible source is better in persuading consumers than a low credible source. The majority of the literature pointed to the positive influence of high credible advertising sources on attitude and intention (e.g., Choi and Rifon, 2002; Shamdasani et al., 2001 or Bell et al., 2020). Nan (2013) suggests that a source rated as

credible has a positive effect on persuasion and that this effect is strong when the source is revealed before the message. As source credibility is composed of trustworthiness and expertise (Hovland et al., 1953), lower credibility is the direct consequence of lower levels of either trustworthiness or expertise. The trustworthiness of a source can be damaged by the revelation of manipulation intent (Bell et al., 2020), personal gain (Shouten et al., 2019; Lou and Yuan, 2018), or conflict of interest (Bell et al., 2020). On the other hand, the perceived expertise of the source depends on how consumers evaluate their careers (Shouten et al., 2019) or from past experience (Mackenzie and Lutz, 1989). There are also cases where low-credibility sources outperform high credibility sources in changing attitude and intention (Pornpitakpan, 2004). Wu et al. (2016) identified situations in which native ads posted on a low credible media out and by a high credible company can still generate better credibility and positive persuasion if the consumers do not recognize the advertising intent from the undisclosed ad. When the advertising intent is revealed, ads from low credibility media outlets can still be effective as long as they feature messages from low credibility companies. However, the consumers hate insincere sources. If the advertisers are perceived as being manipulative with the content of the ad, then the consumers tend to develop a negative attitude toward the brand or the advertiser (Cotte et al., 2005).

Not all source is the same. Different types of sources, such as an advertiser, the medium, sponsor, or influencer, are perceived differently by the consumers and lead to different outcomes. Shouten et al. (2019) compare influencers and celebrities in the same endorser role in advertising. They found that influencers are deemed more trustworthy than celebrities because the consumers can identify themselves more with the former. This, in turn, leads to different advertising effectiveness. Goldsmith et al.'s (2000) 's results suggest that corporate credibility and endorser credibility both influence how consumers view the ad and the brand but in their own ways. Before seeing the ad, corporate credibility, which represents accumulated information about the company over time, was already formed in

consumers' minds (Mackenzie and Lutz, 1989, p.53). On the other hand, the endorsers only serve as evaluation cues in the advertisement.

With the advent of the Internet, the vehicle on which the ad is delivered becomes more important, regarding its role with credibility. With the mass volume of information on the Internet, consumers tend to seek and rely on credible cues to find reliable information (Greer, 2003). Source credibility on the Internet also differs considerably from traditional sources. Lou and Yuan (2018) found that the value of influencers on social media as a source depends on how they can provide informative content over time as an expert. But this effect does not extend to sponsored content. As Bell et al. (2020) mentioned, the ad is not considered a good source of information because of the obvious bias toward the sponsors' interest. When the source is hidden away, as with editorial content, purchase intention increased (Sharmin, 2015). Greer (2003) suggests that when consumers rate the credibility of online information, their judgment is more influenced by the source, and they ignore the information in the surrounding ads. However, Greer (2003)'s experimentation of online web ad is printed out, suggests some validity issues of his treatment.

3.4. Relevant of Ad Credibility over Source Credibility in Advertising Research

Ad is not always about brand/ it can be seen from the view of the medium, which, in this case, is not compatible with source credibility. Extant literature suggests that the consumer's judgment of ad credibility is strongly influenced by their perception of the medium (the Web) and/or the advertiser (the sponsor) (e.g., Choi and Rifon, 2002; Shouten et al., 2019). However, Web credibility is not found to be directly linked with attitude toward the ad and purchase behavior. The authors assumed that the novelty of the Internet might be the explanation. Later findings of Kim and Choi (2012) also lead to the same conclusion, effectively disprove such assumption, given a 10-year gap. At its early stage, consumers may not entirely trust the Web as a credible source of information, so they have to rely on external cues to resolve their judgment. However, what is problematic here is

the insignificance of such link, which suggests consumers' indifference toward the credibility of the Web.

Placing web credibility into the conceptualization of source credibility suggests dozens of compatibility issues. From the conceptual standpoint, source credibility is originally designed for a human entity. It works incredibly well in explaining human sources such as celebrity endorsers or influencers (e.g., Shouten et al., 2019; Lou and Yuan, 2018). Source credibility (Hovland et al., 1953) is composed of trustworthiness and expertise. Expertise refers to the perceived ability of the communicator to make correct assertions. Trustworthiness refers to the extent to which the communicator's claims are perceived as valid. In other words, it is the perception of consumers on whether an entity (a source) can do what it claims to do. Shouten et al. (2019) 's findings reveal that influencers are perceived as being more trustworthy and having expert status because of the lack of direct influent from the sponsor. The results are surprising because it is well known that influencers also get paid for their brand-featured contents in the same way celebrities are hired to appear in commercial ads. In any case, influencers' paid content generates much positive attitude toward the ad and the brand in comparison to celebrities' promotion (Shouten et al., 2019).

Source credibility can also be applied to explain company-sponsored ads to some extent (e.g., Goldsmith et al., 2000; Sharmin et al., 2015; Bell et al., 2020). Sharmin et al. (2015) compared how consumers perceive editorial content, sponsored editorial content, and traditional advertisement and their effect on purchase intention. They found that editorial content and sponsored editorial content were seen as more credible (with a higher level of expertise and trustworthiness) than a traditional advertisement. The difference in credibility was attributed to the disclosure of sponsorship in the lower-rated formats, as required by law (Sharmin et al., 2015; Bell et al., 2020). On the other hand, the influence of the credibility of the sponsors extended to all aspects of advertising effectiveness

directly, from the attitude towards the ad to purchase intention, while influencers only have an effect through attitude towards the ad (Goldsmith et al., 2000).

However, source credibility falls short when it comes to explaining non-human entities like medium or placement. Ad vehicles, like the mobile or platform, are not subjected to competency evaluation or trustworthiness perception. To be competent as a source means that the mobile should have been able to provide valid information. And to be trustworthy refers to be seen as unbiased in providing such information. As a non-human entity with no experience and personal agenda, Ad vehicle cannot satisfy these conditions.

But it doesn't mean that the vehicle or placement has no influence on ad credibility. Consumers, who relied most on the Internet for information, rated the credibility of the info's medium the highest (Johnson and Kaye, 2000). Past research has found that the same message on different devices would be judged differently. Barque-Durant et al. (2017) found that consumers tend to make utilitarian decisions when reading on mobile vs. on desktop. Similar to ad types (article-style native vs. traditional banner ad), Harm et al. (2019) pointed out that different presentations of the ad would lead to a different level of perceived ad credibility. More specifically, they found that banner ads outperform native ads in terms of ad credibility and attitudes. This is somewhat contradicting against other studies. For example, Kim et al. (2019) found no difference in performance between native ads and banner ads in solo placement. However, the native ad was seen as less credible when placed next to the banner in their duo placement. Both studies (Harm et al., 2019 and Kim et al., 2019) agree on the point that native ads suffer from negative evaluations were due to consumers' increased understanding of this format, and thus, they recognized its promotional intention right away. It should be noticed that because these studies employed relatively young respondents (20-40 years old in Harm et al. (2019) and student sample in Kim et al. (2019)), their results should not be generalized for the whole population. A previous study from 2005 by Cotte et al. on the general population found recognizing advertisers' manipulation intent to be an important mediator of ad credibility.

In other words, as soon as consumers realize that the advertisers are trying to conceal their promoting intention, the ad would be seen as insincere and judged low credible. In short, when examining the influence of different ad vehicles (e.g., devices or types) on ad credibility, it would be more relevant to look into the context than the credibility of the vehicle itself.

3.5. Context Influence on Ad Credibility

Extant literature shows that whether the ad is being trusted by its viewers depends a lot on how its information is presented. Kim et al. (2017) suggest that advertisements containing a narration are perceived as more credible than without one, mostly because their content is less likely to be challenged (p.4). One of the reasons being narrative arguments are very difficult to discount, and there is no explicit argument to refute (Dal Cin, Zanna, and Fong, 2004). Moreover, if the narration includes characters with whom the viewers can identify themselves, the counterargument is more likely to be blocked (De Graaf et al., 2012). Adding more information also might increase credibility. For instance, adding instruction on top of a vivid image would make the advertisement more effective (Petrova and Cialdini, 2005). And advertisements that show progression in multiple steps are perceived as more credible (Cian et al., 2020). But just information volume alone will not have the desired effect on ad credibility (Cian et al., 2020). The extra information should be relevant, and else it would undermine the total effect of the advertisement (Petrova and Cialdini, 2005).

The content of an advertisement is not perceived individually. The positive attitude often associated with the surrounding context would be spilled over to the ad when the two are blended together (Choi and Rifon, 2002). An Ad is more likely to be perceived as credible when placed within a congruent context (Dahlen and Edenius, 2007; Kim and Choi, 2012; Kim and Hancock, 2017). When the featured product in the ad is similar to the content of the website, the ad is more likely to be perceived as true (Kim and Choi, 2012). The

difference between the ad and its contexts can also lie in its presentation structure. When an ad is integrated seamlessly and becomes a part of its context, like the case of a native ad, it is judged as more credible than the banner ad, which stands out more (Kim, Youn & Yoon, 2018). This integration takes advantage of the credibility granted by the viewers to the context, like when advertisers try to blur the line between advertisement and editorial content by placing them next to each other (Kim and Hancock, 2017). Thus, it reduces the viewers' skepticism and improving the persuasion effect (Kim, Youn & Yoon, 2018).

This is because consumers do not recognize any explicit attempt to advertise, and therefore, they judge the ad not as advertisement content but as a part of the editorial context (Dahlen and Edenius, 2007). Moreover, the credibility of the source of the Ad determines how true the ad will be perceived (Choi and Rifon, 2002; Kim and Choi, 2012). Even though in the online context, the credibility of the website seems to be irrelevant (Choi and Rifon, 2002) and only effective when standing incongruent with the ad content (Kim and Choi, 2012). This also improves the credibility of the ad by reducing the sense of skepticism and deception towards the ad (Tran, 2017; Kim and Hancock, 2017).

The congruency effect is effective only when the advertisement-context boundary remains discreet. When the website is viewed as credible, then the ad would be viewed similarly (Kim Youn Yoon, 2018). However, the viewers would reject the congruency effect when they recognize and perceive the advertisement individually (Kim, Youn & Yoon, 2018; Dahlen et al., 2005; Dahlen and Edenius, 2007). The clear distinction between the ad and its context is more profound on the traditional advertising platform while appears insignificant in the new context (Dahlen and Edenius, 2007). A similar phenomenon was also suggested by Kim, Youn and Yoon (2018) when the ad is placed next to a contrasting element. Or when the advertisement is repeatedly exposed to its viewers, not only once (Kim, Youn & Yoon, 2018). Consequently, breaking congruency would also mean losing the perceived credibility of the ad. For instance, an advertisement featuring an incongruent brand is more likely to be rated as not credible (Dahlen et al., 2005). And advertising

disguised as editorial content to blend into the context, if judged alone, would be frown upon because consumers tend to think they are deceptive (Harms et al., 2019).

The congruency between the ad and its context does not only stop at physical appearance but also extends to the other factors related to the viewers. A,ccording to Xue (2019), the ad of a brand that has been liked by a friend tends to be seen as more credible. Consumers exposed to ads with social cues are also more likely to perceive them as more credible and more relevant (Morris et al., 2016). Moreover, in a religious context, hope is another factor that can increase ad credibility (Sarofin and Cabano, 2018). In sum, we can see that the congruency effect of advertising credibility constitutes of various elements, one of which is seen as credible. Without a source of credibility, the congruency effect tends to lose ground. Likewise, Kim and Choi (2012) failed to find a significant effect of ad-advertiser congruency without strong credibility from the advertiser. In other words, the congruency effect seems to act as a conduit to transport credibility towards the ad.

3.6. Summary

In sum, ad credibility is a well-established concept in advertising effectiveness literature. Even though originally conceptualized to assert the degree of truthfulness of claims about a brand (Mackenzie and Lutz, 1989), ad credibility has been a strong research variable in many advertising research contexts, such as ad format (Kim et al., 2019), SMS ad (Liu et al., 2012), or argument types (Scholsser, 2019). Thanks to such versatility, ad credibility was employed in almost every single credibility of advertising publication since its first conceptualization in Lutz (1985). It is also the only credibility variable able to establish a direct link to all advertising effectiveness outcomes (Mackenzie and Lutz, 1989). In some cases, Ad credibility can be wrongly grouped together with source credibility, thanks to the ambiguous word choice of advertising credibility (e.g., Choi and Rifon, 2002; Bell et al., 2020). While source credibility (Hovland et al., 1953) is also a very strong concept in advertising credibility literature, it is not of the same significance as Ad credibility. In terms

of conceptualization, source credibility focuses on the communicator of the message, such as ad sponsor (Lou and Yang, 2018) or corporation (Goldsmith et al., 2000). Since Ad Credibility (Mackenzie and Lutz, 1989)'s focal point is "the claim about the brand." These two concepts are distinct and cannot be group together. In fact, Source credibility is closer conceptually to a sub-category of Ad Credibility: Advertiser credibility.

The ad is also more likely to be perceived as true when placed into a congruent context. It is either due to the ad visual presentation blending in with its host website (Kim Youn Yoon, 2018; Kim and Handcock, 2017) or because of its content not inciting critical thoughts (Kim et al., 2017). Empirical evidence indicates that higher ad credibility affects positively attitude towards the ad, attitude towards the brand, and purchase intention (e.g., Cian et al., 2020; Kim et al., 2019). Moreover, ad credibility can assist consumers' decision-making by clearing uncertainly and vulnerability (Gefen et al., 2003). It can also play a role in the relationship between advertisers and consumers, as untrustworthy ads would be ignored (Yang et al., 2013).

4. Consumer Engagement

4.1. Conceptualizing Consumer Engagement (CE)

The advertising industry is moving away from the dated effort to directly persuading consumers to purchase. With the introduction and proliferation of social media, the advertisers now possess a much more relevant and powerful tool to approach their prospective customers. In France, 39 millions out of its 65 million population have frequent access to a social media account, or a 60 percent penetration rate (We are social, 2020). There is even higher rate in North America, where 71% of the population using Facebook as of 2021 (Statista, 2022). Now advertisers are striving to create and disseminate relevant and valuable content on digital platforms to develop engagement, trust, and relationship with consumers (Holliman & Rowley 2014; Pulizzi 2014; Rancati & Gordini 2014). This

changes the face of advertising from a more traditional purchase incite format to a more call-to-action type of digital content. In other words, advertisement now trying to look less as advertising and closer to consumer-generated content and aiming to generate more engagement.

Even though "engagement" has been existing in academic for years, the engagement behaviors of consumer toward the brand started to gain momentum around 2010 (Brodie et al., 2011; Kumar et al., 2010; van Doorn et al., 2010). The phenomenon was approached differently by each author, leading to a variation of terms, such as consumer engagement, customer engagement, or consumer-brand engagement (see below table). For instance, Kumar et al. (2010) focus on the engagement behaviors of consumers after purchasing the product, hence the name "customer" engagement. While this approach is suitable for the majority of products, there are businesses involving zero purchase, such as non-profit organization or social media content creators. Limiting the scope of engagement by the act of purchase leaving out a large number of behaviors occurring before of outside of consumer-brand transactions. Other authors, such as Van Doorn et al. (2010), consider engagement behavior to be beyond mere monetary transactions. Rather than being the direct consequence of a purchase, consumers' engagement are seen as the product of consumers' motivational drives (Van Doorn et al., 2010) or an interactive relationship with the brand (Hollebeek et al., 2014). The enactors of engagement behaviors in this case are not customer in the sense of a person did a purchase but rather any consumers committed an interaction with the brand. Despite of the various approaches, these authors essentially studied the same concept of active brand interactions that matter to the brand (Hollebeek et al., 2021). The inclusion or exclusion of the act of purchase does not change the fact that consumers invested in a co-creative interaction with the brand and such behaviors benefits the brand positively (Kumar & Pansari, 2016). We would argue that the act of purchase is not an indispensable dimension of consumers engagement, like Kumar et al. (2010), have conceptualized, especially considering many contexts where purchase is not possible. For example, climate change communication on social media is obviously not meant to

persuade people to buy anything but rather to encourage a certain behavior. This removes the purchase dimensions out of the equation and makes the conceptualization of customer engagement (Kumar et al., 2010) unfit to this context. It is even more significant when we consider consumer engagement behaviors to be very context-dependent (Hollebeek, 2011) and its outcomes can be measured directly using social media metrics (Barger & Labrecque, 2013). For this reason, the variety of customer engagement such as consumer engagement, consumer-brand engagement or consumer engagement behaviors are referred together to as CE. Further discussions of different definitions of CE and their unique approach are provided below.

Table 2 List of definition over the years (non-exhaustive)		
Authors	Definition	Terms used
Vivek, Beatty, and Morgan (2012, p. 133)	The intensity of an individual's participation in and connection with an organization's offerings and/or organizational activities, which either the customer or the organization initiate.	Consumer engagement
Mollen and Wilson (2010, p. 922)	The customer's cognitive and affective commitment to an active relationship with the brand as personified by the Web site or other computer-mediated entities designed to communicate brand value. It is characterized by the dimensions of dynamic and sustained cognitive processing and the satisfying of instrument value and experiential value.	(Online or computer-mediated entities) Customer engagement
Brodie et al. (2011, p. 260)	"[A] psychological state that occurs by virtue of interactive, co-creative customer experiences with a focal agent/object (e.g., a brand) in focal service relationships."	Customer engagement
Hollebeek (2011, p. 790)	The level of a customer's motivational, brand-related, and context-dependent state of mind characterized by specific levels of cognitive, emotional, and behavioral activity in brand interactions. It includes the themes of immersion, passion, and activation.	Customer–brand engagement

Van Doorn et al. (2010, p. 254)	Customer engagement behaviors go beyond transactions and are defined as a customer's behavioral manifestations that have a brand or firm focus, beyond purchase, resulting from motivation drivers.	Consumer engagement behaviors
Gambetti, Graffigna, and Biraghi (2012, p. 668)	Customer-brand engagement appears as a multi-dimensional concept combining such elements as attention, dialogue, interaction, emotions, sensorial pleasure, and immediate activation aimed at creating a total brand experience with consumers.	Advertising/media engagement but referred to as customer–brand engagement
Kumar et al. (2010)	Customer purchasing behavior, whether it be repeat purchases or additional purchases through up-selling and cross-selling. Customer referral behavior as it relates to the acquisition of new customers through a firm initiated and incentivized formal referral programs. Customer influencer behavior through customers' influence on other acquired customers as well as on prospects Customer knowledge behavior via feedback provided to the firm for ideas for innovations and improvements and contributing to knowledge development.	Customer engagement

Although describing the same interactive engagement behaviors of consumers toward the brand, each author took a different venue. On one side, CE is conceptualized as a psychological process (Bowden, 2009; Mollen & Wilson, 2010; Patterson et al., 2006). For instance, one of the earliest works being that of Patterson, Yu and De Ruter in 2006 define customer engagement as "the level of a customer's physical, cognitive and emotional presence in their relationship with a service organization". Bowden (2009) shares the same view of consumer engagement as a psychological process connecting satisfaction, loyalty

through commitment, trust, and involvement. This process contains both cognitive and affective aspects, which draw the difference between new and existing consumers. While the latter's engagement is dominantly affective, the former's is mostly cognitive. Further investigation of Mollen and Wilson (2010) took place within an online context also look at engagement as "the cognitive and affective commitment" to the brand. Their definition of engagement is centered around a cognitive process being sustained by multiple layers of instrumental value and experiential value and includes a wide range of interactions with the target of the engagement behaviors. This characteristic differentiates engagement from the usual involvement, which only indicates an association with the interested subject. In comparison with the previous definitions, Hollebeek (2011)'s acknowledges three distinct dimensions: cognitive, affective, and behavioral.

Another approach to defining consumer engagement is to see consumer engagement as a pattern of specific activities (e.g., Kumar et al., 2010; Vivek et al., 2012). Kumar et al. (2010) focus on the activities that directly profit the firm. Thus, their definition of CE is centered around the act of purchase, and they posit that CE is an important metric to estimate the value of a consumer. Their conceptualization is also very detailed and consists of four dimensions: customer purchases, customer referral, customer influence, and customer knowledge. These dimensions refer to the actions that consumer undertook to contribute to the value of the firm, either directly via purchasing a product/service or indirectly via asserting their influence on other consumers. On the other hand, Vivek et al. (2012)'s definition of CE expands beyond the transactions. While Kumar et al. (2010) fixate on the purchase as the starting point and the eventual engagement behavior any consumers would reach, Vivek and colleagues see the act of buying as no more than one of the many. They describe an intense level of participant and connection with the content delivered by the brand. These interactions can also include word-of-mouth activities, business to consumer interaction and blogging with the help of online tools (van Doorn et al., 2010). The engagement behaviors, therefore, are not simply related to buying behaviors

and actually are the "manifestations that have a brand or firm focus, beyond purchase, resulting from motivational drivers" (van Doorn et al., 2010, p. 254).

Among the early definition of CE, there exists already a clear emphasis on the important of interactive behaviors occurring rather than just a mere process. These interactions are also included in the CE concept of several other researchers in the same period (e.g., Brodie et al., 2011; Hollebeek, 2011), who defined CE as a psychological state or a state of mind resulting from the interactive and co-creative experience between consumer and the brand. Brodie et al. (2011)'s conceptualized CE reflecting "consumer psychological state, which occur by virtues of interactive customer experiences with a focal object (e.b., a brand) in service relationship" (p.260). Hollebeek et al. (2014) also put heavy emphasis on the notion of an interactive brand-consumer relationship as an indispensable and typical characteristics of CE, pervading all three of its dimensions. Moreover, CE is also very context-dependent (Hollebeek, 2011), as it reflects engagement behaviors with specific brands. This implies that consumers' interactive experience tends to differ significantly between different environments, especially when considering the rise of social media and its interaction functions.

Despite the growth on CE literature and the increasing understanding of the phenomenon, the various approaches to CE conceptualization cause the field to be fragmented and can impede further theoretical advancement (Hollebeek et al., 2019). The most apparent evident is the number of terms dedicated to CE. Hollebeek el al. (2021) identified seven equivalent terms for CE across 706 publications in their summary article: Customer engagement, consumer engagement, customer brand engagement, consumer brand engagement, customer engagement behavior, user engagement, and online engagement. This is in part coming from the approach of the authors. For instance, Kumar and his colleagues tend to focus on CE from the firm perspective, in which they highlight the importance of CE to the profitability of the firm (Kumar & Pansari, 2016). Their initial work established consumer purchase as the starting point of the engagement process

leading all the way to commitment and then engagement (Kumar et al., 2010). Professor Kumar also advocates the development of engagement to stakeholders other than just the customers, such as employee's engagement (Kumar & Pansari, 2016) or marketing actor engagement (Hollebeek et al., 2020). Other authors (e.g., Hollebeek et al., 2014; Barger et al., 2016; Pezzuti et al., 2021) conducted highly context-specific CE research, which risks producing isolated insight and could not be generalized to other context. For instance, professor Kumar's conceptualization of CE with consumer purchase as an indispensable dimension (Kumar et al., 2010) is not very compatible with consumer engagement behaviors that are facilitated by digital platforms since they do not necessary include any buying activity (Barger et al., 2016).

Fortunately, most authors seem to agree on the multi-dimensionality of CE and that it reflects the interactions of consumers toward an engagement object, which happens to be the brand in most case, in a way that benefit the firm (e.g., Hollebeek et al., 2021, Kumar and Pansari, 2015, Brodie et al., 2011). In this study, we follow the conceptualizations of Van Doorn et al. (2010) and Hollebeek (2011), which see CE as comprising of three dimensions (cognitive, affective, and behavioral) and align well between the psychological process approach and the explicit behavior approach. Hollebeek (2011) differs from Van Doorn and his colleagues only in their emphasize in the context-dependent nature of CE as "the level of a customer's motivational, brand-related, and context-dependent state of mind characterized by specific levels of cognitive, emotional, and behavioral activity in brand interactions" (p.790). Other approaches, such as that of Bowden (2009). Other definitions often fail to account for the behavioral dimension of CE, which explain how consumers like to spend time and effort interacting with the brand. It is important to note that the notion of interaction according to Van Doorn et al. (2010) and Hollebeek (2011) does not fixate on the purchase as an indispensable act of engagement like Kumar and his colleagues did (Kumar & Pansari, 2016; Pansari & Kumar, 2017). While Kumar's approach is very appropriate and applicable in most business context, in which the purchase is an inevitable cross point, there are still many brand activities that are "beyond purchase". For instance,

climate change content on social media is a legit content that attract a huge number of interactions from consumer. Since the phenomenon itself is not a business activity, including purchase as an inevitable starting point of the engagement with the consumers seems very out of place. In this case, the conceptualization of Van Doorn et al. (2010) and Hollebeek (2011) proves its versality and cover a wide variety of subject, including the current dissertation.

4.2. Antecedents

From a broader viewpoint, most known antecedents of CE reflect personal characteristics of consumers, such as involvement, emotions, attitude, or personality traits. This is understandable given the conceptualization of CE as either a psychological process or a behavioral patterns (Brodie et al., 2011; Kumar et al., 2010). Hollebeek (2011) suggested that emotional related constructs, such as rapport, commitment or satisfaction could also serve as the antecedent of CE. Similar results were also suggested by subsequent examination of CE under different conceptualization approach. For instance, Pansari and Kumar (2017)'s study of CE confirmed satisfaction and emotions being very reliable predictors of CE behaviors, with the former influences directly the consumers' purchasing behaviors as the main form of engagement, while the later has an indirect impact via referencing, feedback and influencing. Hollebeek (2013), similarly, concluded that consumers, who are emotionally motivated to buy a product, are more likely to engage in other CE behaviors before and after the purchase. Another separated attempt by Read et al. (2019) to conduct extensive review of CE antecedents from published articles within 2009 – 2017 period reveals a significant number of identified factors that could influence CE: hedonic and social value, attitude, or satisfaction. Though we can assert that these exists a certain homogeneous level among them with two separate category, consumer-related factors and brand/context-related factors.

Among the identified factors, involvement (Zaichowsky, 1994) stands out as the most examined factor in its various forms (brand involvement, customer involvement) (France et al, 2016; Harrigan et al., 2017; Hollebeek et al., 2014; Leckie et al., 2016). Involvement is defined as how consumers perceived the brand as relevance to their needs, values, and interests (Zaichkowsky, 1994). Involvement arguably appears very similar to the concept of CE as the interactive experience (Brodie et al., 2011), but it is instead a distinct concept and has been shown to be the driver of CE across many studies (France et al., 2016; Hollebeek et al., 2014; Harrigan 2017). Specifically, the early conceptualization of CE requires a certain level of customers' interest and personal relevant for engagement to occur (Bowden, 2009). Therefore, involved consumers, who perceive a high level of interest and relevance with the brand, are motivated to develop an interactive experience with the brand and its related content (France et al., 2016).

Because involvement is a consumer-centered concept, different brands, or engagement objects, may appeal to different groups of consumers, and at different levels (Harrigan 2017; Dessart, 2019). Different segment of engaged consumers exists, roughly based on the three dimensions of CE (Dessart 2019, Brodie et al., 2011): affective, cognitive, and behavioral. Harrigan 2017 suggested that brand can elicit involvement in their customers by appeal to their value and preference. However, they did not examine how each dimension of CE can be influenced by involvement. Dessart (2019) demonstrated that to encourage consumers to engage with the brands requires distinct approach accordingly to each CE dimension. Affectively engaged consumers derived emotions from their interactions with the brand and do not think much about it nor they act toward brands (Dessart, 2019). On the other hand, engaged consumers in the behavioral category demonstrate their loyalty through visible interactions with the brand. They need to be close to the brand and actively participate to the brand communities to develop their behavioral engagement. Thus, to attract different groups of engaged consumers to engage to the content is a difficult task. Dessart (2019) recommends attracting emotional consumers by using affective or entertaining content, which will induce them to develop loyalty

afterwards. On the other hand, the cognitive and behavioral groups prefer informative content to help them better reflect and participate in the communities would encourage their interactive behaviors.

Aside from personal characteristics, the brand-related factors were also suggested as antecedents of CE (e.g., Hollebeek, 2013; Pansari and Kumar, 2017; Read et al., 2019). One of the most important required factors prior to the formation of CE is interactivity, or brand interactivity, which is some forms of interaction occurred between the brand and the consumer (Hollebeek, 2011). These interactions can be offline or online, and were demonstrated empirically that the perception of brand interactivity influences consumers' engagement behaviors toward the brand. In other words, when consumers perceive a brand as interactive, they feel welcome and encouraged to engage with the brand. This strengthens the relationship between consumers and brand, leading to increasing level of engagement behaviors (France et al., 2016). The perception of interactivity seems to differ for social media users. In the traditional setting, brand interactivity tends to imply individual experience. France et al. (2016) see brand interactivity as a two-way conversation between consumer and brand, while Hollebeek (2011) treats it as the initial behaviors of consumers toward the brand. In online social media platforms, where interactivity is the norm for all users, the consumers can still assert the level of interactivity via how the brand interact with other users publicly (Read et al., 2019). Most social media publicly display certain metric of engagement to each content, like Twitters' retweet and Facebook's trio: like, comment and share, which helps consumers determine the level of activeness and how helpful the brand is. Interactivity being an important antecedent of CE is not unexpected, since CE arises from strong interactive experiences with the brand (Brodie et al., 2011).

Another brand-related antecedent of CE is how consumer perceive the quality of the brand. But there is a discrepancy in the approach undertaken by different authors. As demonstrated by France et al. (2016), consumers' overall assessment of the quality of the

brand, which is influenced by its standard and positioning, is required for consumers to invest emotionally and cognitively to engage to the brand. They look at perceived brand quality from a general perspective that encompasses all aspect of brand-consumer relationship. Other authors, (e.g., De Vries and Carlson, 2014; Read et al., 2019) examined the brand quality as personal evaluation of the brand would contribute to the tendency to engage to the brand. De Vries and Carlson (2014) studied how consumers engage to brand in Facebook Page environment and found that higher brand strength, which is composed of involvement and perceived congruency to the brand, would encourage engagement behaviors. In this case, the brand "being significant to their life and congruent with their self-concept" (p.901) is the self-reflection of consumers of the expected interactive relationship with the brand. This approach is very different to that of Read et al. (2019), who look at the brand-related antecedents from a more distant viewpoint. Their CE study on Twitter suggests that the consumers observe the interactive relationship of others in a public digital environment and assert the quality of brand's customer service and online experience. The more brands are perceived to have high-quality service, the more likely consumers would engage to the brand. Finally, it is also important to note that the consumers' perception of brand quality can be subjective (Hollebeek, 2013). Consumers may rely on hedonic cues to arrive at their conclusion, such as the size of the online brand communities (Dessart et al., 2016), or the number of follower (Read et al., 2019).

4.3. Consequences

4.3.1. Profit

The consequences of CE can contribute either tangible or intangible benefits to the firm (Pansari and Kumar, 2017). The obvious tangible contribution of CE to the firm is to purchase, or, in the conceptualization of Kumar and his colleagues (2010), to repurchase. By purchase the product or service of the firm, the consumers contribute directly to its profitability and helps it allocate resources better (Kumar, 2013). Within the CE literature,

purchase is not widely examined as the consequence of CE. One possible reason is that purchase is rather unimportant within most conceptualizations of CE. Only Kumar et al. (2010) and their subsequent studies consider purchase as the starting point of the engagement to the brand, and even then, it is only a small factor in the whole engagement phenomenon. For instance, online discussion can create a greater ripple effect that induce other consumers to purchase the brand (Pansari and Kumar, 2017). This demonstrates the limit of purchase as a typical consequence of CE. Moreover, the notion of CE as behaviors manifested "beyond purchase" is widely adopted in the literature (Hollebeek, 2011; Van Doorn et al., 2010). These conceptualizations emphasize the importance of a variety of phenomenon that, together, compose the entire consumer engagement to the brand. Combined with the fact that consumers' direct contribution to the firms via purchase is a well-established in the literature (Pansari and Kumar, 2017), purchase is a rather unattractive target to study.

On the other hand, indirect or intangible contributions to the brand account for the majority of CE consequences. Since about 90% of engaged consumers would not demonstrate any visible behaviors (Dessart et al., 2019), the consequences of CE encompass a wide variety of phenomenon, from satisfaction, loyalty, co-promotion, value co-creation to behaviors (e.g., Barger et al., 2016; France et al., 2016; Pansari & Kumar, 2017; Read et al., 2019). While many in number, the known consequences of CE can be loosely grouped into two groups: consumer-related outcomes and consumers' observable behaviors. The former includes factors that reflects the inner state of the engaged consumers but not physically or visually manifested. These outcomes are often measured using self-report questions and not observable using quantifiable metrics.

4.3.2. Satisfaction and Trust

Depending on the context, satisfaction and trust can be antecedents of CE as when consumers are new to the brand (Brodie et al., 2011). While the existing trust or satisfaction

obviously encourage consumer to engage with the brand (e.g., Van Doorn et al., 2010; So et al., 2014), they are also assumed to be the consequence of CE. Hollebeek (2011) drew the analogy between the nature of employee's engagement to the firm and that of consumer and brand to suggest satisfaction as the outcome in both cases. The more strongly a consumer engage with a brand, the more intense he will perceive the positive outcome, which ultimately results in satisfaction (Rather, 2019). Other researchers also concur with this finding. For instance, Vivek et al. (2012) found that consumer engaging with brand often result in positive attitude towards the brand, and eventually satisfaction and confidence. A positive exchange-rich relationship is very suitable to develop a sense of trust between the involved parties, namely the consumer and the brand (So et al., 2014). So far, the current empirical evidences all support the notion of trust being built upon a continuation of positive exchange, whether they are in a conventional service context (Rather, 2019) or in a more casual social media setting (Dessart, 2017).

4.3.3. Brand Loyalty

Loyalty to the brand is a major outcome featuring in a large number of publications concerning CE. Since the early conceptualization of CE, loyalty has been considered to be a direct consequence of engagement (e.g., Hollebeek, 2011; Vivek et al., 2012). While conventional wisdom may dictate that loyalty should have led to CE, not vice versa, their conceptualizations say differently. Brand loyalty is commonly defined as the behavioral bias towards a certain brand, as the results of a comparative evaluation and decision-making processes (Jacoby and Chestnut, 1978), while CE actually refers to the experience between consumers and brands beyond the product purchase (Hollebeek, 2011; Vivek et al., 2012). So rather than a competing process, the repeated interactions by CE provides the necessary foundation for consumers to build up their brand loyalty (Bowden, 2009).

It is fascinating to see why loyalty has been featured extensively across the CE literature. We argue that early studies of CE already laid very clearly their relationship, with minor

variations as the conceptualization of CE advances. The initial link examined by Bowden in 2009 was under the lens of a psychological process, in which CE was defined within a formal service context. Later, the scope of CE moved away from a simple repeated purchase to include all engagement behaviors "beyond the purchase" (Van Doorn et al., 2010). In other words, CE could still result in increased loyalty to the brand even with non-purchase behaviors. The CE-brand loyalty relationship was then reexamined by various authors (e.g., Hollebeek, 2011; So et al., 2014; France et al., 2017), all leading to the same conclusion of CE being the superior predictor of loyalty. Their contributions are rather focused on examining the possible covariate of CE that arises from the new contexts and non-purchase engagement behaviors. For instance, De Vries and Carlson (2014) highlight the importance of consumers' participation to brand's Facebook page to predict loyalty. Their results suggest that as consumers interact with the page's content, their loyalty to the brand also increases, further driving future interactions. Another study by Francet et al. (2017) added to the understanding of CE-loyalty in which consumers' interactions leading to both increased loyalty and brand value. Other researchers opted to empirically examine this link in specific context, such as in banking service (Moliner 2018) or hospitality (Rather, 2019). While CE's influence on brand loyalty is empirically proven, such effect is not uniform among consumers. There exist different segments of engaged consumers corresponding to CE's 3 dimensions (Brodie et al., 2011), and each requires different condition to manifest their loyalty behaviors (Dessart, 2019).

The literature addressing the CE-loyalty relationship demonstrates a pressing issue alerted by Hollebeek (2021). As we scrolled through the articles, there is a high level of similarity between the findings. For instance, many results (e.g., Harrigan (2017); De Vries & Carlson, 2014) on loyalty as CE consequence are certainly overlapping. The difference mostly comes from separate approaches to CE conceptualization. France et al (2017) follow the definition of Hollebeek et al. (2014), which sees CE as a state of mind, but opted to remove the behavioral dimension to stay true to CE's nature as a psychological state. De Vries and Carlson (2014), on the other hands, see CE as a behavioral manifestation and

their measurement also reflects this view. These examples are only a few among the many that were uncovered during our review. The subsequent articles would continue to differentiate themselves by adhere to a different version of CE conceptualization, ultimately examining the same phenomenon under different lenses. This will ultimately lead to what Hollebeek (2021) refers to as an increasingly fragmentation of CE literature, which is a valid concern since all CE concepts describe the same phenomenon. We argue that the crack would continue to deepen without a dominating CE concept. As the role of social media increases in consumer market, the context-dependent nature of CE would drive the research towards a behavioral manifestation approach. Researchers should start to focus on the observable behaviors of consumers on social media. De Vries and Carlson (2014) have already suggested that consumers tend to perform certain behaviors, such as follow page, click like or comment when they are engaged. And Barger et al. (2016) rely entirely on the platforms' provided metrics as the only measurement of CE.

4.3.4. Value Co-creation

A very important consequence of CE is to directly affect the consumers' assessment of brand value. The notion of value being co-created by both consumers and the brands is deeply reflected in all dimensions of CE. For instance, when a consumer is emotionally engaged to the brand, they perceive an increased level of value from the brand (France et al., 2017). And because the engagement process is a continuation of repeated interaction from both sides, the added value is distributed to either consumer and the brand, hence the co-creation of value.

From the consumer side, value is also co-created in the interaction with brand, through which consumers derives value from the benefits they got. The co-creation process is also remarked with a heightened level of affection from the consumer's own engagement experience (France et al., 2017), which is a product of the firms' effort to provide the most value to their customers to the point of achieving positive emotions (Pansari and Kumar,

2017). The brand-consumers conversation can enable consumer to integrate their own experience into the brand story, add more value to the brand itself (Read et al., 2019). This is thanks to the quick interaction provided by the brands, especially on social media platform such as Twitter, letting consumers adding value to themselves by receiving or providing feedbacks (De Vries and Carlson, 2014).

From the brand perspective, the engaged consumers tend to contribute to the brand story through their interaction, such as providing feedback (Kumar et al., 2010), co-promotion (Read et al., 2019) or advocate the brand to others (Vivek et al., 2012). While value is rather perceived internally by the engaged consumers, the value created for the brand is perceived externally either directly from consumers to consumers or indirectly via other consumers' interaction with the brand story. This phenomenon is apparently popular in modern social media platforms, such as Twitter or Facebook, where consumers' interactions are displayed publicly for others to see. Since many consumers derive value from observing these interactivities (Read et al., 2019), the public conversations between consumers and brands, then arguably would be beneficial to the brand value.

It is important to note that the co-created brand value is not only about creating but also de-creating or destroying. Dolan et al. (2016) categorized seven types of engagement behaviors on social media based on its valence (negative/positive) and its status (passive/active). These behaviors are co-creation, positive contribution, consumption, dormancy, detachment, negative contribution, destruction. Their results demonstrated that a higher level of engagement does not necessarily mean good but could also signify undesirable consequences. The interactions with the brands can result in a decrease in engagement behaviors, if these exchanges were deemed unsatisfactory (Bowden et al., 2017). Unlike the usual co-creation of value, its destruction seems to occur shorter and less extensive. Hollebeek (2021) uses online dating as example to demonstrate that unsatisfactory initial interaction with the engagement subjects (the target's profile picture) results in immediate negative appraisal of potential outcome, followed by a manifested

behavior to prevent further exchange (withdraw). Moreover, this outcome could be the result of consumers' conscious/unconscious attempt to co-create value. Hollebeek et al. (2020) suggested that some consumers intentionally engage in areas that the potential co-created value is perceived to be high. Similarly, cheap service customers may not be willing to engage because they do not think their exchanges would add anything to the brand, while customer of luxury services are more likely to do so if they think the quality is high and their contribution is valuable (So et al. (2014). Unfortunately, not much is known about what trigger this value-destruction process. Hollebeek (2021) hints at a possible impact of the perceived distance from the consumer to the engaged subject within a digital context, but more empirical evidence is needed.

4.4. Online CE facilitated by digital platforms

The digital platforms, notably social media sites such as Facebook, Twitter or Tiktik, is the powerful communication tool that empower CE. Because CE is context-depended, the platform has, arguably, significant influence to the consumers' engagement behaviors. It has been receiving significant attention from the academia, mostly due to the rising dominant of the digital context in the consumer scape (Hollebeek, 2021). The digital context is also where many influential CE studies were conducted, such as that of Van Doorn et al. (2010), Hollebeek et al. (2014) or De Vries and Carlson (2014). This speaks volume of the importance of the digital platforms in examining the totality of CE phenomenon.

CE on digital platforms differs from the classic CE in which consumers do not interact directly with the brand. Rather, consumers engage with the brand indirectly and through a more formalized manner, by utilizing the provided functions such as like, share or comment. In this case, the brand acts as a primary engagement object and the platforms are the secondary engagement object meant to facilitate brand engagement (Vanhoutte, 2016). While platforms' functions differ from one to another, the differences are not radical and

rather minor. The three most basic interactive functions on Facebook are now like (with a variation of several types of emotion), comment and share. Other platforms utilize the same sets but employs different name or adding their distinct features. For instance, on Twitter, the share function is divided into retweet and share buttons, with the former dedicated to distributing the content within the platform. For this reason, there is little distinction of a particular interacting features within CE literature because the behavior underneath is fundamentally the same. Barger et al. (2016) grouped these metrics together to define the CE behavior on social media as "a set of measurable actions", standardized for all platforms.

The distinctive features that make modern digital platforms apart from other contexts are that both brands and consumers can freely create and interact with content in a transparent way. Brands establish their presence by setting up their own space, called Page on Facebook or simply an account on Twitter. Consumers publicly indicate their interest by clicking the like, allowing the system to display brand-related contents as well as other consumers'' interaction to their homepage (De Vries and Carlson, 2014). This space is then used to communicate with consumers as well as demonstrate these interactions to others. Likewise, an active brand presence on social media is likely to be perceived as more interactive, and invite consumers to engage (France et al., 2016). These digital platforms also facilitate easier ways for consumers to share and to co-create the brand stories. All major digital platforms now employ the share button as a mean to spread the content, sometimes with consumers' own contributions, such as feedbacks or an invitation to discuss. Thus, it leads to an enhanced perception of CE on these digital platforms and encourages positive behaviors towards the brands (De Vries and Carlson, 2014).

5. Theoretical Model and Hypotheses

5.1. Proposed Theoretical Model

From reviewing the literature, we identified the variables that might help explain the behaviors of attached to mobile consumers. Our proposed theoretical model was based on the Construal Level Theory (CLT) (Trope and Liberman, 2010), which has been a central framework in consumer psychology. CLT dictates that a message should be perceived as construal of varying levels (from concrete to abstract) from a psychological distance. Thus, portraying a subject in a message concretely or abstractly and the perceived psychological distance are two highly relevant variables. Attachment to mobile (Vincent, 2006; Konok et al., 2016), the focal concept of this dissertation, is incorporated into the framework for its role in explaining mobile users related behaviors (e.g., Clayton et al., 2015; Konok et al., 2017). And finally, credibility (Mackenzie and Lutz, 1989) is a known consequence of the perception of psychological distance and a confirmed antecedent of CE (Brodie et al., 2011; Read et al., 2019). Moreover, the use of digital devices varies between different genders and demographical groups. Younger consumers, particularly those in the recent generations, are more familiar and proficient with mobile technologies (Nielsen, 2020). And different genders react differently to digital content. For instance, men use mobile mostly for business purposes, while the women socialize with it (Robert, Yaya and Manolis, 2014; Sanchez-Martinez and Otero, 2009). Previous studies also found a higher level of attachment in female respondents than their male counterparts (Konok et al., 2016). Therefore, these variables would be controlled in our model.
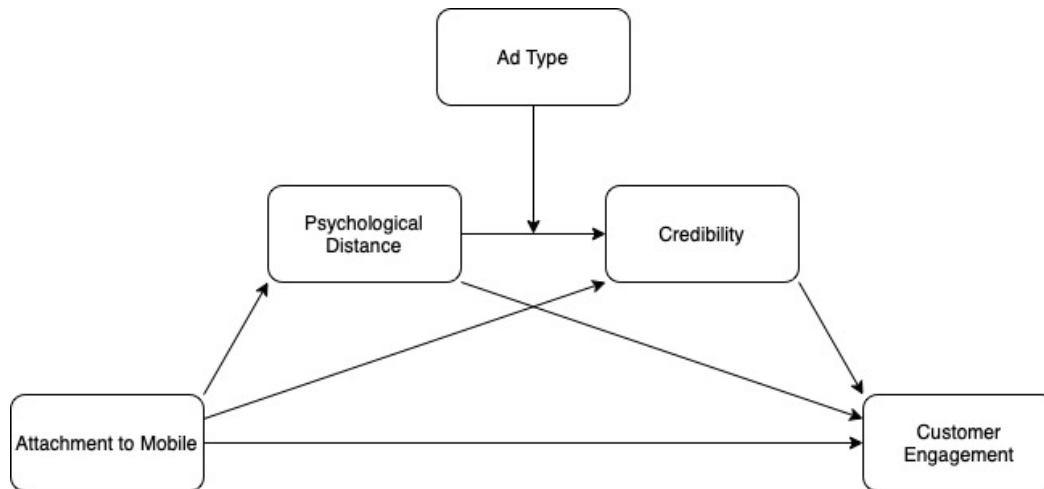
Figure 2 Research Model

5.2. Proposed Hypothesis

Similar to the infant-parent attachment relationship, the attachment to mobile provides security feeling (Konok et al., 2016; Vincent, 2006) and psychological comfort to its users (Melumad & Pham, 2020). Within this safe haven-like environment, the children are encouraged to explore their surrounding environment (Bowlby, 1969), and consumers seems behave less cautiously. For instance, they are more receptive toward mobile ads (Kolsaker & Drakatos, 2009) and more likely to share personal info on mobile (Melumad & Meyer, 2020). The use of mobile as safe haven also results in an increase in confidence and may encourage the users to explore their environment (Parent & Shapka, 2020). And with the requisite condition for engagement to occur being a relationship based on trust and commitment (Pansari & Kumar, 2017), a higher level of Attachment to Mobile would yield higher degree of interaction with the ad.

H1a: Attachment to Mobile is positively correlated with CE.

While consumer's relationship with their device could influence the outcome of the ad, the imagery elements in the ads should play an important role. Construal Level Theory (Trope and Liberman, 2010) dictates that people perceive and interpret an object by forming a mental representation, or construal at high or low level, depending on their goal. But by manipulating the level of abstraction of the object, people can be primed to construe it more abstractly or concretely. For example, local portrayal of climate change increases people's concern of the issue (Spence et al., 2012). Or Duan et al. (2019) found that the abstractness or concreteness of the ad's imagery would moderate its behavioral impact. On the other hand, CE is driven by a heightened level of emotion and behavioral activities as a result of interacting with the subject (e.g., Hollebeek et al., 2014; Brodie et al., 2011). The consumers are attracted and invest themselves cognitively and affectively to the engaged subject. Hence, we argue that consumers exposed to concrete climate change message, which is often associated with near psychological distance (Duan et al., 2019; Trope & Liberman, 2010), would incite stronger level of CE.

H1b: Participants with a higher level of Attachment to Mobile would be more likely to engage with the concrete climate change message.

The Construal Level Theory describes a relationship between emotional state and psychological distance (Trope and Liberman, 2010). Attached to mobile individuals found themselves psychologically comfortable with their mobile (Melubah and Pham, 2020), which is suggested to lead to perceiving the surrounding as benign (Swarchz and Clore, 1983). In this state, they are more likely to focus on broad characteristics (Gasper and Clore, 2002) and evoke abstract construal (Labroo and Patrick, 2009). Similar results were observed when individuals seek their mobile as a safe haven and secure base (Konok et al., 2017). Therefore, we hypothesize, participants scoring higher in Attachment to Mobile would perceive longer psychological distance on mobile:

H2a: Participants with higher level of attachment to mobile would perceive the ad at longer psychological distance.

A variation in perceived psychological distance can potentially influence how consumers react to the ad. We are specifically interested in a "congruency effect" (e.g., Hansen and Wanke, 2010; Sungur et al., 2016). In short, congruency effect occurs by matching a concretely/abstractly constructed message to a closer/more distance picture (Hansen and Wanke, 2010) or by having a similar level between the audience's construal level and psychological distance of the message (Sungur et al., 2016). Such consistency would make the stimuli easier to process (Reber, Schwarz, and Winkielman, 2004) improves the credibility of the message (Hansen ad Wanke, 2010; Sungur et al., 2016). Therefore, in this study, we expect that matching an abstractly constructed ad with a more distance view of the participants would increase the ad credibility.

H2b: The further the perceived psychological distance, the more credible the abstract ad would be perceived

Because the change in perceived psychological distance is influenced by participants' level of attachment to their mobile. It is plausible to assume that the more an individual is attached to their mobile, the more likely they would find the ad featured on their mobile more credible. Other empirical investigations seem to indicate similar phenomenon. Melumad and Meyer (2021) showed that attached to mobile individuals tend to share their private information easier when they use their mobile. Smartphone users also seem to be less worried about their private information being stolen (Das & Khan, 2016). Since attached to mobile individuals would be at a closer psychological distance when reading a message on mobile, message with matching construal level to psychological distance between it and the audience will be judged as more credible according to congruency effect (Sungur et al., 2016). Our hypothesis is as follow:

H2c: Matching psychological distance and construal level would lead to a higher level of Credibility.

Since CE describes the consumer-engaged object relationship, the consumers' view of such object has been always investigated. Consumers are encouraged to engage with a brand they already formed a trusted relationship with (Van Doorn et al., 2010). And this credibility exists in a feedback loop that strengthen the engagement behaviors overtime (Brodie et al., 2011). Thus, the higher level of credibility the ad is seen, the more intensively consumers would engage with the ad. If the congruent effect demonstrated in Study 2 improves the credibility of the ad, we expect an indirect effect from attachment to mobile to CE via psychological distance and CE, moderated by Ad Type. We propose the following hypotheses:

H3a: Participants who perceived the ad as more credible will express a higher tendency to engage with the ad.

H3b: There is a significant indirect effect from Attachment to Mobile to CE via Psychological Distance and Credibility.

Chapter 3 – Methodology

Chapter Overview

The current doctoral dissertation outlines a research process, starting from the identifying the appropriate research questions, developing a research design, specifying the research strategy and data collection, to describing the final analysis and results. At the end of the previous chapter, we have identified and established a broad approach to the research problems. Following the logic of research process (De Vaus, 2001), we used deductive reasoning to define the research questions and propose a theoretical model. In essence, we are looking to examine the combined impact of consumers' attachment to their mobile and the device they are using on the perception of credibility of advertising message via psychological distance. Our model contains the variables which we will measure on consumers via the chosen instruments to test the proposed hypotheses. Our approach is positivist, and the validation of the model will be done by collecting primary data via experimentations as are the majority of studies on psychological distance and Attachment to Mobile (e.g., Barque-Durant et al., 2017; Konok et al., 2017; Wang et al., 2019). In order to test this model, we need a suitable methodological approach and research design. These two are critical for the success of any marketing research project and are at the hard of a scientific approach (De Vaus, 2001; Malhotra and Peterson, 2006; Kenneth and Bruce, 2011).

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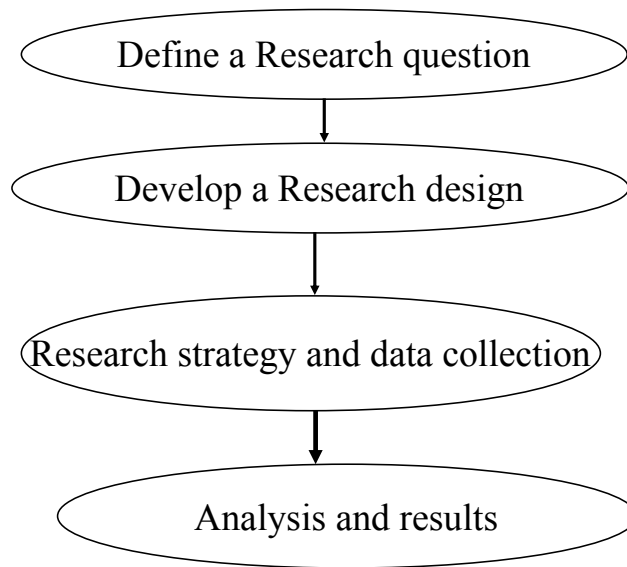
Figure 3 Research Process

In this chapter, we will discuss our choice of research design, research strategy and data collection. In fact, research design contains all of the three above-mentioned components. Research design is the framework for conducting our research (Malhotra and Peterson, 2006). It does not, in any case, refer only to the mode of data collection but rather the logical structure of our work (De Vaus, 2011). "The function of a research design is to ensure that the evidence obtained enable us to answer the initial questions as unambiguously as possible" (page 9). Typically, a good and well-planned research design consists of the following components:

1. Selection of an appropriate research design among the three following ones: Exploratory, Descriptive and Causal Design.
2. Identification of the necessary information related to the research problems and the chosen research design type.
3. Justification for the measurement scales to measure the required information.
4. Forming data collection strategy.
5. Specifying sampling method and sample size.
6. Describing the appropriate data analysis method.

The first haft of Chapter 3 addresses the justifications for the chosen research design. We first present our reasonings for the epistemology choice of positivist, leading to the final adapted causal research design. We argue for the appropriateness of causal research design as the only relevant solution for our research problems. We reject the two other designs, exploratory and descriptive, as unfit to guide us at a satisfactory conclusion, given the current state of research in Attachment Theory and Construal Level Theory. The second part of the Chapter 3 is dedicated to specifying the data collection mode, sampling method and measurements that we are going to use in our empirical studies.

1. Research Design

1.1. Justification of Epistemologiy Choice

Epistemology is important because it influences how researchers frame their research in their attempts to discover knowledge. All researcher should know the epistemological paradigm of their study because it conditions the admissible research practices as well as the appropriate justifications (Gavard-Perret et al., 2012, p. 13).

1.1.1. Positivism and The Problem of Induction

The term positivism was originally popularized by the great social theorist Auguste Comte, who argues that social phenomena can be studied and understood using the same methods as natural sciences. Positivism recognizes an objective reality that is independent from the researcher (Hudson and Ozanne, 1988). And positivist researchers, who assumes a neutral observation, can reveal this truth through rigorous scientific methods and data. During the 1920s, scientists and philosophers of the Vienna Cirle advance Compte's approach of applying natural scientific methods on social science to develop positivism into a full-pledged philosophy of science known today as "logical positivism". Their works were heavily influenced by great thinkers like Humean skepticism or Wittgenstein logical

philosophy. Therefore, positivism embraces Mach's exclusive reliance on observed phenomenon, Hume's disbelief of inductive reasoning, Wittgenstein's verifiability principle and Russel's statistical and analytic tools (Hunt, 1991).

Positivism advocates the use of deduction reasoning, in which hypotheses are proposed based on theoretical analyses and then tested with empirical evidences (Babbie, 2005). Positivist acknowledge that these social behavior can be measured out of its context, and that such measurements can be done objectively (Hughes & Sharrock, 1997). By relying on only objective observation and inductive statistical methods, logical positivism and logical empiricism face the problem of induction inference. Suppe (1977) stated that logical positivism includes three classes of theoretical statements: logical and mathematical terms, theoretical terms, and observation terms. Any scientific theory must obey the correspondence rules of explicit connection between theoretical and observational terms, which means that they must be verified empirically and expressed in the observation language (Suppe , 1977). However, because the production of theoretical knowledge are preceded by the observation of facts, logical positivism fall into what Chalmers (1976) called the problem of induction. Following the verification logic of logical positivism, a general statement needs to be tested infinitively in all times and conditions and thus, can never be verified (Chalmers, 1976). Moreover, the argument supporting induction reasoning on the basis of past experiences is itself inductive and thus is not valid to justify induction principle (Chalmers, 1976). This debating regarding the validity of induction leads to the foundation of logical empiricism, a more moderate version of logical positivism based on the works of Carnap (1936).

Like logical positivism, logical empiricism acknowledges the existence of an objective and comprehensible reality. But Carnap (1936) admits that a finite number of successful empirical tests under a finite number of conditions cannot verify a law, but should confirm it. Therefore, theories are inducted from the accumulation of observations of facts and of inductive statistical methods. Eventually logical empiricism became the standard view of

science for many years until its gradual decline in the 1960s. From this point, positivism face challenges from modern movements such as critical theory or post-positivism, which criticize positivism of not being capable of capturing the complexity of social movement. While positivism is no longer the dominant research paradigm in consumer research (Hunt, 1991), it does not mean that it is no longer relevant. Positivism still has prominent roles in social science as the dominant public model for research (Ryan, 2006).

The use of inductive reasoning based on controlled observation suffers the same problems as logical positivism. Firstly, observation is subject to measurement errors, which obviously results in incorrect interpretation and conclusion. Moreover, it means that the observation is measurement dependent, and thus cannot yield objective facts. Secondly, because observation precedes the creation of new theory, it is dependence to existing knowledge (Kuhn, 1962). Hence, it violates its own assumption of objectivity since the information is not independent of the concept. The concepts adopted by the researchers in their description inevitably influence it. It means that what the researchers produce is rather an interpretation than an objective observation. Therefore, following the reasoning of induction, the objectivity of the results would be put into question.

1.1.2. Argument for Positivism

Considering the objective of this study, which is to examine the impact of attachment to mobile to perception of credibility, a positivist approach is the most appropriate. The underlying assumption of this study's goal is that there exists a causal relationship between the pattern of attachment and their perception, and that such causality is context and time independent, and it can be studied using experimental and statistical techniques. These assumptions fit well into the domain of positivism, in which the subjects and their researchers do not influence each other, the single and objective reality can be uncovered using statistical methods (Carson, Gilmore, Perry, & Gronhaug, 2001), and that such real cause does exist (Ozanne & Hudson, 1989). Thus, positivism and its methods align with

our interest in confirming the suspected causal relationship. Its data is generated independent of the authors' subjective opinions or their influence. And the processing and interpretation process must conform to rigid statistical and methodological techniques. This ensures that the end results are bias-free and internally valid. Another advantage of this approach is that the rigid structural frameworks and objectively obtains results permit the replication of the same experiment, which in turns, strengthen the study's external validity and its managerial value.

1.2. Types of Research Design
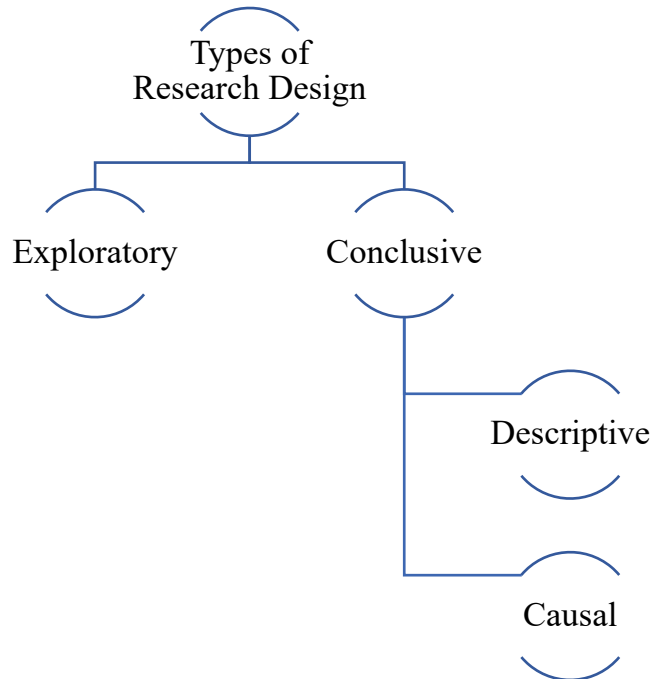
Figure 4 Classification of Research Deisgns (Malhotra and Peterson, 2006)

Research design could be broadly categorized as exploratory and conclusive research (Malhotra and Peterson, 2006). Too often, researchers confuse research design with data collection, or with quantitative/qualitative research methods (De Vaus, 2001). It is erroneous to equate either of those types to a particular research design. It is true that certain data collection mode is often associated with a research design. For instance, exploratory

research tends to employ in-depth interview as the primary way to gain insights into the research problems. And descriptive research mostly uses surveys on a large-scale sample. However, a research design is not, in any way, restrained into one or several modes of data collections. It is ultimately the logical structure of the whole research project. "How the data is collected is irrelevant to the logic of the research" (De Vaus, 2001, p.9). Any data can be used for any research design, as long as it provides a compelling test for the theoretical propositions.

Before going deeply into our choice of research design, let's explore the two available design categories.

1.2.1. Exploratory Research Design

The primary objective of exploratory research is to provide in-depth insights of the research problems. It is aimed at classifying observed behaviors, identifying potentially important variables and describing the manifested relationships within the probed area. Exploratory research is often adopted in the early stage of a research field, when there is little information available. It is carried out to probe into the research problems, generate new ideas and create the foundation for more extensive investigations later on the discovered relationships. It is not used where definite results are the objective. Therefore, the research method is flexible, unstructured, and designed to generate maximum insights. The collected sample can be small and non-representative. And the data, either primary or secondary, is often analyzed qualitatively. The results of exploratory research are tentative and can be presented as a stand-alone finding or followed up by conclusive research to be verified or quantified on a large and representative sample.

1.2.2. Conclusive Research Design

On the other hand, the other broad research design category is conclusive research. As the name implied, this research design is often adopted at the end of the research process. Its results are conclusive and can be applied into managerial practices. For example, the primary objective is to test the proposed hypotheses and verify the specific relationships, generated after close examinations of the theory. Because of that, conclusive research design is the stark contrast of exploratory design. Its methods are more structured and less flexible. Conclusive research can be either descriptive or causal, depending on the kind of behavior/relationship the researchers want to verify.

Descriptive Research Design

Descriptive research's main objective is to describe a phenomenon or to determine the association between the existing variables. Therefore, clearly defined knowledge of the subject is required to conduct any descriptive research. These knowledges can be derived from extant literature or from the initial exploratory studies. All the relevant information has been identified and categorized in advance, leading to the formulation of specific hypotheses. Thus, descriptive research design is structured and based on a large and representative sample. Popular data collection methods often associated with descriptive research are surveys, secondary data, panels, and observation. It is important to note that researchers adopting descriptive research design are not obliged to use any of the above-mentioned but are free to use any appropriate data collection methods. Finally, descriptive research design can be divided further into Cross-sectional design and longitudinal design.

Cross-sectional design is the most common form of descriptive research design in marketing research (Rindfleisch et al., 2008). It involves collecting information from the samples of the targeted population once (single cross-sectional design) or multiple times (multiple cross-sectional design). In the former, data is collected at a single point in time. It is then analyzed to define the relationship to describe the relationships between the defined variables down to the individual levels. For multiple cross-sectional design,

multiple attempts to collect data are made at different times. And information is extracted from these samples only once. The consumers in these samples are not the same across the dataset, in terms of both individuality and time. Therefore, they are not eligible to compare directly. Rather, they are analyzed as cohorts, which is defined as the people experiencing the same event within the same time interval (Malhotra and Peterson, 2006, p. 77). For example, consumer behavior researchers often adopt the terms "generation" to refer to the different cohorts of consumers. For instance, Generation Z is the consumers born between mid 1990s to mid 2000s. These young consumers are distinctively different from those from other generations, such as Generation X (otherwise often referred as the Millennials) or Generation Y. Cross-sectional design has the advantage of being representative of the population. Therefore, researchers can employ this design to compare between different groups or sub-groups of consumers.

However, cross-sectional design is not without issue. Consumer behavior researchers have long taken caution with the validity of research employing cross-sectional design. The two most concerned issues are common method variance (bias due to continuous use of a single source) (Kamakura, 2001) and causal inference (Wittink, 2004). These issues are particular important to cross-sectional design studies because its data is technically the imprint of a single moment in time. To combat against these issues, researchers are recommended to either increasing the sample size, data types and data collection (Rindfleisch et al., 2008).

Longitudinal research design, in essence, only differs from cross-sectional design in that the concerned sample remains the same over time. The same consumers are involved from the start to the finish of the research. In short, the same people are measured the same way over and over again in a long period of time. This is a stark contrast to single cross-sectional design, which gives a snap shot of the consumers at a single moment in time, and slightly different from multiple cross-sectional design, which takes multiple records of different consumers at different time points. Because longitudinal design measures the same consumers the same way repeatedly over time, it excels in detecting change at individual

level. For instance, researchers can use longitudinal data to examine the evolution of consumers behaviors in relation with other marketing variables, such as attitude or purchase. Because it concerns the same consumers, random variations between individuals can be safely eliminated to reveal even the smallest changes. Another advantage of longitudinal is that it does not need to rely on consumers recalling their past behaviors since it has time on its side. These data might be erroneous due to participants' memory performance. Researchers can simply record the present day's behaviors and ignore any memory-related issues. Thus, longitudinal design is often more accurate than cross-sectional surveys (Malhotra and Peterson, 2006, p. 80). Moreover, longitudinal design can solve the common method variance and causal inference issues posed by cross-sectional design without scarifying researchers' ease of application (Rindfleisch et al., 2008). However, longitudinal research design suffers from non-presentiveness and response bias. Firstly, studies undertaking longitudinal design is time-consuming in nature. This puts heavy demand on researchers to keep their participants cooperated in an extended period of time. Moreover, people that join these kinds of activities are not necessarily common. Hence, there is no evidence to assume that the longitudinal sample is representative of the general population. Secondly, there are differences between the initial responses and the subsequent ones. The novelty of the surveys/panels tend to make the respondents overestimate their behaviors. Bias can also occur in the later period of the study, when respondents are too familiar with the instruments.

Table 3 A Comparison of Basic Research Designs

	Exploratory	*Descriptive*	*Causal*
Objective	Discovery of ideas and insights	Describe market characteristics of functions	Determine cause-and-effect relationships
Characteristics	Flexible, versatile	Marked by the prior formulation of specific hypotheses	Manipulation of one or more independent variables
	Often the front end of total research design	Preplanned and structured design	Measure the effect on dependent variable(s)
Methods	Expert surveys	Secondary data: quantitative analysis	Experiments
	Pilot surveys, Cause studies	Surveys	
	Secondary data: qualitative analysis	Panels	
	Qualitative research	Observation and other	

Source: Malhotra and Peterson, 2006

Causal Research Design

The final category of research design is causal research design. Causal research's primary objective is to prove causal relationship between the concerned variables (Malhotra and Peterson, 2006), such as whether using mobile causes consumers' judgement to lean towards utilitarian decisions or seeing color vs. black and white images would improve their preference of the featured objects. It is appropriate for determining the cause and the effect, for examining the nature of such causal relationship and for eliminating any alternative explanation of the observed phenomena. Therefore, the researchers should have a thorough understanding of the subject before commencing their projects. Like descriptive

research, causal research requires a planned and structured design, with the main method being experimentation.

How do we prove a causal relationship, or more accurately, causal inference? Shadish et al. (2002), citing the classic analysis of the 19th – century philosopher John Stuart Mill, assert that a causal relationship has the following characteristics: "(1) the cause precedes the effect, (2) the cause related to the effect and (3) there is no plausible alternative explanation for the observed effect other than the cause" (p.6). Hence, experimental research is remarked by its ability to manipulate the independent variable (the plausible cause) and the control over the other extraneous variables. So far, causal research design is the only research design that is capable of validating causal relationship. Descriptive and exploratory research design can only infer correlation relationship. They fail to dictate whether the cause precedes the effect, or if there are any other alternative explanations.

It is important to note that the cause and the effect do, like in descriptive research, correlate with each other. However, simply having a correlation relationship is insufficient to conclude the existence of a causal relationship between the identified variables. Even though they may exert influence from one to another, such relationship is always under the possibility of being the results of an uncounted for factor, a confounding variable. Like Shadish et al. (2002) put it, turning a switch might be related to a light turning on. But we have no idea whether it is the act of turning that switch that lights the bulb until we make sure that. Perhaps there are others switch elsewhere that is turned on by others the moment you touch yours. In order to prove a causality between turning the switch and the light emitting light, the researchers need to: prove that the act of turning occurs before the light is on, establish a relationship between these two observed events, and finally, eliminate any alternative explanations.

The three defining characteristics of causality mirror what happen during an experiment. Firstly, researchers manipulate the assumed cause (the independent variable) and observe the subsequent effect (the dependent variable). Then, they verify whether the variation in

the cause is related to that of the observed effect. Finally, researchers control the extraneous factors to eliminate the plausibility of alternative explanations. To manipulate the independent variable, researchers must expose the participants to at least two levels of that variable. These conditions are called treatments. Depending on the design of the experiment, researchers may apply treatments to all or to only one group of participants. The non-treatment group is called the control condition. They are meant to serve as the baseline of behavior to compare against other treatment groups. To ensure that the comparison is valid, researchers have to control for extraneous variables to eliminate alternative cause. For instance, researchers may want to compare the behaviors between rural and urban consumers. If a significant number of participants have been living in both areas in an equal period of time, then it would be difficult to isolate the effect of living environment on the observed outcome. The living time is now an extraneous variable. Therefore, researchers have to hold this value constant among their participants across the experimental conditions. Everything must be the same, except for the independent variables. In the event that the extraneous variable cannot be held constant, then researchers can randomize the effect across treatments. For instance, if there is any reason that participants' living time cannot be controlled properly, then the effective way is to distribute this variation equally among the experimental conditions to even out their effect on the observed dependent variable.

1.3. Internal and External Validity

Whether the design of this doctoral dissertation is conclusive or exploratory, it needs to have a satisfactory level of both internal and external validity, even though these two concepts are sometimes conflict to each other. In this section, we define the two validity concepts and discuss their relevancy when choosing a research design.

1.3.1. Internal Validity

Internal validity (Campbell and Stanley, 1963) is the ability of the research design to test the proposed hypotheses. In other words, internal validity is the ability of the chosen research design to do what it is designed to do. In an experiment, internal validity refers to whether the manipulation of the independent variable actually cause the observed change in the dependent variable. Causal research design places significant important on maintaining the highest level of internal validity. The reason is that causal study's first and foremost objective is to confirm the causality between the variables, or whether the observed effect is caused by the manipulated variable. If the effects are influenced by other confounding variables, then it would be impossible to correctly infer such relationship. In this way, the experiment fails at its essential function.

To enhance internal validity, careful planning of research design is required. Researchers should determine which variables would be use for manipulation or observation and identify the plausible alternative explanations in the initial design. However, it is not possible to eliminate all sources of interference in a study. (Malhotra and Peterson, 2006). This poses a bigger problem to descriptive research, since it is not designed to control all possible extraneous variables. Fortunately, if the effect is known to the extant literature, the researchers still can take such confounding effect into analysis. Then, the study still maintains a faire degree of internal validity.

1.3.2. External Validity

External validity means that the research findings can be generalized beyond the context and the sample of the original study. A common limitation of most consumer research studies using student sample is that their findings have limited direct application on the real consumers. Of all three main research design, exploratory design has the lowest level of external validity, due to its nature. Because not much is known about the field before

conducting exploratory design, which is the reason why exploratory research is conducted in the first place, it is a bit premature to generalize its findings. Its results are also tentative, not conclusive. Hence the researchers lack a solid foundation to extend their findings beyond the original context.

There are several factors that can threaten external validity of a study (Campbell and Standey, 1963). Firstly, the pre-test of an experiment can exposes the participants to the independent variable, thus changing their reactions in the post-test. This renders the findings non-representative to the general population. For instance, respondents in advertising studies may get bored of the stimulus if they see them multiple time. This contradicts the usual advertising setting where audience only get to see the ad once. Secondly, the observed effects may be unique to the selected sample. This occurs mostly because researchers recruit non-representative participants. The findings may or may not apply to a more diverse population, who lacks the distinct characteristics of the sample population. Finally, the experimental conditions do not reassemble that of the outside world. Attachment to Mobile studies, such as that of Konok et al. (2017), required the participants to leave their mobile and sit tight on a table with biometric instruments attached. While this ensures a high degree of internal validity, the setting is alien in comparison with consumers' usual environment.

In an ideal world, all studies should be capable of direct application outside of its original setting. However, as Malhotra and Peterson (2006) suggest, the objective of research needs not to always focus on generalization. Rather, the primary aims of scientific research are to identify a suspected relationship and to reveal its underlying mechanism. The ability to generalize to the larger population is appreciated, but not essential in every studies. The question of external validity is less relevant in studies that explore theoretical reasonings to determine the occurring conditions of the observed phenomenon. Such question is of higher demand when the studies' findings are expected to be applied to real-world setting.

For instance, laboratory experimentation is meant to have high level of interval validity, whereas field study focuses on achieving a high degree of external validity.

1.4.   Justification for Causal Research Design

Having multiple types of research design, the question posed to the researchers is "What design will best ascertain associations or causal paths among all the relevant variables?" (Miller, 2006, p. 19), knowing that the choice of research design is vital for their research project. Researchers choose their design depends on available information such as the nature of the problem, past data and number of references. Concerning the current research questions being what and how attachment would change consumers' behavior, we need a research design capable of determining the type of relationship between the known variables as well as revealing the mechanism underneath. To test the proposed causality in our hypotheses, causal research design was selected. In order to confirm or reject a causal relationship, researchers need to verify: the cause must precedes the effect chronologically, there exists no spurious relationship between the two, and the proposed explanation is the only appropriate one (Shadish, Cook, & Campbell, 2002). Experimental method is the only method which conforms to all of these criteria and thus, is the perfect choice for our study.

The other research designs, on the other hand, are not suitable for the task. Exploratory research design is meant for the early phase in a research area, where there are few reference studies. While exploratory excels in probing for new ideas, establishing relationships, or identifying potentially important variables, its findings are not conclusive and cannot be generalized to the population of interest (Malthotra and Peterson, 2006). Exploratory, in fact, is complementary to conclusive research design, rather than replacing each other. The current doctoral dissertation is based on Construal Level Theory (Trope and Liberman, 2010) and Attachment Theory (Bowlby, 1969), both of which have a well-developed literature and have been adapted extensively in many marketing studies (e.g., Melumad and Pham, 2020). There is little motivation for us to probe for new ideas using

exploratory research design.

As for descriptive research, researchers observe the identified variables and determine the relationship between them. The end results are the detail descriptions of this correlational relationship, such as magnitude or direction. Because they are closely related to each other, it is possible to predict one variable using another. However, because descriptive research design does not manipulate the cause nor does it control for extraneous variables, it is not capable of determining causal relationship. Such ability requires an experimental design, in which the independent variable (the cause) is manipulated, and any plausible interferences are eliminated through a controlled environment. The effect is then inferred through careful observation of the dependent variable. Neither of these tasks are included in descriptive research, leaving the possibility of mixing the cause with the effect, or having other plausible influencing factors.

At this point, we have provided our decision and reasoning for choosing causal research design. Before conducting the first empirical study, we need to specify the general procedures of our experiments: the manipulations, the control, the participants, and other details concerning specific designs. In the next section, we discuss some of the available experimental designs and our implementations.

2. Experimental Design

In the previous section, we have established our decision to employ causal research design for the current research. In order to successfully test our hypotheses and answer our research questions, causal research design is the most suitable design. This section describes some of the experimental designs and discuss their strengths and weaknesses in relevant to our study. An experimental design is defined as a set of procedure specifying (1) the test units and how these units are to be divided into homogeneous subsamples, (2) what independent variables or treatments are to be manipulated, (3) what dependent

variables are to be measured, and (4) how the extraneous variables are to be controlled (Malhotra and Peterson, 2006, p.221).

2.1. Randomized Experiment

Otherwise referred to as true experiment (Shadish et al., 2002) or classic experimental design (De Vaus, 2001), randomized experiment contains two groups, one treatment group and one control group without any treatment. Participants are assigned randomly into either group. Afterwards, they are measured pre-test (before exposed to the treatment) and post-test (after the exposure) to reveal the impact of treatment on the observed dependent variable. The random assignment ensures that the two groups (treatment and control) are statistically equivalent to each other. Thus, any difference in observed dependent variables between these two groups are due to the treatment only and not in-group distinct characteristics. More importantly, randomized experiments allow for statistical estimation of the true effect within a range of confident interval. Other variants of this design, such as the Solomon four groups or posttest only design, omit or add extra elements to the original design. But the core concept remains unchanged.

2.2. Quasi-experiment

Quasi-experiment, popularized by Campbell and Stanley (1963), is also capable of validating and describing a causal relationship between a manipulable cause and the observable effect. Quasi-experiment differs from randomized experiment in one key characteristics: random assignment of respondents to experimental groups. Assignment, instead, is decided by researchers or by participant themselves. It is important to note that the researchers still have full control over other aspects of the experiment. Thus, in quasi-experiments, the principle of a causal research design is well maintained. The cause is manipulable and precedes the effect. Extraneous variables are controlled. And participants are exposed to the same environment, saved for the treatment. On the other hand, because

the randomized assignment is not possible in quasi-experiment design, it leaves room for alternative explanations. Any difference due to the treatment may stem from the systematic difference between the experimental conditions, while in true experiment, researchers can safely ignore such possibility.

2.3. Factorial Design

So far, we have only discussed the experimental designs with one independent variable. Actual studies often contain more than one independent variable. In fact, separate experiments could be conducted to evaluate each variable. But that would be too inconvenience and costly to the researchers. Testing these variables individually also reduce the study's internal validity, since the observed effect might be the compounded results of all independent variables, rather than a direct effect. Factorial design allows researchers to take into consideration the interactions between the independent variables. Factorial design refers to any experimental design that have more than one independent variables (Gorvine, Rosengren, Stein and Biolsi, 2017) An interaction occurs when the combined effect of two or more variables is different from individual effects from each variable. For instance, a person might like drinking cold beverage and coffee. But a cold coffee is not necessary his/her favorite drink. In this case, we say there is an interaction between the types of beverages and drink temperature.

There are many possibilities for a factorial design. The simplest version of this design being a 2 X 2 design, with two independent variables, each having two levels (usually a low – high combination). When deploying factorial designs, researchers have to form an equal number of experimental conditions for all possible combination of the independent variables. As for a 2 X 2 design, there are four conditions in total. It would be very impractical if the researchers keep adding additional variables as well as extra categories. Thus, most studies settle for a 2 x 2 or 3 x 2 designs (e.g., Kim et al., 2019; Konok et al., 2017).

2.4.   Our Experimental Design

Given that our objectives are to examine the influence of Attachment to Mobile on how consumers perceive different types of advertisement, our empirical studies are quasi-experimental in nature. A true experimental design is not possible with Attachment to Mobile because it is a relationship that was developed between the person and the subject (Bowlby, 1969) and thus no treatment can be applied to our participants. Furthermore, a true experiment design is best applied to determine the cause of an effect, as we observe in other Attachment to Mobile studies (e.g., Melumad and Pham, 2020; Konok et al., 2017). This is outside of the scope of this dissertation. The other research design, factorial design, was also considered but felt out of favorite due to an ambiguity in the definition of low/high level of Attachment to Mobile. While there is a fully developed measurement for Attachment to Mobile (Konok et al., 2017), a person scoring low in the scale still demonstrates similar behaviors, only at lower frequency. This makes it difficult in determining the two groups as distinct. There is also the issue of correctly targeting the lowly attached person based on certain behavioral filters provided by advertising and survey platforms. Our ultimate aim is to validate the proposed mechanism in the field. Thus, staying consistent with the platforms take priority. A quasi-experimental design fits our objectives the most.

In order to examine the impact of Attachment to Mobile, we specifically target mobile users who are most likely to develop an emotional relationship with their mobile. While their demographic characteristics in the general population are not known, certain researchers like Konok et al. (2016) assume that a majority of the younger population has a rather high level of Attachment to Mobile. Plus, these mobile users should have demonstrated typical attachment related behaviors, such as a highly frequent usage (Vincent, 2006). However, this targeting may imply that any changes observed in the dependent variables may be the results of this systemic different between the experimental conditions, thus questioning internal validity (Campbell and Stanley, 1963). In other

words, the observed difference could be attributed to the distinct characteristics of this chosen population and not necessarily due to the influence of Attachment to Mobile. This consequence also means that our findings are quite particular and may not apply to a general population.

To account for this, we conduct multiple experiments to test our hypotheses and to validate our theoretical model. Each experiment examines a portion of the whole model, with the subsequence experiments replicates the previous findings on a different sample. By doing multiple trials of the same experiment, we can make sure that our results are consistent and not influenced by the random distribution of our selection. Moreover, the participants are recruited from different platforms: on-campus students and online respondents from Mturks and Prolifics. In doing so, we aim to avoid the particularity of any given sample and even out the chance of our participants having a random characteristic that can influence the dependent variables. This also enhance our external validity. If our predictions work for more than one sample, then it means we can generalize our findings onto the larger population.

3. Research Strategy

3.1. Research Setting: Laboratory vs. Field

After choosing research design, we have to decide on our research settings. There are two research setting for marketing research: laboratory and the field. Our decision depends on the potential costs, the convenience, and our research questions. In a broad sense, a laboratory environment is artificial in relative to the natural environment in which the target behaviors often occur (Bordens and Abbott, 2011). It refers to the enclosed environment that is set up by the researchers to study a specific phenomenon. For instance, a laboratory experiment can be conducted in a classroom, in the park or any available space. In contrast, the field is the natural environment of said phenomenon. It is synonymous with the real

marketplace where consumers consume the products as they naturally do without researchers' interference.

The advantage of laboratory experiment over field experiment is the high level of internal validity. Because researchers exert a much higher degree of control over the involved variables, the possibility of interfering factors can be minimized. Participants are exposed to the same environment, except for the intended intervention. Laboratory experiment has been employed in marketing research for an extended period of time. For instance, Lee et al. (2014) conducted a laboratory experiment on a student sample. Two groups of respondents were exposed to different sets of images, while everything else was held constant. The dependent variable was recorded using a self-report measurement. At a higher control level, Konok et al. (2017) had their participants sit in a fixed location and measure their reactions using biometric instruments, such as heart rating, and psychological test. Because of their artificial nature, laboratory experiments, in general, are less expensive and are more convenience for researchers than field experiments. However, its isolated environment poses some concerns over its internal validity and external validity. Firstly, the employed stimulus is not necessarily similar to the real marketing phenomenon. The respondents' reaction to these experimental conditions might be unique within the laboratory and not what the researchers intended. Or as Mayo (1996) put it, experiments are no longer necessarily theory-bound, but rather have a reality of its own. Furthermore, new behaviors could manifest in the new environment, most of which are non-existence in the natural consumption setting. For instance, respondents may attempt to guess the researchers' intention or to resist persuasive attempts towards them (Malhotral and Peterson, 2006, p. 236). Finally, the findings in an artificial environment are not guaranteed to be generalizable to the real world, which questions its external validity.

Field experiments, on the other hand, have an edge over laboratory experiments in external validity. Experimental intervention is placed directly in a real-life environment, as in the

laboratory. Because of this, everything that works in a field experiment would arguably perform in any actual business settings. But field experiments suffer from inadequate control. For instance, Bart et al. (2014) measured consumers' reaction to mobile advertising through real ad banners. They gathered over 20,000 responses and showed that ads featuring utilitarian products work better than hedonic products' ads on mobile. While their results are very rigorous and practical, researchers lack actual control over the profile of the respondents or the extraneous factors. Consumers read these ad banners in their own natural environment. And the ad delivery platforms are independent of the researchers. Moreover, major platforms such as Facebook are known to implement their own optimization algorithms to boost ad results. There is no way to ensure that their preference was not influenced by a third advertising banner elsewhere, or that the audience selection mechanism is the same for both ads. Therefore, field experiments are inferior in terms of internal validity. Aside from that, field experiments are, in general, more expensive to conduct and less convenience for researchers. For instance, real advertising research like Bart et al. (2014) is costly and requires practical knowledge of advertising platforms. While Van Lent et al. (2016)'s study observing Twitter hashtags related to Ebola outspread is practically cost free, they need to rely entirely on third-party hashtag monitors.

We understand that there is a large gap between an advertisement in the laboratory experiment and in the field. Laboratory environment strives to isolate the ad to study and understand every aspect of its impact on viewers. Usually, respondents are only exposed to a single ad or a set of advertisements, with the focus on a single element of interest. Unnecessary or conflicting elements are striped off. Researchers like Lee et al. (2014) showed their participants only the shapes and manipulated their colors. Although their results have great implication in advertising, it is the principle that we are looking for in these experiments, not the direct application. Real world environment for advertising is often noisy and hostile. On a single webpage, there may be several conflicting ad banners competing for attention. Advertisements on social media like Facebook, on the other hands, are contained in a standard post and under the effect of classified optimization algorithm.

So, any effect from the treatment will be interfered by the extraneous variables, many of which the researchers cannot control. Field test also limits the researchers' ability to measure many variables in the proposed theoretical model. Thus, it is inappropriate to study the underneath mechanism of the targeted causality just using field test.

Considering the advantages and disadvantages of both research settings, we decided that rather than sacrifice one aspect for the sake of others, the two settings can actually complement each other. Since laboratory experiments excel in controlling for extraneous variables and revealing the underneath mechanism, they are conducted first to test the causality in our hypotheses. The higher internal validity of laboratory research ensures that our findings reflect what we want in the propositions. It also eliminates most plausible alternative explanation. The resulting framework will be then integrated into the final field test for validation.

3.2. Study Context: Climate Change

This research employed climate change as the context for most of our empirical studies. We believed that climate change is a good choice of context that can bring fruitful results for several reasons. Firstly, employing a neutral subject such as climate change eliminates cultural influence on consumers' perception of the ad. The scientific and public consensus is that climate change is caused by pollution, and it is happening. It is not, by any mean, a local phenomenon that can be interpreted differently between region to region. Even though its effects are something that mostly felt locally, climate change is recognized cross-culturally. Crona et al. (2013) studied consumers from six countries and found that 90% of their respondents agreed on a core set of values regarding climate change.

There are, of course, certain levels of variation, but most of them are not directly related to the perception of climate change as a phenomenon itself, but rather to public's reactions (Adger et al., 2013) or concern (Spence et al., 2012). By eliminating a potential source of

interference, we can improve the internal validity of our experiments. Studies employing cultural-specific subject, such as taboo (Theodorakis and Painesis, 2018) or religion (Sarofim and Cabano, 2018), are always at risks of contamination from participants' personal belief or cultural exposure. These extraneous variables are very difficult to control. People from different backgrounds may perceive and react to a taboo very differently, and this information is not always foreseen completely during the planning of a research project. For instance, joking about a person's skin color is very distasteful in Western countries, but such thing is considered quite neutral in the east. This is especially very complicated when a respondent lives in the West but is actually a recent immigrant from Asia and retain his/her original perception. Nevertheless, controlling these aspects is not impossible but the researchers need to implement extra preparation and measurement, all of which increase the complexity of the whole research project.

Another positive aspect of employing climate change as our research context is that it is an on-going issue. Studies focusing on phenomenon in the past, such as purchase history or previous relationship, must face respondents' memory performance. Their ability to recall depends greatly on their health condition. While a certain degree of this can be controlled via demanding respondents' age, it may not be known even to themselves without medical examination. Moreover, the act of accessing memory is much more efficient with external aid. For off-line experiment, it is less of a concern than for online experiment. Because researchers do not have direct control of the survey-taking environment, there is always possibility of respondents recalling the events thanks to an object or a person nearby.

Climate change as a contemporary global issue also benefits psychological distance research. Because our objective is to examine the difference of perception of psychological distance between experimental conditions, a neutral subject is ideal. A phenomenon that is too far away, such as a historical figure, or a location in a foreign country, may interfere with our data. This is further complicated when psychological distance dimensions are

known to interact with each other (Bar-anan et al., 2006). One overestimated dimension is potentially a confounding variable and may ruin the whole experiment.

Finally, previous work on climate change provides sets of measurement scale that is developed specifically for this context. This problem is particularly true with psychological distance, which is primarily the object of manipulation (Maglio, 2019) and not a dependent variable. The original scale was developed by Spence et al. (2012) and went through different iterations in subsequent studies (e.g., Chu and Yang, 2019; Konok et al., 2017), each of which improve the internal validity of the scale. We took advantage of this development to enhance our research measurements rather than converting it to adapt another context.

3.3. Data Collection Method

Once a suitable design has been chosen, we now consider a data source for our empirical studies. Data sources are many in marketing research. There are human sources and non-human sources. The latter refers to statistics, documents, or images, that are gathered by researchers or generated by a third-party. The former refers to consumers participating in surveys or experiments. In this research, our experimental design does not allow the adoption of non-human data sources. To manipulate Attachment to Mobile and to measure the perception of psychological distance require real human input. Therefore, we utilize human data sources for our empirical studies. The central issue of recruiting human participants for our studies is the representativeness of the collected sample. In this section, we describe some major sampling techniques and discuss our decisions regarding data collection methods.

3.3.1. Participants

With the main objective of this research being the effect of Attachment to Mobile, we identified consumers owning a mobile as the target population. As of December 2020, there are 3.6 billion smartphone users, and this figure is increasing rapidly every year (Statista, 2021). These users are widespread across society and not just concentrated into one demographic group. For instance, in France, more than 80% consumers from 12 to 39 years old have a mobile. This rate is lower with the consumers over 55 years old at 44% in 2018, but this has been increasing at a steady rate (Statista, 2019). However, it is not possible to include every mobile user due to their huge number.

It is important to note that the effect of attachment to mobile on consumers behaviors, while statistically significant, does not have very strong effect (e.g., Kolsaker et al., 2009; Konok et al., 2016). This does not mean to undermine the potential of Attachment to Mobile as a predictor of advertising effectiveness on mobile, because the current findings until now still showed a significant different between non-attached consumers and attached consumer (Kolsaker et al., 2009; Melumad and Meyer, 2020). Moreover, we have no idea how many people are highly attached to mobile in the population. Even though Konok et al. (2016) gave us an insight of Attachment to Mobile is very popular among the young consumers. This makes sense because being young means that they have different exposure to mobile tech than their seniors as well as different behaviors (Nielsen, 2019). But aside from this, there is very few indicators of their proportion in the population. And previous studies (e.g., Konok et al., 2016; Chu and Yang, 2019) recruited mostly young, consumer of under 25 years old. Therefore, we believe that having an older and similar to the population is the key to determine the effect of Attachment to Mobile.

The sheer scale of mobile user population indicates that they are likely to spread across multiple cultures. The obvious question is that whether culture is a determinant of their Attachment to Mobile behaviors? From the perspective of Attachment Theory, the

attachment behavior is universal and has no cultural boundary (Bowlby, 1969). These innate behaviors manifest the moment an infant receive care from its parent before any cultural interference. Ainsworth (1978) also claims a standard distribution among the attachment patterns found in children, which indicates that attachment behaviors are the results of evolution rather than cultural development. Mesman, Van Ijzendoorn and Sagi-Schwartz, (2016) compared studies employing Attachment Theory around the world and found similar patterns of attachment behaviors in both Western and non-Western culture, "in samples ranging from hunter–gatherer societies characterized by high levels of alloparenting to affluent and deprived urban contexts" (p. 804). In fact, they even found that these behaviors manifest in the extreme condition of Israeli children's communal sleeping context. In short, there are strong empirical evidences supporting Attachment Theory's claim of cross-cultural validity.

As for Attachment to Mobile, since this behavior manifests similar characteristics and essentially an extension of infant's attachment behaviors to object, the universality claim is still valid. Nevertheless, it does not mean that there is no slight variation of attachment behaviors between culture. While the behavioral patterns themselves are universal, the ways of expressing attachment are still cultural-specific (Mesman, Van Ijzendoorn and Safi-Schwartz, 2016). But these variations are not robust enough to refute Attachment Theory's universality claim and to warrant scientific interventions (Keller, 2018). For these reasons, we do not think that the cultural difference between respondents' background is a major concern in our experiments.

3.3.2. Sampling techniques

Many think a good sample should be representative of the general population. However, a good sample does not need to completely match the population but rather, its results should be consistent with a similar study conducted on the entire population (Fricker, 2017).

Sampling techniques can be grouped into two broad categories: probability sampling and non-probability sampling (Malhotra and Peterson, 2006).

Probability Sampling

In probability sampling, respondents are selected randomly (thus probability sampling is often synonymous to random sampling), and the probability of including every member of the population in the sample is known. Though each individual sample needs not to have exact same probability of selection when they are drawn from the population. This requires a precise knowledge of the target population. Thus, the researchers can estimate, to a certain degree of probability, the representativeness of the sample in regard to the target population.

There are several probability sampling techniques that vary in terms of their sampling efficiency. It refers to the balance between cost and precision. The greater the precision, the closer the sample's characteristics to those of the population. However, increasing precision also mean higher cost. So, an ideal efficiency is achieved when the sample has the highest level of precision with minimal cost. In general, there are four main kinds of probability sampling techniques: random sampling, systematic sampling, stratified sampling, and cluster sampling.

- In *Random Sampling*, any element in the population has the same probability to be included in the sample, and this number is known to the researchers. The participants are chosen truly randomly through a procedure or via computer's algorithm.
- *Systematic Sampling* follows a consistent rule made by the researchers to select participants. For example, for a meta-analysis study, the first 20 articles published in the top 100 journals of every month are included in the database. Systematic sampling is similar to random sampling in that each element in the population has

an equal probability of being selected. However, it is under the assumption that the order of things is not related to the target of investigation. In our example above, if the time of publication is not related to the quality of the article, then the results of such sample will be similar to a random sample from the population.

- *Cluster Sampling* divides the population into distinct groups, or clusters. Within each cluster, the elements should be as heterogeneous as possible, while there is homogeneity between the clusters. The sample consists of randomly selected elements from each cluster. Researchers can choose to take a representative sample or just take a random sampling in each cluster. Cluster sampling aims at optimizing cost by giving the researchers a quick and simple snap at the population.

- *Stratified Sampling*, on the other hand, sets up categories (or strata) that consists of representing characteristics of the population. The participants are then randomly selected to match these requirements. The strata are mutually exclusive to each other, so that there is maximum heterogeneity between them. But within each category, the elements should be similar to each other. Stratified sampling is designed to increase precision of the sample, so that the characteristics of the participants are relevant to the subject of interest of the researchers, but without a significant increase in cost.

Non-Probability Sampling

Non-probability sampling, unlike probability sampling, does not priority representativeness to the general population. Instead, non-probability sampling is chosen so that the collected sample is the most appropriate to study a phenomenon. It relies on researchers' judgement in selecting participants, rather than on statistical procedure or computer-generated list. In general, researchers decide on what is the best to include in the sample. The biggest shortcoming of non-probability sampling method is that the final results are not directly generalizable to the larger population without heavy consideration.

There are three main kinds of non-probability sampling techniques: convenience sampling, judgmental sampling, and snowball sampling.

- *Convenience Sampling* is based on the ability to collect sample of the researchers. The researchers simply opt for the most accessible data at the time of conducting the research. Student sample is very popular in social science because students are very convenience for most researchers to approach and recruit for their studies. Other than student, researchers can intercept consumers at their place of convenience, such as supermarket or pedestrian street, or mass sending invitation email. Of all the sampling techniques, convenience sampling is the least expensive and least time-consuming. However, it is hardly the most cost effective. It is not representative to the general population. And the data is susceptible to numerous biases, such as self-selection bias. Therefore, convenience sampling is often recommended for exploratory research, where researchers have little idea of the research area, or in large scale descriptive research, in which the size of data may make up for the non-representative of this method. It is not suitable for causal research because random respondents' reaction or bias may interfere with the final results as a source of contamination.

- *Judgmental Sampling* is also a form of convenience sampling, but the participants are chosen based on the researchers' judgements. For instance, researchers can choose to investigate a Facebook group, which they judge to be representative of the targeted population. Or they can choose a specific group of consumers because they are the most salient at a certain behavior, thus making them appropriate to study a specific phenomenon. Judgmental sampling shares the advantage of convenience sampling in that it is low cost and simple to deploy. Yet, it is limited in direct generalization of general population because of its value depends entirely on the researchers' judgment. It is useful in theoretical examination and not recommended in applied research or field test.

- In *Snowball Sampling*, the recruited respondents recommend another subject, who continues to identify the next one. This process continues until the researchers are satisfied with the results. Usually, the first respondent is selected randomly. But the entire sample is still non-probability even though the actual choice of selection is not in the hands of the researchers. These respondents are actually connected, so the sample would have very homogenous demographical and psychographic characteristics. While snowball sampling does not produce a representative sample, it is very effective in studying rare phenomenon that is not accessible via public recruitment. For instance, a study on rich consumer might have a hard time recruiting respondents via other means than personal referral. Since researchers actively searching for people of a specific characteristics, snowball sampling increases the likelihood of locating these individuals with the least cost and effort.

The Current Research

The choice of non-probability or probability is based on the nature of this research, the magnitude of the expected sampling errors and other operational variables such as time and cost. Firstly, given that the current doctoral dissertation employs mostly causal research design, probability sampling method seems to be the idea choice for all empirical studies. However, the primary objective of our laboratory experiment is not generalization to the population but instead verification and description of the causal relationship between Attachment to Mobile and ad credibility. A representative sample is not guaranteed to manifest Attachment to Mobile – related behaviors. Its observable reactions are not very salient. Cheever et al. (2014) found attachment-related behaviors visible only with heavy mobile users. And Konok et al. (2017) relied on biometric instruments, and still concluded that the observed effect was only lukewarm, albeit statistically different. Therefore, we need to recruit specific participants that contains the desired traits. Judgmental sampling method fits our requirement perfectly.

Another consideration is that we have no idea of the composition of attached to mobile consumers in the general population. While mobile is proliferating in our daily life, it is not known how many people feel attached to their device. Thus, we cannot calculate sampling error because there is no accurate estimate of the population characteristics. In this case probability sampling is not guaranteed to produce better results. For instance, a random sample of the population is likely to have no attached to mobile consumer, which undermine our experimental research. The use of judgement sampling allows for greater control over the sampling process, making it a more suitable choice.

Finally, non-probability sampling is faster and cost less than probability sampling. The question is whether there is justifiable reason to spend extra for a representative sample? The answer is a resounding no. It is not our objective to generalize the findings of the laboratory experiments. Rather, this job is meant for the field test. We launched our field test to the larger population using Facebook Advertising platform. Arguably, our decision to utilize Facebook can be categorized as judgmental sampling method and yet the results are highly generalizable. The ad's audience is decided based on the analysis of laboratory experiments. So, these consumers are not selected randomly and entirely in our control. Furthermore, Facebook is chosen deliberately. It is not the only social network, but it is the largest. With 2.8 billion active users, it is plausible to say that almost every living people has an online presence on this network. In France, there are 33 million Facebook users out of a 67 million population. We specifically chose Facebook as the field because we believe if an ad works here, it would work everywhere. Yet the sheer scale guarantee strong direct application of the field test. In practice, if an advertiser follows our guidance, which utilized the same sets of inputs, then they can replicate the results easily. Following a probability sampling method would jeopardize our experiments since we are obliged to collect data from other social networks. Each social network, for example, Twitter or Tiktok, employ a different advertising platform, whose functioning algorithms are not known to the public. Directly comparing effects from different advertising platforms, in this case, is like

comparing apple to orange. This would negatively affect both the internal validity and external validity of our field test.

To conclude, there is no support for adopting probability sampling in our study since it does not fit the current research's objective. On the other hand, judgmental sampling, a non-probability sampling method, provides ground for the execution of our laboratory research and the field test. It is also simpler and less expensive to employ. Therefore, we decide to adopt judgmental sampling method for our empirical studies.

3.3.3. Online Data Collection

Since our context focuses heavily on online advertising, we decided to conduct all of our experiments online. Previous laboratory experiment (Konok et al., 2017) observed that the effect of Attachment to Mobile is not very salient, possibly due to the artificial nature of a laboratory environment. An important aspect of Attachment to Mobile is the positive experience associated with the device such as fondling their mobile (Vincent, 2006) or feeling relaxed (Melumad and Pham, 2020). A traditional laboratory environment is hardly any of those. Considering that we want to study consumers when they are both with and without their mobile, a natural environment is preferred. We aimed to eliminate this issue by allowing the participants to do the test in their own environment. Online data collection is a natural choice. The consumers can consume advertisement as they always do without additional stress from being in an alien environment. And we have easy access and measurement to these consumers at our convenience.

The Internet is a powerful vehicle for conducting causal research. In general, online respondents' recruitment is more cost-efficient and has much wider reach. Researchers are not restricted geographically when finding participants for their studies. It is also more convenience for the participants themselves to take part in an experiment from their place without having to move. Aside from the test-taking environment, the Internet provides very

strong mechanism for controlled experiment, be it laboratory experiment or field test. For instance, survey platform, such as Qualtrics, provides high quality controls just as in a normal lab. Researchers have access to a variety of tools, from random distribution of stimuli, time control to timer and more.

On the other hand, online data collection is not without limitation. Its most significant shortcoming is the lack of control over the survey-taking environment. There are many potentially influencing factors that the researchers could not control, such as other opening windows or accompanying people. Despite having many controls available, there is no way to know whether the respondents actually look at the stimuli, or their decisions are under influence from another advertisement nearby. Still, its advantages outweigh the limitations. The lack of control over their surrounding environment, in fact, is not that severe if our participants follow our instructions and pay attention to the questions. There are many ways to enforce these rules, such as using attention check question or measuring answer time. We will discuss these methods in detail in each empirical study's section.

In most of our empirical studies, we recruit participants online from a mix of Mturk and Prolific platform. Both platforms only handle participant recruitment and payment and leave the data collection to researchers' own tools. More importantly, the unique situation at the time of data collection did not support traditional survey or laboratory. Sanitary procedure to prevent the spread of Covid-19 demanded us to work online most of the time. Among the available participation pools (e.g., Prolific, Qualtrics, Mturk…), Mturk is the most utilized in previous studies (e.g., Chu and Yang, 2019; Wang and Lehto, 2019) with satisfactory results. But Prolific's respondents are more naivete to experimental research tasks and are more diverse in terms of ethnicity and location (Peer et al., 2017). Recruited participants were from English native speaking countries to ensure they understand the questions perfectly. Participants took part in the study for monetary gain. As per ethic conduct, we set the reward at the average rate of 7.5 USD per hour, equivalent to the minimum pay rate in the USA.

In consumer research domain, responses from MTurk and Prolific were comparable to other forms of data collection (Paolacci, Chandler and Ipeirotis, 2010; Ford, 2015; Steward et al., 2015; Palan and Schitter, 2017). In fact, their respondents were considered as yielding higher quality data than student samples (Palan and Schitter, 2017; Kennedy et al., 2020). Buhrmester and colleagues (2011) found that large-size MTurk samples has the same psychometric standards as the published studies. Paolacci and colleagues (2010) compared samples from Mturk, university pool and online forum by having the respondents completed the same set of questions in judgement and decision making. They found that MTurk sample is similar to the others in terms of reliability. In certain domains such as psychology or decision making, MTurk samples are even more diverse (Buhrmester et al., 2011) and more representative of the population than traditional collected data (Bentley et al., 2016; Paolacci et al., 2010). Thus, the current study collected a similar-sized sample following that of previous psychological distance research (e.g., Chu and Yang, 2019).

3.3.4. Determining The Sample Size

Usually, sample size is not only determined by statistical calculation but also by managerial considerations such as cost and time. The idea is to have enough observations to power the necessary statistical analysis, but not overly huge to be a burden on the schedule and budget. In our case, there are several factors that prevent us from calculating a statistically suitable sample size. Firstly, our sampling method is judgmental sampling. Because the population's characteristics are unknown for attached to mobile consumers, and our participants are not selected randomly, it is not possible to calculate a confident internal for our sample. Secondly, there exists a rule of thumb that allows for quick estimation of sample size. Hair et al. (2001) suggested a general rule of five observations per variable as the minimum level. If possible, a ten-observation-per-variable ratio is preferred. But not all study follows this rule to the letter, mostly due to operational concerns.

Another approach for estimating sample size is to follow previous studies' practice. Studies in the same research area typically recruits from 150 to 400 participants (e.g., Cheever et al., 2014; Chu and Yang, 2019). Studies that employ similar factorial design limits the number of respondents per conditions around 30 to 60 (Konok et al., 2017; Wu et al., 2016). This approach is favored because the result is balanced between the necessary statistical power and expected operational concern. For instance, Konok et al. (2017) perform power calculations on Clayton et al. (2015)'s results and obtained 22 observations per condition for 80% effect size.

What about operational concerns? Looking at our research, our proposed theoretical model contains a similar number of variables (45) to that of Konok et al. (2017) but superior than that of Clayton et al. (2015). Adapting Hair et al. (2001)'s rule of thumb for the number of required observations leaves us at an ideal sample size of around 500 for each experiment. Comparing this number to similar studies (Wu et al., 2016; Konok et al., 2017), our number of observations per experimental conditions is two times larger. Concerning operational factors, we expect longer time to collect enough mobile-user respondents. Mobile surveys are more time-consuming and have higher drop-out rate (Qualtric, 2021), both of which are unfavorable to our study. Therefore, we decided to follow a balanced approach with around 40-50 observations per conditions. This leaves the sample size for each empirical study at roughly 150 - 300 participants.

3.4.   Operationalization and Measurements

After finalizing on general design of our empirical studies, this section specifies the steps we took to implement the projects and describes the employed instruments. In total, we had conducted 4 online laboratory studies using online participants and 1 field experiment on a major social network. In between each study, a quick analysis was performed on each dataset to confirm achieving the main objectives before launching the next one.

3.4.1. Measurement

This section details the employed measurement scales and our reasoning for each of the variables in the theoretical model. More information on the scales and their items can be found in the Appendix.

Finally, we provide in detail our choice of measurement scales for all of our experiments. Even though CLT and Attachment Theory are well developed in other areas, their application in the mobile context is quite recent. For instance, psychological distance, a key concept within CLT, is mostly the subject of manipulation and rarely measured as a dependent variable. Most of our measurement scales are developed within five years and were employed in studies of the same context. Our studies take advantage of this to enhance our validity as well as continue to refine these measurements.

Attachment to Mobile

Over the 30-year history of Attachment Theory, there have been over 29 instruments constructed specifically for examining the attachment behaviors in children, adolescents, and adults (Ravitz et al., 2010). Put aside their validity or reliability, none of these scales was designed to reflect the attachment relationship between consumers and their mobile. While mirrors the attachment to an object, the mobile-consumer relationship distinguishes itself in its dynamic ability to store memories and maintain a relationship (Konok et al., 2016). Therefore, we need a specific measurement for the mobile-consumer attachment relationship.

To measure the level of attachment to mobile, we adopted the measurement developed by Konok et al. (2017). It was constructed based on Bowlby (1969)'s Attachment to Mobile framework and Vincent (2006)'s conceptualization of consumer-mobile emotional

relationship. At first, the measurement consists of 10 items (Konok et al., 2016) and then was upgraded to a 15-item version in the subsequent experiment (Konok et al., 2017). The scale was also validated in several independent studies (e.g., Han, 2017; Hodes and Thomas, 2021). For instance, Han (2017) adopted Konok et al. (2017)'s scale with high validity (alpha = 0.798). The new scale is superior to the old one in the number of variances explained (70.8%) and in alpha Cronbach value (0.91). In short, the existing measurement is already validated and seems suitable to be used in our empirical studies.

Another advantage of using Konok et al. (2017)'s scale is that it is also used in the consumer research context, similar to the current study, which enhances the internal validity of the measurement. The scale (see Appendix) contains 15 statements describing habitual behaviors related to highly attached to mobile individuals, such as "In a tense situation, I take out my phone" or "If I do not have my phone on me, I do not feel safe." Respondents must indicate whether the 15 statements fit their characteristics on a 5-level Likert scale, from 1-Not characteristic at all to 5-Very characteristic. Thus, respondents scoring higher would be equal to having a higher level of attachment to their mobile.

Psychological Distance

The current study adopted the measurement of Wang et al. 2019, with 18 items measuring on a 5-point Likert scale. This scale is adapted and extended from the questionnaire by Spence et al. (2012), which has been adopted by many previous researchers as a measurement of psychological distance, such as Chu and Yang (2019), Wang et al., (2019). Each dimension of psychological distance: temporal, spatial, hypothetical, and social, are measured by four items.

Psychological distance, which is the subjective distance between the consumer to a subject (Trope and Liberman, 2010), is rarely treated as a dependent variable. In the extant literature, it is mostly the subject of manipulation. For instance, Theodoraki et al. (2018)

manipulate the felt distance in the stimuli by their wording, while Choi et al. (2019) utilized texts versus images. Direct measurement of psychological, in these studies, was often avoided. Instead, they relied on construal level, whose concept was closely linked to psychological distance (Trope and Liberman, 2010), and employed its measurement to check their manipulation (e.g., Theodoraki et al., 2018; Fujita et al., 2006). Among the rare studies that measure psychological distance directly, there is no single established measurement of psychological distance. Outside the climate change context, researchers had to rely on alternative solutions. One approach is to measure psychological distance indirectly. For example, Darke et al. (2016) adapted Bar-Anan et al. (2006)'s implicit association test, which assessed the association between psychological distance dimensions and construal levels. This adaptation was quite extensive. The authors constructed entirely new items for their studies. Though they reported excellent reliability, it demonstrated the difficulties regarding the measurement of psychological distance.

In the climate change context, there were fortunately previous attempts to measure psychological distance as dependent variables (e.g., Spence et al., 2012; Wang et al., 2019). The pioneering scale was that of Spence et al. (2012), who constructed the measurement scale from the inputs of academic panels and experts. Their work was often cited and adapted by subsequent researchers to build their own psychological distance scale. However, it is very important to stress that the original scale of Spence et al. (2012) has not been validated externally in other studies. Across all of its adaption, too often, the measurements were built on the foundation laid by Spence et al. (2012) and other material. For instance, Jones et al. (2017) used the surveys from Yale Project on Climate Change Communication to complement their measurements. Other researchers like Wang et al. (2019) reconstructed the original scale by replacing several self-developed items and a uniform scale. Aside from that, the authors added two extra items for combined temporal plus social distance and temporal plus spatial distance. The validity of this practice is debatable in terms of parsimony and reliability. Firstly, it seems to violate the principle of parsimony in scale development, in which a phenomenon is often best explained by the

simplest framework (Raykov and Marcoulides, 1999). A double-distance item seems redundant, given that psychological distance dimensions react to each other (Bar-Anan et al., 2006). However, Wang et al. (2019)'s scale did well to prove its reliability, which refers to the ability to produce consistent results (Thompson, 2002). The scale was validated through 2 independent samples and achieved an excellent alpha score of over 0.92. This is much better than the modified version of Spence et al. 2012 at alpha = 0.76. Therefore, we decided to keep them in our survey.

Our own experience with Spence et al. (2012)'s original scale suggests that it has a compatibility issue. The initial pre-test of this scale yielded a very low Alpha Cronbach value under 0.5. A possible reason is that Spence et al. (2012) referred only to a general climate change in their items and did not use a specific climate change-related subject as in other studies. For example, Wang et al. (2019)'s respondents were required to view a video about rainfall in West Australia, while Chu and Yang (2019) showed a press article. The texts themselves trigger differently than the images (Duan et al., 2017). Thus, different materials should stimulate different distance perceptions. More importantly, psychological distance dimensions tended to interact with each other, mostly from spatial distance to others, because spatial terms are often employed to describe other distances (Bar-Anan et al., 2010). This complexity in measuring perceived psychological distance might be the reason why a measurement scale is not readily available since the conceptualization of the Construal Level Theory in the 2000s. In our empirical studies, we employed a different set of advertising materials. We expect some of the items would not correlate with others as well as in their original version, especially with the reserved code and the combined distance items. Unfit items would be deleted to retain an acceptable alpha level over 0.7 (Hair et al., 2001).

Credibility

The credibility of an advertisement is often mistaken with the credibility of the source (i.e., the advertiser, the speaker, or the host website). However, the source is outside of the scope of this research, which is the credibility of the advertisement or the message itself. For most of our empirical studies (Study 1 – 3), we employed the measurement for general ad credibility from Mackenzie and Lutz (1989). This is the original conceptualization of Ad credibility, and its scale has been adopted in a majority of the studies in advertising credibility literature. The scale is well constructed, with high internal validity at an alpha level over 0.75 in most studies (Dahlen 2005; Kim, Youn, and Yoon, 2018, Harms et al., 2019). This scale is also adapted and modified in subsequent studies, either by taking (Kim et al., 2017) or transforming the original items (Cian et al., 2020). Even though these newer scales performed much better in terms of Alpha Cronbach value, they are context-specific and rarely adopted outside of the original study. On the other hand, Mackenzie and Lutz (1989)'s 3-item scale has been extensively validated since its conceptualization. Furthermore, it is important to note that Ad Credibility's conceptualization is still based on Mackenzie and Lutz (1989)'s approach. Thus, the Ad credibility measurement scale is often adapted from Mackenzie and Lutz (1989), which asks the subjects to indicate how convincing/unconvincing, believable/unbelievable, and biased/unbiased they felt the ad was. The three items were rated on a 5-point bipolar scale.

Customer Engagement

Although there is a considerable number of research conducted on the subject of CE, each authors undertook a different approach, leading to a fragmented literature (Hollebeek, 2021). Naturally, measurements follow. There are almost as many CE measurements as the number of definitions. Fortunately, these many different definitions share the same core concept of consumers' interactions with the brand (Hollebeek et al., 2021), albeit having some contextual differences. In general, there are two approaches to measure CE:

traditional measurement scale constructed for academic surveys and integrated measurement on online platforms.

The former approach was followed by the prominent authors like Hollebeek et al. (2014) and Kumar & Pansari (2016). These measurements reflect closely the definitions on which they were built upon. For instance, Hollebeek and colleagues (2014) define CE as having three dimensions: affection, cognitive and activation. Their measurement scale also contains the respected dimensions, in a total of 10 items (see Table…). Similarly, Kumar and Pansari (2016)'s measurement adapts the conceptualization of Kumar et al. (2010) as well as its four aspects: customer purchase, customer reference, Customer influence and customer knowledge.

Table 4 CE measurements developed by Hollebeek et al. (2014)	
Cognitive processing	1- Using [brand] gets me to think about [brand] 2- I think about [brand] a lot when I'm using it 3- Using [brand] stimulate my interest to learn more about [brand]
Affection	4- I feel very positive when I use [brand] 5- Using [brand] makes me happy 6- I feel good when I use [brand] 7- I'm proud to use [brand]
Activation	8- I spend a lot of time using [brand], compared to other [category] brands 9- Whenever I'm using [category], I usually use [brand] 10- [brand] is one of the brands I usually use when I use [category]

Table 5 CE measurements developed by Kumar and Pansari (2015)	
Customer Purchase	1- I will continue buying the products/services of this brand in the near future 2- My purchases with this brand make me content 3- I do not get my money's worth when I purchase this brand 4- Owning the products/services of this brand makes me happy
Customer Reference	5- I promote the brand because of the monetary referral benefits provided by the brand 6- In addition to the value derived from the product, the monetary referral incentives also encourage me to refer this brand to my friends and relatives 7- I enjoy referring this brand to my friends and relatives because of the monetary referral incentives 8- Given that I use this brand, I refer my friends and relatives to this brand because of the monetary referral incentives
Customer Influence	9- I do not actively discuss this brand on any media 10- I love talking about my brand experience 11- I discuss the benefits that I get from this brand with others 12- I am a part of this brand and mention it in my conversations
Customer Knowledge	13- I provide feedback about my experiences with the brand to the firm 14- I provide suggestions for improving the performance of the brand 15- I provide suggestions/feedbacks about the new products/services of the brand 16- I provide feedback/suggestions for developing new products/services for this brand

The other approach is to directly adopt the engagement metrics from various online platforms (e.g., Barger et al., 2016; Bernritter et al., 2016; Huang et al., 2013). In general, most platforms provide its users three basic interactive functions: comment, share and like, with a twist for each system. For instance, Facebook does not just offer a like button but provide a variation of emotions (like, love, haha, wow, sad, angry). And Twitter uses the heart button instead of the "like", plus a retweet option meant for sharing within the platform. Although differentiated on the surface, all metrics reflect the measurable actions

that consumer take on social media in response to the content. How details we can record these actions depends on the system in use.

The traditional measurement scales developed by prominent researchers such as Hollebeek et al. (2014) or Kumar & Pansari (2016) focus heavily on the consumption and purchase of branded product in a conventional way. While the purchase of a brand is the focal point in most CE studies, the concept of CE is not restricted by it and can be expanded to other objects as well (Hollebeek et al., 2021). After all, the engagement behaviors of consumers has implication far beyond transaction (van Doorn et al., 2010). Because the constructed measurement scales meant for surveys are bounded by their definitions (Hollebeek et al., 2014; Kumar & Pansari, 2016), and that CE is context-dependent (Brodie et al., 2011), these scales seem unsuitable to measure non-purchase related interactions, such as in the case of not-for-profit content (Bernritter et al., 2016), user generated content (Anderson & Simester, 2014) or viral video (Huang et al., 2013).

We adapt the approach to measure CE from Barger et al. (2016), who operationalize CE as a set of measurable actions taken directly from the social media platforms: like, comments, share and post user-generated content. These actions are shown directly on the content, as in Facebook or Tweeter. Therefore, this approach reflects very well the actual behaviors of the consumers on their environment and has the advantage of high external validity. However, as far as survey adaptation is concerned, it is not possible to simulate the interactive functions of platform on a questionnaire. Each action on real online social network is about real interaction with other users, which is completely missing on a survey platform. Hence, the self-report intention measurement appears more appropriate and correct. To measure CE, we adapt the public engagement scale of Bernritter et al. (2016) - public and private engagement with brand on Facebook - as a mean to measure the brand-related actions on social media. This scale is constructed to measure brand-related activities on social media, ranging from private consumption to public engagement. These activities are brand-focused and have significant consequences for the firms (Muntinga et al., 2011),

which are the same phenomenon as customer engagement (Hollebeek et al., 2021; Pansari & Kumar, 2017). We would argue that Bernritter and colleagues (2016)'s scale is perfectly suited for surveys aiming to measure CE on social media condition. To stay consistent with the field study's output, we only utilize the public engagement and ignore the private engagement half.

Table 6 CE measurement developed by Bernritter et al. (2016)	
Private engagement	
1- I would like to visit the website of (brand). 2- If I could subscribe to a newsletter of (brand), I would do that. 3- If I could order an information-package about (brand) online, I would do that.	(1 to 7: Totally disagree–Totally agree)
Public engagement with brands	
1- I would like to like (brand) on Facebook. 2- I would like to share (brand) on Facebook. 3- I would appreciate it, if content from (brand) would appear on my timeline on Facebook	(1 to 7: Totally disagree–Totally agree)

3.4.2. Procedures of Laboratory Experiments

Implementation

As discussed before, the laboratory experiments are designed to have a maximal level of internal validity. Therefore, one of our utmost concerns is to eliminate all the plausible threat. We identified two most outstanding factors that can reduce our internal validity: extraneous variables and instrument errors. For the former, because online experiments lack direct administration from the researchers, the variations surrounding the participants might influence their responses. For instance, a second device nearby might influence our participants perception of climate change without us knowing. While the recruiting platforms provide us with past performance record of respondents to filter out low performers, this does not completely solve our problem. Therefore, the participants were

randomly assigned to the experimental conditions to even out the odd. For the latter, we run a pre-test preceding each experiment to verify the manipulation of the stimuli. It is to ensure the participants would perceive the ads as we planned. Another manipulation check question was installed in the surveys as an extra level of control. Another issue with the employed instrument is related with frauds, which has been haunting online recruitment platforms for years (Kennedy et al., 2020). Throughout the questionnaires, several attention-check questions and Captcha were placed. These measures are meant to examine whether the participants actually read the questions, and if they are human. Attention-check questions give contradicting instructions to the actual answer. If the participants do not pay attention, their responses would stand out in the database as faulty. On the other hand, Catpcha forces the participants to complete certain tasks designed to detect autonomous programs. Only passing respondents would have their response and payment validated.

Aside from the physical space surrounding the participants, the online experimental environment is controlled tightly to ensure everything but the treatments is constant. Each experiment follows a similar procedure. The surveys were created on Qualtrics and then posted on a recruitment platform, either Mturk or Prolific. These two systems are often used in tandem thanks to their closely integration to each other. Qualtrics provides validation code generator within their system. Participants who had finished their responses had to submit the code at the end of the survey on Mturk to access their reward. Mturk, in turn, distributed the survey access link to qualified participants. At the beginning, participants were welcomed by a short introduction and a declaration of consent. The participants had to agree to participating in the research and acknowledge that embedded data would be collected for control purpose. No identifying information would be asked on any of the questions. All collected data was used for academic purposes and only the final analyzed results would be shared in scientific publications and conferences. Non-consent participants were directed to the end of the survey without actually seeing the questions. Consent participants were randomly and equally attributed to each condition.

Afterward, they were guided to the questionnaires. At the end of the survey, the participants were asked to copy the validation code and paste on the last section as well as on Mturk.

Limitations

While Mturk experiments are somewhat comparable to traditional laboratory tests (Paolacci et al., 2010), they are not without problem. Firstly, we employed judgmental sampling and decided to collect our data from Mturk. While our decision mostly based on the fact that MTurk is the largest recruitment platforms, and that past data from Mturk has indicate their equivalent to the general population, our judgment is still limited by our own knowledge and vision. The comparison studies addressing Mturk has aged. The most extensive comparison was conducted back in 2010 (Paolacci et al., 2010). The actual situation may have changed completely in this 10-year gap. This is evident by recent studies on Mturk have raised many validity issues (Kennedy et al, 2020; Smith et al., 2016). Notably, Mturk is facing a data quality crisis, mostly due to the abusive behaviors of its users (Kennedy et al., 2020). Even though we tried to balance this limitation by using another platform, Prolific, we admit that this is not a complete remedy and only a temporary cure. Our choice of Prolific still relies heavily on our limited understanding of this platform as a viable alternative to Mturk. Future studies should attempt to use probabilistic sampling method to consider this limitation.

Moreover, they shared the same disadvantage of having low ecological validity for dependent variables. Part of the problem is that these variables are not part of the metrics which indicate advertising effectiveness in modern platform, such as Facebook or Twitter. Consequently, it is actually very hard to tell whether the proven method in the laboratory actually worked in the real population. There is also concern of data quality on Mturk, due to speeders, cheaters, and bots (Kennedy et al., 2020; Smith et al., 2016). Cheaters are participants lying about their profiles to get into any studies to get paid. For example, there are a significant number of participants using fake IP to take part in US habitant only

surveys, which tend to have higher reward (Ford, 2017). Without specific filters, the participants tend to be young Asian (Smith et al, 2016) or even bots (Kennedy et al., 2020). Another concern is speeder, who finish the survey with the least cognitive effort possible to optimize earning (Smith et al., 2016). They do not pay attention to the questions and ruin attitudinal data (Fleischer, Mead, and Huang, 2015). While there are concerns over the quality of data gathered from Mturk, most of these issues can be remedied using a various checking tactics (Kennedy et al., 2020). The fraudulent respondents tend to be the experienced test-takers, who know how to get around these methods. Still, they account for only 10% of Mturk population (Ford, 2017). The risk is manageable for internal validation of the theoretical model.

3.4.3. Field experiment using Facebook A/B Testing

Reasoning

To overcome the limitations in the external validity of our laboratory experiments using Mturk, a field test is conducted. Many marketing researchers have argued that experiments conducted in natural settings yield a much higher external validity than lab studies (Gneeezy, 2016). However, field experiments and lab studies are not conducted in the same manner (Cialdini, 2009). For instance, field experiments focus on the observed behaviors and not the underlying processes. This is mainly due to the time-consuming nature of the operation and the lack of instruments in the field. Researchers cannot carry the survey questionnaires around to ask for opinions of some attitudinal items. And preparation for an experiment takes much time from initial design to an actual run. There are materials to purchase, permission to ask, and personnel to manage. Moreover, because field experiments are conducted in the natural setting of the consumers, they suffer from a higher level of noise from the environment with little to no control. Consumers may ignore the stimuli because they are occupied with other things in their minds. Alternatively, rain can

easily ruin months of setup. Nevertheless, the generalizability of a theory should depend on the theory itself, not on the method (Lynch, 1999).

Field experiments can only indicate where and when we can observe similar occurrences (Gneezy, 2016). To focus too much on the observed behaviors leads us to ignore our core theoretical contributions, the mechanism of how things work. We argue that combining lab studies and field experiments is the solution for the limitations of both types of studies. Their results complement each other. While most published studies include a managerial implication section, they should be taken with a leap of faith since the metrics are not employed in the real world. This is especially true for online advertising research. Professional advertisers are long used to, or forced to get used to, the metrics of influential advertising platforms like Google or Facebook. Furthermore, usual measurement scales such as Attitude toward the Ads or Purchase Intention are not implementable on these platforms. We argue that our research would have a much higher level of validity, both externally and internally, if the lab studies and the field experiment all converge on similar results.

With 1.4 billion active users, Facebook offers unprecedented access to a large pool of real consumers and a dynamic environment. Facebook Advertising provides experimental functions to help Advertising Manager try out their advertisement materials before launching. This context is perfect for advertising research. There are several advantages that make the Facebook field test stand out from the traditional marketing field test. Firstly, Facebook is the number one popular social network in the world. Nearly 2 out of every living person uses Facebook. This ensures that the researchers have affordable access to almost every kind of respondents, including those inaccessible by traditional means, such as the stigmatized (Mangan & Reips, 2007) or socially outcast (Kosinksi et al., 2015). Secondly, as a social network, Facebook contains various data of its users, from simple demographic data (age, location, or education) to complex behavioral data (such as preference or habit). The data is recorded and processed within the system as researchers

send out the advertisement by instructing the system of the targeted audience. Facebook then decides the most appropriate users to show these ads, depending on the campaign's target and budget. Thus, the input quality is arguably higher than the traditional field test, where researchers are out in the open with fewer criteria to decide on.

FABT is, of course, not without shortcomings. Firstly, Facebook Advertising lacks the ability to implement our own measurement scale. Researchers and practitioners alike only have the option to choose the audience of their advertisement. Since our model examines attachment to mobile's effect, we opted to target the audience that shares the characteristics of the high attachment participants in our lab studies. Secondly, Facebook follows a black-box approach for its advertising platform. After receiving the input, Facebook's optimization algorithm, which is not published to outsiders, handles the rest. Our final outputs for the two conditions would be stimuli 1 + optimization vs. stimuli 2 + optimization. This poses a challenge to the theoretical model's internal validation. In any case, the Attachment to Mobile effect was reported to have a small impact in previous lab studies (Konok et al., 2016; Melubad and Pham, 2020). We argue that if the effect can still be predicted even under the higher level of environmental noise and with the use of proxy, we could still have claimed the validity of our theoretical model.

Implementation

The experiment function we decided to employ is currently called A/B Testing. Used to be called Split Test, this is proven and recommended method in marketing research (Orazi and Johnston, 2020). Facebook A/B Testing (then referred to as FABT) operates similarly to a between-subject experiment. An audience of similar characteristics is randomly assigned to either of the testing condition. The system compares the outputs of these conditions and informs researchers of the better performing one and the probability of repeating the same results. A winner is declared when a condition is likely to have better outputs at more than 75% of the time.

It is important to note that FABT is only the comparing and sorting tool. It runs on top of the usual Facebook Advertising platform. The advertisement conditions involved in FABT are actual ad campaigns that are configured and published to run as regular ads. These ads vary significantly in their configuration and objectives. For instance, advertisers can choose to promote a Facebook Page with the target to increase the number of Likes. The system will automatically evaluate the ad and send it to the users whom it judges to be the most likely to visit the page and click Like. Researchers have no control or information regarding these selection mechanisms or algorithms. The only inputs we can manipulate are to select the audience based on a range of pre-defined demographic filters and to design our own advertisement.

To ensure we have an authentic natural setting for our ad sets, we decided to promote a real Facebook Page of an architectural studio located in France. The advertisement images were selected by the researchers and modified by the studio's architects. All utilized materials were judged to have the same quality as any publication made by the studio's marketing team. These ads went through a pre-test to make sure they successfully manipulate the viewers' construal level before being deployed on the field test. More details on the results of the pre-test are in Chapter 4.

As required by Facebook Advertising, the ad campaigns had to link to an existing Facebook Page as the advertised subject. We obtained permission from our architecture studio in France to run the advertisement on their Facebook Page. The studio's product is high-value architectural renders and designs, which were sold after an elaborated negotiation with business partners. Therefore, the usual approach when running advertisements on social networks is to generate consumers' engagement and eventually attract high-profile investors. Following the management's advice, the campaign's objective was set to generate post engagements, not to attract clicks or conversion as previously done by Orazi and Johnston (2020). The content was kept at a minimum, with a single image in the

standard Facebook frame. The call-to-action button was set as "Get Quote" as per the studio's usual practice. The ad sets were set to run on three days, with an average budget of 20 euros/day.

Data analysis

Outputs were downloaded from "Ad Reporting" section of Facebook Ad Manager. Per Orazi and Johnson (2020)'s recommendation, the following metrics were subtracted for subsequence analysis: Reach, Impression, Frequency, Amount Spent, Post engagement. More details of the ad outputs can be found in the table below.

Table 7 Facebook Advertising outputs

Condition	Gender	Impression	Reach	Engagement	Cost per engagement
BW	Male	3837	2892	497	0.04
	Female	1700	1383	269	0.04
	Unknown	65	49	11	0.03
Color	Male	3595	2760	470	0.04
	Female	1792	1412	235	0.04
	Unknown	46	32	7	0.04
Total			9646	1489	0.04

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Because FABT's output does not contain any raw data but only metric numbers, it is impossible to run regular statistical tests. The data provided by FABT is at an aggregated level. Following Orazi and Johson (2020)'s guidance, we perform a chi-square comparison on post engagement between the two experimental conditions. If the results are significant, it means that there exists a relationship between these variables. Thus, we can compare the outputs and interpret their difference.

3.5. Data Collection Plan

3.5.1. Preliminary verifications

Before launching the experiment online, the stimuli of each empirical study were run through a pre-test to validate their manipulation. This pre-test consisted of exposing the respondents to the stimuli and having them answered the psychological distance scale. Because the population size of the mobile users on recruitment site like Mturk and Prolific was not public, we risk showing them the same materials multiple time. This would inevitably lead to contamination of our experimental conditions. To counter against this, the sample size was set to under 100 to limit the negative impact on our respondents' population. We collected the user ID of all participating respondents in the pretest and exclude them to take part in the subsequent main studies.

The laboratory experiments' questionnaire was created on Qualtrics and tested thoroughly for the best experience. This was done between the researchers and several colleagues. The objectives of this test run were multiple. Firstly, it was to ensure there would be no glitch on the side of the participants. Since most of our experimental stimuli are image, we have to consider their loading time. If there is insufficient Internet speed at the time of the experiment, the image would fail to load before the enforced exposure time ran out and ruined the effect. Unfortunately, there is no previous example to follow. We took several runs with different Internet connections and settled on the average time. More details of this control can be found in the respective study in the next chapter. Secondly, we tested the survey flows and divide the questions into pages. Due to the difference in display screen, the mobile can only display a small image and one item at a time, while the PC, where we develop the survey, can show the whole question and much larger photo. At the end of the test run, we ensure that respondents on mobile experience have an adequate experience and do not have to stroll down too long to search for the answer.

Finally, monetary reward was required to collect data on most participant recruitment platforms. We tried to give the fairest payment possible given our limited budget. Prolific enforces a minimum payment rate at 6.7 euros / hours while Mturks does not provide any specific guideline. Thus, we chose to pay our respondents based on France's minimum net salary of around 8 euros per hour. The actual amount for each task would be readjusted after we finished collecting the data to reflect the intended remuneration.

3.5.2. Schedule and planning

Usually, the timing of the experiment should not be a major concern. Our studies were conducted in the middle of the Covid-19 Pandemic, which caused massive disruption to our daily lives. The most apparent issue is possibility of a confounding factor contaminating the experiments. Because one significant part of attachment behaviors concerns anxiety caused by separation from the attached object, our participants could have heightened level of anxiety because of the contemporary condition. As a consequent, data collection starts on September 2020. We wanted to avoid the period when concern for Covid-19 was at the highest. September is the best choice at the time because it is several months since the end of the first lock down in June 2020. And September is also when the announcement of a potential vaccine is imminent. We argue that these events could reduce, to some extent, the heightened anxiety felt by our participants and warrant a high level of internal validity. All data for online laboratory studies was collected by the end of October 20 to avoid any unexpected news contaminating our studies.

The field test is scheduled to run immediate after the laboratory experiment and its data analysis. As presented above, field test using Facebook Advertising needs input from the laboratory experiment, since it uses a completely different set of input and metrics. An additional issue with our field test is that the Facebook Advertising account we employed belongs to an actual company. The benefit of using a real account is to have the most

accurate response from real audience seeing the ads. It is especially important for Facebook Ads because the ads are not run independently but as the promoting function of a Facebook Group. While the display algorithms are not known to use, it is reasonable to assume that it will take into account the activities and audiences of the attached Facebook Group. As a consequent, we depend on the company to produce ads as per our requirement. The expected publication is set at March 2021.

4. Summary of Chapter 3

This chapter addressed our methodological choices and specified the necessary steps to implement the empirical studies. In the first section, we have presented and justified the ontological paradigm of positivism as the strong foundation to establish our research design. After discussing the available designs, the causal research design was chosen as it was the most appropriate to answer the research questions and guide our empirical studies. Finally, general steps to implement the empirical studies were listed and justified in the second section. These include the general experimental procedures and the employed measurements. Thanks to the well-developed literature on Attachment to Mobile and construal level theory, we made the decision to adopt the existing measurements for our empirical studies. However, we did not dismiss the possibility of altering them to fit our data as the current research advanced. We also proposed to conduct an additional field test to complement the lack of external validity in our laboratory experiments. Conducting two types of experiments allows us to reinforce the internal validity of the laboratory experiments without much concern for the immediate generalization of the findings. The data collection plan and the expected controls are listed in the final section of this chapter. In the next chapter, we present each empirical study in detail and report our findings on the collected sample.

Chapter 4 – Empirical Studies

Chapter Overview

The proposed theoretical model is tested across four studies, including three controlled experiments and one field test. All studies were conducted on mobile users and in the most natural environment possible. Because mobile users often operate in noisy environment with many possible interfering factors, it was important that the proposed model in question (1) was validated with multiple materials; (2) was tested with several independent samples; and (3) exhibited a similar outcome both in the field and in the lab. In the controlled experiments, we tested the proposition that the more attached to the mobile, the more likely the participants would engage to the advertised content publicly. We began by testing the main effect in Study 1 with a classic student sample recruited from a business school campus. Study 2 examined only the middle mechanism on a text message by surveying participants coming from an online platform. Study 3 validated the whole proposed model with the participants from Mturks, whose demographic characteristics were known to be very generalizable (Ford, 2015). Finally, a large-scale field study on Facebook Advertising platform was conducted with real advertising materials and consumers to verify the predictive power of the proposed model.

1. Study 1 – Main Effect: Consumer demonstrate different level of CE when exposed to different types of Ad

1.1. Overview

The aim of Study 1 was to examine the impact of the level of Attachment to Mobile on consumers tendency to engage to the brand through different Ad Types (Concrete vs. Abstract). We conducted an experiment on students at a Business School in France on how presenting climate change in an abstract/concrete way influence their engagement to the content. Participants were exposed to framed messages on their own mobile in a controlled environment. A concrete message is much stimulating and incites more protection desires from the audience than as an abstract event (Schuetz et al., 2020). Doing so on mobile should lead to an increase in Attachment to Mobile and customer engagement. Theoretical contributions and subsequent studies are then discussed.
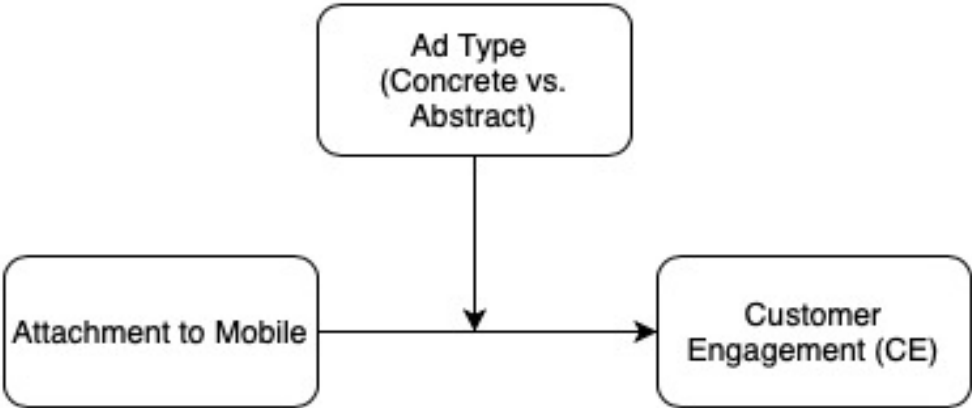

Figure 5 Main Effect

1.2. Methodology

1.2.1. Participants

A total 130 participants were recruited from students in an English degree program university in France (Skema Business School). All participants volunteered to take part in the survey during break time and were asked to browse the same content on their own smartphone. An equal number of participants was assigned to either condition: abstract and concrete and then proceed to the questionnaire.
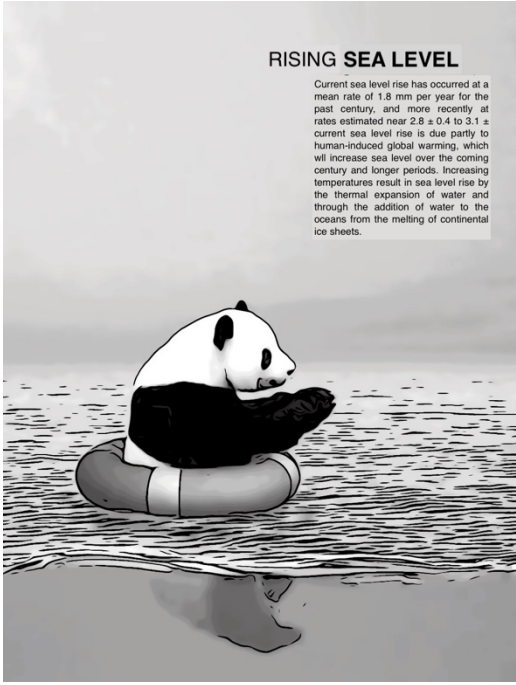
Table 8 Demographic information of participants in Study 1

Variable	Mean	Value	Frequency	Percentage
Age		Under 25 y.o	107	82%
		25-30 y.o	18	14%
		Over 30 y.o	5	4%
Gender		Male	87	67%
		Female	43	33%
Daily mobile use		Less than 1 hour	3	2.3
		1 – 3 hours	32	24.6
		3 – 5 hours	46	35.4
		5 – 7 hours	25	19.2
		More than 7 hours	24	18.5

1.2.2. Experimental Procedures

We selected a real climate change ad from WWF to create the two conditions: abstract and concrete. The formation of abstract/concrete perceptual materials has been identified and verified in prior experiments (e.g., Burgoon et al., 2013; Duan et al. 2019; McCrea et al., 2012). For instance, Lee et al. (2014) suggested that colorful images should be used in

concrete condition because they are perceived more concretely than the black and white version. Other factors include using different people-related themes (Duan et al., 2017) or adjusting image's level of details (McCrea et al., 2012). This demonstrates the high complexity of determining the construal levels of visual materials. As a preventive measure against possible misinterpretation of the construal levels as abstract or concrete against our intention due to unexpected elements, ads containing people or cause/consequence focus were not considered as test materials. We only manipulate the color and the level of details of the ad to create two conditions, following previous examples of McCrea et al. (2012) and Duan et al. (2019). The two versions of the modified climate change ad were pre-tested using a small sample of 80 MTurk respondents using BIF scale for construal level perception (Vallacher & Wegner, 1989). Our independent t-test indicates that there is significant difference between the two versions in terms of construal levels ($p < 0.05$).

Table 9 Experimental Stimulus for Study 1	
Black and White (Abstract) Condition	Color (Concrete) Condition

1.2.3. Analysis

The hypothesized moderated mediation model was tested using the bootstrapping analysis PROCESS to examine the significance of the indirect effect from Attachment to Mobile to Credibility of message via perceived Psychological Distance at different levels of the moderators (Hayes, 2013). We used PROCESS model 7 at 95% confident interval and 5000 bootstrapping samples. Attachment to Mobile was introduced as a predictor variable. Credibility of the message was inserted as the dependent variable. The dichotomous variable for the type of Ad exposed was the moderator. As for Psychological Distance, it was placed into the Mediator role. We ran each dimension at a time and reported the results separately. We found no need to run all three dimensions together as three mediators because psychological distance dimensions correlate with each other symmetrically in the general context as well as for climate change context (Zhang and Wang, 2009; Spence et al., 2012).

1.3. Findings

1.3.1. Scale Reliability

Our Alpha Cronbach results indicate good validity across all of our measurements. The Alpha values for CE and Attachment to Mobile are 0.928 and 0.912, respectively, all higher than the recommended threshold of 0.7 (Hair et al., 2001).

While higher Alpha values implies better internal consistency, value higher than 0.9 can have diminishing return (Osborne and Banjanovic, 2016). Therefore, further verification was performed using EFA (Exploratory Factor Analysis) with Varimax rotation to ensure the items converged in their respective measurement. This allows us to interpret whether our participants understand the questions. Interestingly, all three reverse coded items do not converge in the Attachment measurement. The most plausible explanation is that these

questions might cause certain confusion and thus are interpreted differently than the rest of the items. We proceed to remove the three items (Attach_12, Attach_14, and Attach_15) to retain a better internal consistency of the measurement. Our Alpha value for the modified measurement of Attachment is 0.940, satisfying the required level.

1.3.2. Manipulation check

We compares the mean value from BIF scale for construal level perception (Vallacher & Wegner, 1989) by running the independent t-test. Our result indicates a p-value of 0.02. This suggests a significant difference between the two versions in terms of construal levels. Our manipulation on the ad's construal levels seems to function as intended.

1.3.3. Hypothesis Tests

We first test the hypothesis 1a (Having a higher level of Attachment to Mobile would lead to a higher level of CE) by running univariate linear regression with CE being the dependent variable and Attachment to Mobile being the independent variable. The result indicates an unstandardized coefficient of 0.485 and p-value smaller than 0.001. In other words, the more the participants attach to their mobile, the more likely they will interact with the ads shown on their mobile. Hypothesis 1a is supported.

We test the H1b, which hypothesizes the reaction of higher attachment to mobile consumers when exposed to concrete ad, using PROCESS Macro's Model 1 by Hayes (2013). More specifically, we proposed the moderating effect of AdType on the impact of Attachment to Mobile on CE. The macro program was run on SPSS. The output indicates a significant impact of AdType x Attachment to Mobile interaction on CE (p = 0.0288). This confirms the moderation role of Adtype. Looking at the conditional effects of the focal predictor at values of the moderator, we observe that Attachment to Mobile has a positive significant influence on CE only in Black and White condition (effect. = 0.7, p < 0.01, CI95

= [0.41; 1.0]). In other words, the more attached to mobile, the higher the intention of our participants to engage to the content on their mobile. However, this effect is only true to those exposed to Black and White version of the ad. While the moderating effect is suggested from the analysis, Hypothesis 1b is unfortunately not supported.

1.4.   Discussion

Our result indicates that the level of attachment to the mobile does have an impact on how consumers behave on their mobile. The more attached to the mobile, the more likely consumers would engage with the featured advertisement. These engagement behaviors include like, share, and/or comment. More precisely, participants with higher level of attachment to their mobile show higher level intention to interact with the black and white ads and the others. While this moderation effect is expected, our predictions of higher attachment consumers engaging more with concrete ads was not validated. Our results seem to contradict those of Spence et al. (2012), who propose that portraying climate advertisement concretely should induce more positive reaction from the consumers. Given that previous studies from Melumah & Meyer (2021) or Kolsaker & Drakatos (2009), found that attached to mobile consumers' behaviors on their mobile tend to be more open, our results suggest the existence of hidden variables, potentially psychological distance, as Spence et al. (2012) suggested. However, our data does not allow us to examine such possibility because we do not include psychological distance measurement. Moreover, there are chances that the respondents being influenced differently by the elements in the ads. CLT research has indicated that there are differences in terms of effect between images and textual elements in opposite directions. There might be conflicting elements with opposing effect. Therefore. It might be beneficial to investigate further into the mechanism itself.

Further limitation may lie in the fact that the measurement of engagement only indicates the intention to act and not the behavior. While intention is a very good indicator of actual

behavior, the environment surrounding the consumers is remarkably different between in the field and in a controlled experiment due to potential interfering factors. Therefore, it is beneficial to test our prediction in the field to see whether the observed phenomenon is strong enough against external influence.

1.5. Conclusion

The initial results from Study 1 suggests that attached to mobile consumers would be more likely to interact with the ad shown on their mobile. This behavior seems to only occur when consumers are exposed to black and white content, which is often perceived as more abstract and from a further psychological distance. Despite the obvious limitations, this establishes a strong ground for us to continue to probe into the mechanism of the phenomenon to verify our predictions. Study 2 addresses these limits and expands the findings of the Study 1.

2. Study 2 – The Role Of Psychological Distance and Credibility

2.1. Overview

The initial results from Study 1 clearly demonstrate a difference in the level of consumer engagement (CE) when attached to mobile participants are exposed to different ad types. Study 2 expands the finding of Study 1 and tests our prediction of its mechanism, which is through Attachment to Mobile's impact on perceived distance and credibility. While Attachment to Mobile literature mostly addresses the separation from the mobile (e.g., Konok et al., 2017), there are evidents suggesting attachment effect when using the device (Kolsaker et al, 2009; Melubah and Pham, 2020). In Study 2, our objectives are two folds: to adopt the measurements of psychological distance and credible, and to test the proposed mechanism. Thus, we only focus on examining the impact of Attachment to Mobile on psychological distance. We also compared the perceived credibility of concrete vs. abstract ad for consumers attached to mobile using their own mobile. And as Study 1 has suggested, such effect should be moderated by the Type of Ads that the participants were exposed to. Three hypotheses are tested:

H2a: Participants with higher level of Attachment to Mobile would perceive the ad at longer psychological distance.

H2b: The further the perceived psychological distance, the more credible the abstract ad would be perceived.

H2c: Matching psychological distance and construal level would lead to a higher level of Credibility.
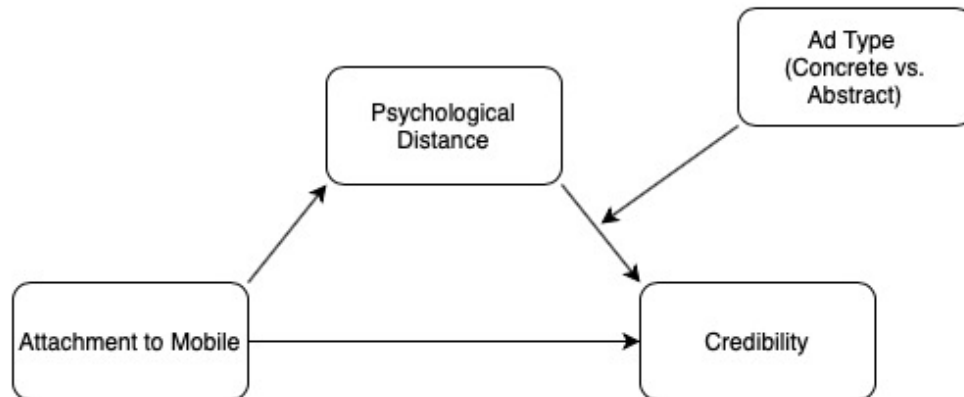
Figure 6 Proposed mechanism of Attachment to Mobile impact through Psychological Distance – Study 2

2.2. Methodology

2.2.1. Participants

We recruited respondents from Prolific to participate in the study. Because the delay between Study 1 and Study 2 was one week, it was preferable to use another respondent pool to avoid having the same participants as the first study. This is especially important since the two studies utilize a fair number of common items. The participants voluntarily took part in the study for monetary reward. Because online survey can encounter fraud responses and Prolific did not automatically vet participants, we used a combination of the platform's behavioral filters and self-report measurements to recruit respondents. For the filters, the setting was set for participants using a mobile multiple time a day and residing in the US or UK. These respondents were then screened for fraud and attention using location, IP, total finishing time, and attention check questions. Responses, which did not have matching filter values, had finishing time three times the standard deviations under the mean, and failed the attention check, were removed.

In all, we collected 138 valid responses, 78 out of which scored high in Attachment to Mobile and 60 scored low in Attachment to Mobile. The sample included 26.1% males and had an average age of 27.3 years old. A large portion of participants held a college degree or higher (39.1%), while the rest had completed high school or had no formal education. All participants owned a smartphone as it was the initial condition to access the study. In general, they used mobile frequently during the day, with only 4.3% spent less than 1 hour a day on mobile. 82.7% of participants were on their mobile from more than one to less than seven hours per day. And 18 participants or 13% were heavy users who spent more than 7 hours daily on their mobile. Naturally, these participants had a long history with mobile usage. More than half of them (60.9%) had been using mobile/smartphones for more than seven years.

Table 10 Demographic information of participants in Study 4

Variable	Mean	Value	Frequency	Percentage
Age	27.4	Under 25 y.o	78	56.5%
		Over 25 y.o	60	43.5%
Gender		Male	36	26.1%
		Female	102	73.9%
Education		No degree	6	4.3%
		Highschool	78	56.5%
		College and higher	54	39.2%
Daily mobile use		Less than 1 hour	10	5.4%
		1 – 3 hours	57	31%
		3 – 5 hours	61	33.2%
		5 – 7 hours	27	14.7%
		More than 7 hours	29	15.8%
Mobile Ownership		3 – 5 years	21	15.2%
		5 – 7 years	33	23.9%
		More than 7 years	84	60.9%

2.2.2. Experimental Design

We constructed a new promotional message based on an original advertisement message that was taken from Euro Tech Maritime's Official Facebook Page with consent. We knew that the level of abstraction in the imagery part of the original advertising also played a role in evoking high-level construal in respondents' mind (Trope and Liberman, 2010; Duan et al., 2017). For instance, colorful images were found to be more concrete than black and white images (Lee et al., 2014) or that images containing abstract features were of higher construal level (Trope and Liberman, 2010). Worse, abstract, or concrete visuals could influence how psychological distance is perceived (Duan et al., 2019). To avoid the influence of the imagery elements in the original advertising, we only kept the texts as our stimuli. Aside from the original message "*Let's conserve before it melts*," we added one more line to form the two conditions: high construal/abstract message "*2019 was the second warmest year on record*" and low construal/concrete message "*2019's average temperature increased 11 degrees Celsius*". The extra text was verified information of 2019's climate and was used in several advertisements. Because the "2019" was an indicator of time, we expected participants to be influenced in their perception of Temporal Distance the most.

2.2.3. Pretest

We conducted a pretest with a small sample (n = 84, 59.5% male) using BIF questionnaire (Vallacher and Webner, 1987) to confirm whether these messages successfully manipulate the respondents' construal level. The independent sample t-test indicated that participants exposed to the concrete message (n = 43, M = 14.95) scored lower in BIF than those exposed to the abstract message (n = 41, M = 17.26). This difference was statistically significant (p=0.046). This meant that the concrete message did evoke a lower level of construal and the abstract message evoked a higher level of construal. Therefore, the manipulation was successful.

2.2.4. Experimental Procedures

Participants, who indicated their consent to have their device's embedded data collected, were guided into the survey. An equal number of participants were exposed to either of the conditions (high construal vs. low construal). Based on the pretest, we enforced a minimum reading time of 10 seconds to make sure no one skipped the ad and to avoid non-exposure caused due to network problems. After seeing the ad, all participants were guided to the questionnaire. In the end, the survey platform automatically directed participants back to Prolific and recorded the session. The whole test lasted on average 7 minutes.

2.2.5. Analysis

The hypothesized moderated mediation model was tested using the bootstrapping analysis PROCESS to examine the significance of the indirect effect from Attachment to Mobile to Credibility of message via perceived Psychological Distance at different levels of the moderators (Hayes, 2013). We used model 7 of the PROCESS macro in SPSS version 24 at 95% confident interval and 5000 bootstrapping samples. Attachment to Mobile was introduced as a predictor variable. Credibility of the message was inserted as the dependent variable. The dichotomous variable for the type of Ad exposed was the moderator. As for Psychological Distance, it was placed into the Mediator role. We ran each dimension at a time and reported the results separately. We found no need to run all dimensions together as separate mediators because psychological distance dimensions correlate with each other symmetrically in the general context as well as for climate change context (Zhang and Wang, 2009; Spence et al., 2012). Furthermore, because the affected Psychological Distance dimension depends on the stimuli being exposed (Trope and Liberman, 2010), it was more beneficial to examine each dimension separately to unveil the impact of consumers perception.

2.3. Findings

2.3.1. Reliability Check

We began by checking the internal consistency of the adapted measurement scale. The validated scale should have an Alpha Cronbach value higher than 0.7, as recommended by Hair et al. (2001). In the case of non-qualified, the common practice was to remove one or several items to reach the desired Alpha Cronbach value. For Psychological distance scales, Spatial dimension and Hypothetical dimension scored an Alpha Cronbach of 0.790 and 0.832, respectively. Social dimension scored 0.696, under the indicated 0.7 thresholds. Per common practice, we removed one item (Socio_4) and achieved a satisfactory Alpha value of 0.768. On the other hand, Temporal scale's Alpha Cronbach value was 0.684, a bit under the thresholds of 0.7. Removing items did not improve the score significantly, reaching only 0.693. This suggested the possibly of many participants might have trouble understanding the questions. Still, we decided to keep the measurement in the analysis.

The Attachment to Mobile Questionnaire (Konok et al., 2017) scored an overall Alpha Cronbach of 0.919, which was excellent. Breaking it down into four sub-constructs (SH, SA, SI, SB), their Alpha Cronbach values were 0.725, 0.765, 0.868, and 0.788, respective. It was important to note that these four values were achieved by removing the reverse coded items as in the Study 1. Our results showed that the internal consistency of the Attachment to Mobile Questionnaire was very consistent across our different samples and materials. Finally, for Credibility, we had an Alpha Cronbach value of 0.805. This was satisfactory.

2.3.2. Hypothesis Testing

To test hypothesis 2a, which proposed that participants feeling more attached to their mobile would be more likely to perceive mobile ad at a longer psychological distance, we ran a linear regression with Attachment to Mobile as the predictor and Temporal

Psychological Distance as the dependent variable. The results indicated a p-value of 0.003 and Beta = -0.169. This suggested that the more consumers felt attached to the mobile, the further they perceived the psychological distance between them and climate change. Hypothesis 2a is supported. However, we failed to achieve the same results with other psychological distance dimension. All regression returned in p-value larger than 0.1. It seemed that Attachment to Mobile only had a direct impact on Temporal Distance.

Before examining the moderating effect proposed in H2b, a control was made to compare the perceived credibility between two conditions. ANOVA test showed that there was no significant difference in terms of credibility between the two ads (SE difference = 0.1634, p = 0.458). To test hypothesis 2b, we ran a multi-level linear regression to test the moderation effect of Adtype (high construal ad vs. low construal ad) on the relationship between psychological distance and credibility. A dummy variable was created for the interaction terms AdType x Psychological Distance. Credibility was inserted as dependent variable. Psychological Distance, AdType were put in as independent variable in Level 1. And the dummy variable was put in Level 2. The test returned a Sig. F-Change between model 1 and model 2 at p-value = 0.07 (see annex for detailed output). Our plotting diagram indicated that the further the distance, the less credible the black and white (abstract – low level) ad was perceived. While the test only achieved a p-value under 0.1, we would argue that a 90% confident interval was reasonable for online experiment conducted using participants' own devices. The variation between each participant's mobile (such as screen size, form, etc…) could influence somewhat the way they perceived information, but using their own mobile was essential to examine personal phenomenon such as attachment to mobile. More over, the hypothesis proposed further perceived psychological distance would lead to the abstract ad being perceived as more credible. Hypothesis 2b was not supported due to its wordings, but we did have the moderation effect suggested.

In order to test the congruency proposed in H2c, we needed to examine the total effect of moderating effect of Ad Type and the mediating effect of Psychological Distance. We

examined the whole model by running the test of conditional indirect effects by using PROCESS macro model number 14 (Hayes, 2014). Attachment to Mobile was put as predictor, Credibility as dependent variable, Psychological Distance as mediator, and AD Type as moderator. In general, we had consistent results with the previous tests, with Attachment to Mobile having a direct impact on Temporal distance (coeff = -0.1693; p-value = 0.0032). This indicated that the more attached to the mobile, the more likely the consumers perceive the content at a further temporal distance. On the other hand, Adtype moderates the relationship between Temporal distance and credibility: interaction terns Tempo x AdType has R2change = 0.046, p-value = 0.007. This was only significant with Abstract content (effect = -0.7, p-value = 0.0000). Thus, the further the climate change appears in terms of temporal distance, the less credible the ads were perceived.

The Total effect of Attachment to Mobile through temporal distance and ad type on credibility was significant, but not in the way we expected. We observed the significant result with Temporal Distance, at 95% level of confident (Index of moderated mediation's CI95 = [-0.2324; -0.0101]. Though, Attachment to Mobile only has an indirect impact on credibility through Temporal Distance when they are exposed to black and white version. (Effect = -0.1256; CI95 = [-2327; -0.0408]). This meant the more attached to mobile the consumers were, the more they were likely to perceive the ad at a nearer distance. Construct the content as abstract seemed to make it less credible than it should be. Our Hypothesis 2c is not supported. As for other psychological distance dimensions, we failed to get a significant result. There were significant direct effects from Attachment to Credibility, as similarly indicated in our previous regression tests, but the psychological distance and ad type had no mediated moderation role.

2.4. Discussion

Our results verified our proposed mechanism through which Attachment to Mobile asserted its influence on consumers' perception. The increase in the level of Attachment to

Mobile did lead to a change in perceived psychological distance. Both mediated moderation and regression analysis showed a very robust impact of Attachment to Mobile. Our results fit well with the notion of consumers perceiving things at further psychological distance on mobile (Barque-Durant et al., 2017) and attachment influence our perception (Kolsaker et al., 2009). However, our findings of negative credibility suggest a very interesting question regarding the consumers' tendency to share their information on mobile in past studies (e.g., Melumad and Meyer, 2021; Vincent, 2006). The credibility of the information being shared may not be considered for these acts, especially when attached to mobile consumers derived emotional supports from their mobile, either to regulate negative emotions (Hoffner and Lee, 2015) or to calm their stress (Melumad and Pham, 2020). Just as how Konok et al. (2017)'s participants display a much lower anxiety when their mobile remains in their view. We did not find any impact of Attachment to Mobile on Psychological Distance in the other three dimensions (Hypothetical, Spatial, and Social as well as on Credibility). We assumed that the reason lied in the employed message having an explicit time cue: "2019" and eventually the temporal dimension is evidently the most perceived here. The combination of text and image in Study 1 might influence how participants look at climate change since they have a distinct level of construal (Duan et al., 2017). So, the lack of image could enhance the perception of a single dimension and lessen the others.

As predicted, higher Attachment to Mobile causes the participants to perceive the message at further distance. However, we observed a negative impact of Psychological Distance on Credibility, which indicated a lower credibility as the abstract message is perceived at further psychological distance. It questions the credibility principles suggested in the literature, when matching distance was supposed to increase the message's persuasion power (e.g., Kim et al., 2019; Choi et al., 2019). There could be a hidden moderator or mediator that enables the congruency effect. Our findings discourage the use of abstract message on mobile to promote climate change, similar to Barts et al (2014)'s suggestion of using concrete description of products for advertising and Spence et al. (2012)'s

suggestion to making climate change more relevant to incite positive reactions. Further interpretation of test outputs reveals rather surprising observation. The plotting of our linear regression (see Annex) shows that the further abstract climate change ad is perceived temporally, the lower its credibility. No effect on concrete ad was observed. There are several possible explanations. Firstly, our 10-second enforced exposure could be too long for many participants. With the stimuli being a dozen of words long, our participants could have spent more attention than usual, processing them centrally (Petty & Cacioppo, 1986). The consequent is the loss of influence from psychological distance and construal perception, which usually occurs unconsciously. Another possible explanation lies in our measurement of Temporal Distance. Its Alpha Cronbach was slightly under 0.7, which indicates that the participants have trouble understanding our items or our concrete stimuli. The concrete ad was a modified version of the original one, which is abstract in nature. The phrasing may be too different from the real one and confuse the participants, even when our pre-test confirms a significant difference in terms of perceived construal level. Lastly, participants in online experiments in their own place could encounter disturbing elements that were not visible in the survey results. Because attachment to mobile's effect is suggested to be quite faint (e.g., Kolsacker & Drakatos, 2009), outside disturbance might nullify its manifested phenomena.

Study 2 was not without limitations. Our biggest concern is the low Alpha Cronbach value of Temporal Distance measurement. As mentioned before, since the time mentioned in the ad preceded that of the actual date during the data collection period, it could explain the inconsistency of the participants when it comes to interpreting temporal distance. The other dimensions scored a very satisfactory Alpha Cronbach, as in their original study (Spence et al., 2012). Moreover, while it scored just below the suggested reliability value of 0.7 (Hair et al., 2001), it does not imply a disqualification of such measurement. But this needed to be addressed in the follow-up studies. Secondly, it is important to note that the moderated mediation effect seems to quite faint (index = -0.09), albeit being statistically significant. So, the impact of Attachment to Mobile could have limited impact in

persuasion in practice, just like previous studies have suggested. Other limitation lied in the fact that we relied on self-reported measurements, some of which were lengthy and required a large matrix to input. Mobile, in general, had a limited screen size. Reading a large body of text might prove bothersome for certain participants. This could explain the large number of participants failing the attention check placing near the end of the questionnaire. Moreover, our participants were recruited from the Internet and used different mobile devices with different screen sizes, resolutions, and interfaces. We could not hold the constant many visual elements on the screen, many of which could potentially affect the outcome. But since the participants were randomly chosen and randomly attributed to conditions, these environmental noises should be distributed equally across the sample. And lastly, Prolific participants joined the study to earn money, so they tend to maximize their effort/time spent. Many participants could have glanced over questions and did not spend enough thought before giving their answers.

2.5.   Conclusion

Overall, Study 2 successfully proved the indirect effect of attachment to mobile on perceived credibility through psychological distance. The statistically significant results lend support to continue testing the proposed theoretical model in the next study. However, our predictions were only partly confirmed since the increase in the level of Attachment to Mobile did not translate into the desired level of Credibility. In our case, targeting prominent mobile users using abstract message could backfire on their communication effort because it would lead to a lower level of credibility of the advertisement. This work contributes to the ongoing discussions regarding the difficulty of manipulating consumers' engagement to climate change (e.g., Wang et al., 2019; Shuldt et al., 2018). Further studies are needed to understand how attached to mobile consumers react to mobile advertising.

3. Study 3 – Total Effect

3.1. Overview

In study 3, the goal was to test the proposed mechanism by which the participants' level of Attachment to Mobile influence their tendency to engage with the advertised content through their perception of psychological distance and credibility of the advertisement. Specifically, we tested whether different levels of Attachment to Mobile would have different effect on customer engagement between exposure to either concrete or abstract ad. The proposed psychological distance of CLT serves as the basis to explain the observed phenomenon. Moreover, we addressed the shortcomings of the previous studies and probe for explanation. Study 3 was also the testbed for a follow-up field test using Facebook Advertising. Therefore, we tried to adapt the experimental materials to resemble the one on Facebook. Two hypotheses were tested:

H3a: Participants who perceived the ad as more credible will express a higher tendency to engage with the ad.

H3b: There is a significant indirect effect from Attachment to Mobile to CE via Psychological Distance and Credibility.
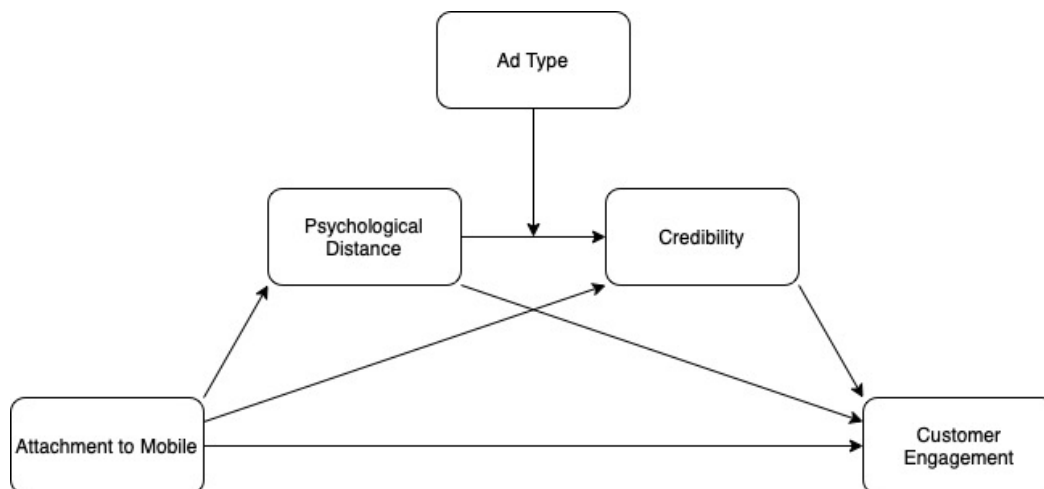

Figure 7 Total Model

3.2. Methodology

3.2.1. Participants

We recruited more than 500 participants from MTurks, the largest online respondent pool in the world. The reason to switch to Mturks from Prolifics was to have access to a more diversified population. Previous research on MTurks repsondents have pointed out that the onine repsondents' characteristics of this plaforms had close resemblance to those of the actual online consumer population (Paolacci, Chandler and Ipeirotis, 2010). We also found that Mturks provide a more useful filter to select participants whose primary device was mobile, and in category of device. This would lessen the load on our additional filter to remove participants using desktop to answer the surveys.

In all, we collected 424 valid responses. Our participants are, on average, 35 years old. Only a fraction of them is under 25 years old. And the majority are in the 30-40 age bracket. Likewise, we have few student participants. Only 37 of them, or 8.7 percent, reported as such. An overwhelming majority of 76.4 percent were in working positions. We also have a quite balance gender distribution, with 40 percent of the sample being female and 59.2 percent being male.

Table 11 Demographic information of participants in Study 4

Variable	Mean	Value	Frequency	Percentage
Age	35	Under 25 y.o	42	3.1
		Over 25 y.o	382	96.9
Gender		Male	251	59.2
		Female	173	40.8
Occupation		Student	37	8.7
		Salary Person	324	76.4
		Other	63	14.9

3.2.2. Experimental Design

From our experience with the two previous studies, we decided to employ a real piece of advertising on Facebook. It was a "sponsored" Facebook post (an advertisement under disguised as a user-generated content) from World Meteorological Organization page, featuring a message and a shortened content. A "see more" button was inserted at the end of the text to invite its audience to click to see and to interact with the content. In short, this is a very standard content that we can find easily on Facebook. Following the same principle, we constructed two versions of the same material: abstract condition, whose colors were removed, and concrete condition, which is the original content. Everything was identical between the two versions, except for the color. This was to ensure a minimum interference from unexpected factors. Each participant had to go through the declaration of intent and agreed to take part in the experiment using their mobile. Additional device filter was placed to eliminate participants who still proceed using a non-mobile device. Furthermore, we employed several reverse-coded items and attention check to detect low quality responses. All responses scoring the same pattern across the survey or failing all our attention checks were then eliminated.

We pre-tested the two materials with a sample of 80 participants from Skema Business School in Lille. Each half of the participants were exposed to a different version of the advertisement and then answered a short survey. We then measured their construal level using BIF scale (Vallacher and Webner; 1987). We compared the results by running a simple independent sample t-test to confirm a significant difference between the perceived construal level of the two advertisements. The output indicated a two-tail p-value under 0.05, which suggested the manipulation of construal level by changing the color was a success.

Figure 8 Stimulus of Study 3

3.3. Findings

3.3.1. Reliability Check

In general, most measurement scored a very satisfactory Alpha Cronbach value that surpassed the suggested 0.7 thresholds level (Hair et al., 2001). Attachment to Mobile had an Alpha value of 0.929. CE got 0.945 and Credibility got 0.769. As for Psychological Distance, we had good results with most dimensions following the adaption from previous studies. Social Distance dimension had the Alpha value of 0.874, with three items as adapted from the previous studies. Hypothetical Distance scored 0.711, and Temporal scored 0.850. A slight issue was raised with Spatial Distance when its Alpha Cronbach only reached 0.573. We proceed to remove the reversed coded items (Geo_3 and Geo_4) to reach a satisfactory 0.793.

A follow-up rotated factorial analysis did indicated that the four dimensions of Psychological Distance did not converge with all the items but excluded the reverse coded items. Removing these items did improve the outcome and the four dimensions converged into four components, albeit having under 0.6 loading scores, and some items loaded higher

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in other dimensions than in their own supposed one. Because Psychological Distance's dimensions were proven to be interact with each other, this was expected.

Overall, as with our previous findings in the previous studies, the reverse code items kept causing inconsistency in these measurements. It is very worth noting since the original study of these items reported a very satisfactory level of consistency. This will be discussed later along with its implication for the results.

3.3.2. Manipulation Check

We verified our manipulation of construal level in the advertisement by compare the scores of BIF (Vallacher and Webner, 1987) (28 items) by running an independent t-test. The test returns a Levene Test's p-value of 0.234 and a 2 tailed t-test at 0.052, under 0.01. Thus, there is a significant different between the perceived construal level of the two advertising. Noted that the significant is only at 90% confident level, signaling a somewhat weaker significant when compared to our pre-test result. Our participants scored on average 16.1 for the BIF scored when they were exposed to the black and white version; and 15.1 for the color version. This suggested that the black and white version is perceived at higher construal level, fitting the literature.

3.3.3. Hypothesis Testing

We test our hypotheses by using the PROCESS model 91 (Hayes, 2018). This test is run on SPSS software. Attachment to Mobile was put as predictor, CE as dependent variable, Ad Type as moderator, Psychological Distance as mediator 1 and Credibility as mediator 2. We examined the PROCESS model 91's outputs regarding the indirect effect from Attachment to Mobile to CE via one moderator and two mediators as well as the direct effects in each path. Looking at the direct patch from Credibility to CE, we observed a significant direct effect at coeff = 0.7758 and p-value <0.00001. This suggested that the

higher credible advertisement would induce higher level of customer engagement, prompting the participants to interact with the content. Therefore, Hypothesis 3a is confirmed.

Our results showed that the index for mediated moderation effect at Index = 0.0207, CI90 = [0.0002; 0.0452]. The bootstrap confident interval at 90% confident level did not cross 0, thus the effect was significant at 90 percent confident level. In other words, this event implies that the indirect effect from Attachment to Mobile to CE would not relate linearly with the moderator (Hayes, 2018). Therefore, we say that the double mediation effect of Psychological Distance and Credibility was moderated by Ad Type. This suggested that the higher credible advertisement would induce higher level of customer engagement through increasing the perceived psychological distance and perceived credibility, prompting the participants to interact with the content. However, we recorded only a significant mediated moderation for Spatial distance. There was no significant effect for other dimensions. For example, our moderated mediation effect with Social dimension as mediator 1 only had CI90 = [-0.0032; 0.0397]. There was a zero within the range of CI90, thus the effect was not significant. It was important to note that the lower bound of our CI90 was very close to 0. This might suggest a possible significant at lower confident level. In any case, Hypothesis 3b was confirmed.

Because the Index of Moderated mediation was statistically significant, we probe the conditional effects of the indirect effect of Attachment to Mobile on CE. Examining the results further revealed that the moderated mediation effect was negative and significant for both types of advertisement, Color version (Effect = -0.0383, CI90 = [-0.063; -0.0156]), and Black and White version (Effect = -0.176, CI90 = [-0.0354; -0.0031]). The test indicated a negative indirect effect of Attachment to Mobile to CE. This is against our original prediction.

We observed a significant interaction of Psychological Distance x Ad Type on Credibility (R-square = 0.0065, p = 0.0796). The conditional effects of the focal predictor at values of the moderators indicated that both conditions showed a significant impact of Psychological Distance on Credibility, with Color condition having a stronger effect than the BW: Color (effect = -0.2252, CI90 [-0.3075; -0.1429]) and BW (effect = -0.1035, CI90 [-0.1838; -0.0231]). In other words, the higher the attachment, the lower the credibility of the ad, the impact is stronger in color condition. Participants highly attached to their mobile, who exposed to the color advertisement would find it less credible, and thus less likely to interact with it. This effect is weaker, albeit still statistically significant, with black and white ad.

In short, our observation still indicates a detrimental outcome of climate change advertisement among the highly attached to mobile participants. Attempting to describe climate change further psychologically would cause highly attached to mobile individuals to interact less with climate change advertisement. This is associated with a further perceived distance to the climate change and lower perceived credibility of such advertisement. By constructing the advertisement more abstractly, this negative impact could be lessened, though not inverted. Our participants were more likely to interact more, because they see the climate change as nearer to them, psychologically and they found the advertisement more credible.

3.4.   Discussion

Our findings validated the proposed mechanism. We did predict a significant moderated mediation effect of Attachment to Mobile to CE through two mediators, Psychological Distance and Credibility, and one moderator, Ad Type. The mechanism was statistically significant at 90% confident interval level. Even though this is lower than the 95% level often employed in a majority of other studies administering PROCESS module, the choice of using the 90% confident level reflected a higher error margin (Hair et al., 2009) and

therefore, did not invalidate the said mechanism. We would argue that a lower confident level was acceptable for mobile-related studies, especially those not enforcing a strict control of the environment surrounding the participants. In fact, the environment surrounding the mobile were often distracting in nature, such as in the crown (Andrews et al., 2015) or next to a TV (Garaus et al., 2017). This distraction went deeper into the usage context of the consumers on mobile as well, since mobile advertising was often embedded in other content within an application or a Website (Grewal et al., 2016). Therefore, having interfering environmental factors should be considered as the nature of the device, not as a limiting factor.

A strict controlled environment of the survey takers would arguably result in an over saturated effect or non-validated in the fields, just as how Shankar and Balasubramanian (2009)'s prediction of an effective peripherical persuasion was invalidated in Bart et al. (2014)'s field work due to the fact that the said mechanism failed to activate in the noisy environment of the mobile. Thus, effect validated in an artificially administrated environment should have a higher change of being non-observable in the field. In our case, we do not have control over the test environment of the participants, due to our choice of online recruitment. This choice was deliberate as it had the advance of having the participants to interact with the content in their natural environment, which would test the proposed mechanism's robustness and gave a more accurate prediction in the field. Our significant result indicate that we should have a similar outcome in the field test, which was one of Study 4's primary objectives.

Regarding the total effect, our results corresponded with our findings in previous Study 2. We found the similar detrimental effect of Attachment to Mobile to the Credibility of the Ad. The more attached to the mobile, the more likely the participants perceived climate change as further, and this make the advertisement appeared less credible. Study 3 extends these findings by connecting credibility with CE, therefore completing the predicting mechanism of how consumers would react when exposed to differently constructed

advertisement. While this is against our original prediction, this finding is more in line with what Spence et al. (2012)'s suggestion, whereas posturing climate change at closer distance would facilitate environmentally friendly behavior. We further their findings by pointing out that a further psychological distance to climate change could improve the perceived credibility of climate-related advertising.

As for the effectiveness of mobile advertising, our study did not agree with the findings of Melumad and Pham (2020) regarding the persuasion of consumers on mobile. Unlike their result, we found that highly attached to mobile consumers are actually harder to convince, as evidence by the overall negative impact of Attachment to Mobile on CE. In other words, attempts to persuade and engage consumers on mobile would be more effective only if the consumers scored lower in Attachment to Mobile. One way to get around this detrimental effect is to reconstruct the advertisement to be more abstract thanks to a congruency between the perceived psychological distance and the construal level (Sungur et al., 2016). A possible explanation could be that the participants actually spend more time looking at the black and white advertisement, thus trusting this content more (Darley and Smith, 2003). But a quick comparison of exposure time between the two Ad Type did not result in a significant t-test (p-value > 0.1). The participants did not spend more time on one type and the other. Other reason could be the context of these message. Our studies were the first one utilized Climate change context to test the Attachment to Mobile effect. Other related studies adopted a more generic approach toward the content, such as SMS message (Kolsaker and Drakatos, 2009). A lower credibility could be also related to a larger distrust towards social network sites (Kelly et al., 2010) as we explicitly utilized a Facebook format.

The context effect of climate change could have a deeper implication to the effectiveness of the related advertisement. We know that the effective persuasion phenomenon found in the previous studies was attributed to emotional factors, such as concern (Spence et al., 2012) or pleasure (Melumad and Pham, 2020). So hypothetically, these elements could

have influenced the perceived credibility of the advertisement. However, probing into the data showed the average score of credibility in both types of advertisements being higher than the median. This indicated that the advertisement was quite trusted by the participants. Thus, it is less likely that participants' personal perception of climate change could assert an important influence over the credibility of the advertisement, though given that the test was significant at only 90% confident interval, there were rooms for external interferences. Unfortunately, we did not include any emotional or attitudinal related measurement to control this possibility. Future studies ought to consider the contextual influence of the advertising content over the audiences' perception.

3.5. Conclusion

Overall, Study 3 successfully confirmed the proposed mechanism through which Attachment to Mobile influence CE. Our analysis proved the mediation effect of Psychological Distance and Credibility as well as the moderation effect of Ad Type. The manipulation of the mobile advertisement's construal level also behaved as predicted, with the Black and White version (Abstract) performing better than the Color version (Concrete) in inciting engagement to the content. The end results, however, showed an unexpected detrimental effect of Attachment to Mobile to CE. This is derived from the lower perceived credibility caused by a further psychological distance. This surprising discover suggested many implications in communication practice in mobile, especially when the targeted audience is mobile users.

While the statistical test was only significant at 90% confident interval, this was due to a more natural environment surrounding the participants that might influence their perception. However, considering our objective was to validate the mechanism of Attachment to Mobile impact on CE as a necessary step to launch a field test, Study 3 outcome was complexly satisfactory and build the foundation for a further verification on the field.

4. Study 4 – Field Experiment

4.1. Overview

In Study 4, we attempted to replicate the results of Study 3 on the difference of high construal vs. low construal ads' effectiveness on attached to mobile's perception of credibility in a natural setting. The assumption tested in this study is that individuals having a long history of using mobile tend to interact more with concrete/low-level construal content than high-level construal ones. More specifically, we examine whether a low construal ad would perform better than a high construal ad for mobile users, as observed in Study 3. We used Facebook AB testing as the field of our study. Since FABT allows for no implementation of measurements of construct, aside from its own sets of metrics, it is essentially a black box, in which we can only examine the input and output of our proposed theoretical model. Therefore, we seek to validate a portion of the proposed model in this study.

4.2. Methodology

While Mturk experiments are somewhat comparable to traditional Laboratory tests (Paolacci et al., 2010), they shared the same disadvantage of having low ecological validity for dependent variables. Part of the problem is that these variables are not part of the metrics which indicate advertising effectiveness in modern platforms, such as Facebook or Twitter. There are also concerns of speeding and cheating during the experiments, both of which are impossible to weed off completely (Ford, 2017). Field testing using Facebook AB testing can overcome these issues by having better data quality control, operating the stimulus within consumers' natural setting, and giving actual business-validated metrics (Orazi and Johnston, 2020).

4.2.1. Experimental Design

Pretests

Several sets of images were selected and converted into black and white to test whether they successfully manipulate participants' level of construal. These images were taken from an architect firm's Facebook Page. This is also the account where we ran the AB testing. Due to the nature of the firm's product, all images feature landscaping or buildings with a high number of details in both the focal subjects and the background. Unlike Lee et al. (2014)'s stimuli, which were exposed in front of a white background, turning these images into black and white sometimes make the main subject unrecognizable from its color counterparts. We first had these images evaluated by a group of 3 architects to select the set of images that are capable of showing the subjects' features and forms in both color and black and white formats. The chosen set of images were then pretested using a Mturk sample (n = 98) and the BIF questionnaire (Vallacher and Webner, 1987). Participants were randomly assigned equally to either concrete/color or abstract/black and white conditions. The results of the independent samples t-test showed that the participants exposed to the two conditions differ significantly in terms of BIF scores ($p < 0.05$). This suggests a successful manipulation.

Embedding into FABT

A/B test requires two active ad sets or ad campaigns to initiate. We created two ad sets under a new campaign, each having only one ad image. The chosen images from Pretest were uploaded to their respective ad set. We published the campaign and instructed the system to start the A/B Test with these two ad sets. The system ran the two simultaneously and excluded double exposure. To ensure the similarity to Study 4, the targeted audience was habitants in France and have been using a mobile/smartphone for over a year and more. The ad campaign's audience was limited to mobile users, who had been using

mobile/smartphones for over one year. To avoid the possible influence of existing brand equity of the studio on the social network, Facebook users who liked the page before was excluded from the audience.
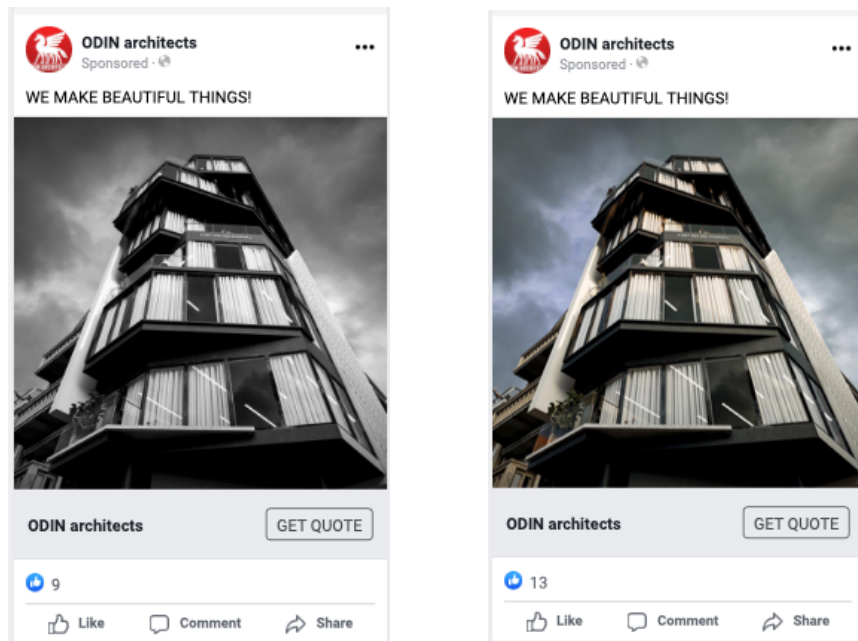
Figure 7 Stimuli – Study 4

As required by Facebook Ad, the ad campaigns had to link to an existing Facebook Page as the advertised subject. We obtained permission from an architecture studio in France to run the advertisement on their Facebook Page. The studio's product is high-value architectural renders and designs, which were sold after an elaborated negotiation with business partners. Therefore, when running advertisements on social networks, the usual approach is to generate consumers' engagement and eventually attract high-profile investors. Following the management's advice, the campaign's objective was set to generate post engagements, not to attract clicks or conversion as previously done by Orazi and Johnston (2020). The content was kept at a minimum, with a single image in the

standard Facebook frame. The call-to-action button was set as "Get Quote" as per the studio's usual practice.

Variables

The most concerning part of employing Facebook AB testing to validate our theoretical model is the lack of a comparable measurement scale with the three previous studies. In this regard, Facebook AB Testing falls behind both laboratory and Mturk and suffers from a restricted output meant only for managerial operations. However, visual, or textual manipulation is perfectly fitted for running on this platform. We resolved the lack of dependent variables' measurement scale by using proxy metrics to capture related behaviors.

Independent variables. Since there is no practical way to employ the previous measurement scales in the previous studies for attachment for mobile, we chose to target an audience with similar demographics characteristics. Study 4's sample fits the above requirements with mobile-only users. The sample consists of primarily over 25 years old individuals who have been owning their mobile for over a year and are frequent users. The targeting setting was set to focus on consumers over 23 years old, having used mobile for more than 12 months.

Dependent variables. FABT does not allow for the implementation of custom measurement scales to measure its effectiveness. Instead, the experiment was evaluated based on a set of pre-define quantifiable metrics. The number of "likes" was one of the primary metrics of performance with the higher the number, the better (De Vries et al., 2012, De Vries et al., 2014). However, "like" is not always a valid measurement of true effectiveness. The unnatural high number of likes impairs the perceived credibility (Devries, 2019). And as the number accumulates, the high number of likes itself can influence the audience's perception via the bandwagon effect (Borah and Xiao, 2018).

Another metric is Facebook's Post engagement, which measures the interaction of the audience with the ads as a result of them finding the ad relevance (Facebook, 2021). The relevance of an ad and its context was found to be positively related to credibility (Choi and Rifon, 2002). This correlation can be reinforced by the tendance of consumers to trusts computer-selected content (Sundar, 2008). In the case of FABT, the content is actually pushed towards a relevant audience if the campaigns are instructed as such (Facebook, 2021).

Data analysis

Exporting Data. Test output was downloaded from "Ad Reporting" section of Facebook Ad Manager. Per Orazi and Johnson (2020)'s recommendation, the following metrics were substracted for subsequence analysis: Reach, Impression, Frequency, Amount Spent, Post engagement. More details of the ad outputs can be found in the table below.

Table 12 Facebook A/B Testing Outputs

Condition	Gender	Impression	Reach	Engagement	Cost per engagement
BW	*Male*	3837	2892	497	0.04
	Female	1700	1383	269	0.04
	Unknown	65	49	11	0.03
Color	*Male*	3595	2760	470	0.04
	Female	1792	1412	235	0.04
	Unknown	46	32	7	0.04
Total			**9646**	**1489**	**0.04**

Analysis. Because FABT's output does not contain any raw data but only metric numbers, it is impossible to run regular statistical tests. The data provided by FABT is in aggregated level. Following Orazi and Johson (2020)'s guidance, we perform chi-square comparison on post engagement between the two experimental conditions. The black and white condition attracted 548 post engagements, while the color condition attracted 496 post engagements.

4.3. Findings

The results of the Chi-square comparison between black and white condition and color condition disconfirmed the relation between the type of ad and the number of post engagement ($\chi^2 = 4.961, p = 0.175$). When controlled for gender, we found that there is a relationship between the type of ad and post engagement for female ($\chi^2 = 4.444, p = 0.035$) and not for male ($\chi^2 = 1.333, p = 0.721$). Then, we compared the number of engagements between two conditions for female (BW = 207; Color = 191). It seems that female consumers exposed to BW image were more likely to engage with the content than those exposed to Color image. On the other hand, male consumers have the same level of interaction for both types of ads.

4.4. Discussion

The results of this study were somewhat expected. Similar to Study 3, high construal ads performed better than low construal ads on mobile. Even though we were not able to measure the psychological variables that could or could not influence this outcome, the similarity between the audience and the output of Study 3 and Study 4 gives us some degree of confidence to assume that the inner mechanism is somewhat close. In other words, because participants generally perceived subjects at a longer distance on mobile, using a high construal ad is more advantageous since psychological distance congruency between the subjects and the perceivers tends to improve persuasion (Kim et al., 2019).

Our results highlight the importance of gender in the mobile online advertising context. In this study, we only observed an impact of matching construal levels for women participants, who interacted differently to the two ad types. Gender has been suggested to have a moderator role in consumers' perception of online advertising (e.g., Shaouf et al., 2016; Swani et al., 2013). For instance, men tend to pay more attention to colorful stimuli than women, so visual advertising cues work better for male consumers than for female ones (Shaouf et al., 2016). On the other hand, female consumers may reject certain ad content that is favored by the male audience.

With the proliferation of mobile, the importance of female consumers is strongly suggested. According to Robert, Yaya, and Manolis (2014), men see a more instrumental use for mobile, whereas women utilize it as a social tool. For females, mobile is often a means to communicate rather than to do business (Sanchez-Martinez and Otero, 2009). Thus, female consumers are more dependent on mobile to retain their social relationships and are more likely to form an attachment to mobile than men (Konok et al., 2016). Even though the difference is statistically significant, the absolute difference is marginal (207 vs. 109). This is following previous studies (Vincent, 2006; Konok et al., 2017), which suggested that the impact of Attachment to Mobile on consumers' behaviors was only lukewarm at best. Nevertheless, in the noisy environment of a field test, any slight improvement counts. The reach of Facebook advertising, especially when considering our tiny budget of 60 euros, is impressive at more than 9000 people. Advertisers with enough budget might make up for the weak effect with a large number of affected people.

4.5. Conclusion

In sum, Study 4's results demonstrated that our proposed theoretical model is functional in real advertising environment although the lack of direct measurement only allows us to examine a portion of it. The high construal ad is more likely to generate more favorable

outputs than the low construal ad for the female audience. We observed a similar outcome to that of Study 3, even though the advertising subject is not climate change. Future studies should focus on integrating the existing metrics of Facebook A/B Testing to the theoretical propositions to take advantage of its high ecological validity.

Chapter 5 – General Conclusion

Chapter Overview

The principal objective of our research is to examine the impact of Attachment to Mobile on the perception of advertising credibility across different digital contexts. In this final chapter, we conclude our doctoral dissertation by discussing our results in terms of theoretical, methodological, and managerial implications. In all, we conducted five empirical studies, including one online field test and four online experiments, to examine and validate our proposed theoretical model. The results are presented and reflected in the previous studies to highlight our contributions. Our findings added to the understanding of the impact of Attachment to Mobile on the perception of advertising on mobile. They also contributed to improving the currently employed methodology to examine the mobile advertising phenomenon. We reviewed and discussed both the measurement scales and a novel venue to validate experimental laboratory results externally. Based on the results, we proposed practical implications to improve climate change-related communication effectiveness as well as general advertising. And finally, our limitations suggest a closer look into some of the measurements and concepts proposed in the studies. At the end of this chapter, we establish our research plan to further improve our dissertation and mark the beginning of our research career.

1. Theoretical Contributions

1.1. Extending The Understanding of Attachment to Mobile

As consumers increasingly rely on the mobile for their daily activities, advertisers spend more and more money to advertising on mobile (Statista, 2021). While marketing researchers have begun to examine mobile consumers behaviors (e.g., Melumad and Pham, 2021; Barts et al., 2014), our understanding of their mechanisms and implications of mobile as an advertising platform is still lacking. The existing mobile consumer studies mostly focus on the negative consequences of mobile separation outside of marketing (e.g., Konok et al., 2017; Cheever et al., 2014) with a few exceptions (e.g., Kolsacker and Drakatos, 2009; Melumad and Pham, 2021). The purpose of this research was to examine attached to mobile consumers' behaviors when they were exposed to different types of advertisement on their mobile and to provide significant insights into the process leading to these behaviors as well as to how to predict the outcome of mobile advertising.

The present research argues that attached to mobile consumers would react differently to different types of advertisement and that this effect is mediated via their perception of credibility and psychological distance to the advertisement. While the extant findings in mobile attachment literature supports the existence of an emotional relation between the mobile and its user, most studies did not explore further into how this relationship affects the subsequent behaviors. We report results from 3 controlled experiments, two of which were conducted online, that provide direct experimental evidence that attached to mobile consumers react differently to different types of advertisement and that psychological distance and credibility mediate this effect. Our results are further supported by a large-scale field experiment using Facebook Advertising platform (Study 4). Moreover, our results suggest that the right format for mobile advertising should be constructed abstractly, avoiding unnecessary details, such as black and white photo or broad description. Plus,

selecting the right advertising for mobile users can be tricky since psychological distance perception is quite sensitive and can negatively influence the credibility of the message.

We contributed to the ongoing discussion of how the mind comes to determine the distance from the subject to itself (Maglio, 2019). Within the climate change context, our results confirmed Spence et al. (2012) suggestion of presenting climate change at near psychological distance to promote environmentally friendly behaviors. We expanded their findings by pointing out that consumers reacted in such a way because they found the climate change communication to be more credible. Even though our studies suggested a negative relationship between Attachment to Mobile and Psychological Distance, it does not necessarily contradict past studies that indicated that mobile users tend to see themselves further away from the subject shown on mobile (Barque-Duran et al., 2017). In all lab experiments, mobile participants' average score of psychological distance often surpasses the median point, which lean towards the further side.

Even though previous studies such as that of Konok et al. (2016) or Kolsaker et al. (2009) suggested a weak attachment to mobile effect, our observed effect was quite robust, considering we did not employ a strictly controlled situation (Konok et al., 2017) or a strong stimulus (Melumad and Pham, 2020). Our last lab study (Study 3) showed a marginal effect of attachment to mobile, which only significant at 90% confident interval. The controlled environment did, however, produce a better effect (Study 1 and 2 with 95% CI). We suspected that the mix of different visual elements, such as the images and word combinations (Study 1, Study 3, Study 4) might interfere with the outcome because the participants have more than one thing to reflect on. This is especially important, knowing that texts and images have contradicting construal levels (Duan et al., 2017). As image is more concrete than words, participants could have "read" the climate change at a further distance but "see" it as closer to them psychologically. With dimensions of psychological distance also reacted to each other as demonstrated in both our studies and in the related literature (Bar-Anan et al., 2005; Chu and Zhang, 2014), it was inevitable that the

measurement of psychological distance to climate change would only score an average but passing reliability Alpha Cronbach. Rather than a limitation, this reflects the robustness of the Attachment to Mobile effect getting through all environmental noise.

1.2. Contribution to advertising effectiveness

Our study is the first to look at the impact of attachment to mobile on the effectiveness of advertising. The level of Attachment to Mobile did influence how likely consumers would engage to the advertising message. We challenge the findings of Kolsaker and Drakatos (2009) and Melumad and Pham (2020), by pointing out that targeting attached to mobile consumers does not necessarily lead to a better outcome. The higher level of Attachment to Mobile actually hurts the effectiveness of the advertisement, even when the average score of credibility was quite high. They were, in fact, more inclined towards a certain type of messages. Our central thesis is that the attachment they formed towards their mobile influence their perception of subject that was introduced on such device – similar to how a child see things within their usual environment.

The proposed theoretical model has been effectively demonstrated to be reliable to explain and predict mobile advertising outcome on social media. By integrating consumer engagement as the outcome, we overcome the traditional limits of utilizing intention and attitudinal variables. Even though the intention-behavior relationship has been proven over the years, it still leaves an important gap between what measurable in a controlled environment and in real consumers activities. By proving the compatibility of CE measurement with many quantifiable metrics of major advertising platforms, we bridge the above-mentioned gap and encourage future researchers to actively validate their proposed advertising effectiveness theory on a real advertising platform.

Moreover, our findings complement the current line of research studying CLT's influence consumers' intention to engage in environmentally friendly behavior. Past climate change

studies often suggest that increasing psychological distance to the phenomenon is detrimental to pro-environmental behavior and intention (e.g., Spence et al., 2012; McGraw et al., 2012 or Wang et al., 2019). For instance, Wang et al. (2019) asserted psychological closeness is the key predictor to explain consumers' support for green behaviors and policies. In other words, the closer the featured climate change appears to the message's audience, the better the results. Spence et al. (2012) arrived at the same conclusion when they considered psychological closeness had a relation with stronger intention to act because seeing climate change in a local context reduces the level of ambiguity related to the possible response. We expanded these findings by pointing out that by portraying climate as far away, the message lost its credibility and lead to negative reactions. In the situations when increased distance was inevitable, adjusting the message's presentation could help remedy this negativity to a certain level. The current dissertation's findings lend evidence to the application of CLT in explaining these possibilities, more specifically, the potential of achieving communication effectiveness from a psychological distant.

1.3.   The Exclusion of Emotion

Attachment theory and related researches strongly imply the involvement of emotion, as indicated with separation anxiety (e.g., Cheevar et al., 2014) or physiological comfort (Melumad and Pham, 2020). However, in the scope of this research, we argue that including emotion is neither relevant nor practical. Firstly, emotion is defined as the mental state arise from appraisal of thought or events, often short-lived and intense (Bagozzi et al., 1999). This is different from affect/mood, which is characterized with a mild reaction, longer duration and harder to measure/observe (Pham, 2004). Attachment theory originally describes a change in observable behaviors when the children are separated from their parents (Bowlby, 1969). Subsequent studies in mobile attachment also focus on the consumers' behaviors during physical separation from their mobile (e.g., Konok et al., 2017) or during their normal routine (e.g., Kolsaker and Drakatos, 2009). These behaviors,

such as reaching for phone (Konok et al., 2017), standing up and down more frequently (Cheevar et al., 2014) or high blood pressure (Clayton et al., 2015), are associated with increased level of anxiety and not with any particular manifested emotion. A more recent attempt to examine attached consumers when being with the mobile indicates that attachment to mobile does not change nor influent the affective state of a person bur rather "one's sense of comfort" (Meludmad and Pham, 2020). Moreover, the change in behavior is rather due to distinct characteristics of mobile usage, leading to a narrower focus on their mobile task (Melumad and Meyer, 2020; Baque-Durant et al., 2017). There is little evident suggesting the attachment feeling to mobile can be associated with a particular emotion, even though it is often dubbed as "emotional attachment" (Vincent, 2006).

For the CLT, it is important to note that CLT does not establish a concrete link between psychological distance and emotion (Trope and Liberman, 2010). Instead, this relationship is suggested in various studies, such as (Chu and Yang, 2019; Dore et al., 2015, Van Lent et al., 2017), with a certain degree of discrepancy between theoretical prediction and empirical evidence. The actual research context always adds something unexpected. For instance, the increased distance between Twitter users and adverse events have been found to have contradicting outcomes. Van Lent et al. (2017) looked at Twitter users' reaction to Ebola, a deadly disease from Africa, and observed heightened anxiety as the spread approached their geographical and social location. However, the same logic did not hold for shooting incidents, which triggered uncertainty and anxious feeling in observers from a distance (Dore et al., 2015). Chu and Yang (2019)'s studies on climate change also did not succeed in predicting the increase in the perceived social distance leading to increased anxiety and shame. Rather, they found increased emotional salient at a close psychological distance, which was contributed to the negativity associated with climate change in general. When we look at the types of negative events employed in these studies, this relationship probably depends on how consumers perceive the likelihood of being affected. Consumers have a clearer idea of where or when they would be under the influence of sanitary crisis (Van Lent et al., 2017) and climate change (Chu and Yang, 2019). On the other hand, there

is a certain level of ambiguity for where the subsequent shooting incidents (Dore et al., 2015) could occur. Thus, the manifested emotion, if any, should be directly related to the type of phenomenon used in the studies and not with the platform used to deliver such material, such as the mobile.

Furthermore, measuring emotion in experimental studies is not reliable. The use of smartphone will amplify the express of both positive and negative emotion, thus the saturation of positive emotions will make it harder to observe negative emotional affect. (Melumad and Pham, 2020). Morever, the effect of mobile attachment is actually quite small (Konok et al., 2017; Kolsacker and Drakatos, 2009). This suggests a low level of intensity, if emotion is concerned, and casts doubt into the accuracy of our measurement. The extant studies, including the correlation and experimental studies, rely on artificially saturated effect by various technic, such as forced separation (Cheevers et al., 2014) or stress induction (Melumad and Pham, 2020). It would be unlikely to observe the same outcome in a mass scale field experience. It also cast doubt on the external validity of these results, on whether their findings can be generalized in a more practical setting.

On the other hand, the current measurement of emotions is mostly done by employing self-report measurements. This method presents certain defaults, which includes missing certain emotional arousal compared to other more advanced measurement (Pozharliev et al., 2022), or being unsuited to measure consumption-related emotions (Richins, 1997). In certain case, self-report measurements are also suggested as unsuited to predict environmental-driven behaviors (Kormos and Gifford, 2014). Given the context used in the present being climate change advertisement, measuring emotion can be challenging. Moreover, emotion or affection in the case of mobile attachment is prone to outside interference. One of the critical characteristics of the emotional attachment to mobile is the dependence of consumers on mobile for contact (Vincent, 2006; Konok et al., 2016). Since our participants joined the surveys at home and with their own computer/mobile, their contact might not necessarily be cut and still remain intact. At any given time, they are free

to answer any mobile call or social network notification in another PC's window. This is a stark contrast to traditional laboratory experiments like those of Clayton et al. (2015) and Cheever et al. (2014), in which participants were confined in their own spot and had to make a request to leave. In this case, while the external validity our results is strengthened, we have no control over their personal space. As Konok et al. (2017) has mentioned, the sight of any mobile, even those belonging to other people, is sufficient to decrease the effect of separation. Therefore, we made the choice to not include emotion in the present study, due to its theoretical irrelevance and practical challenge.

2. Methodological Contribution

In general, our doctoral dissertation offers several main methodological contributions. We first attempt to improve the existing measurement scale for psychological distance and Attachment to Mobile. Then we demonstrate the A/B testing function on Facebook as a trustworthy method for validating the proposed theoretical model in the field.

2.1. Improving The Existing Psychological Distance Measurement Scale

The lack of an established psychological distance measurement posed a certain level of difficulty in capturing the mediating variable in our theoretical model. As we discussed in Chapter 3, the current research adopted the scale developed by Wang et al. (2019) based on the pioneering scale by Spence et al. (2012). Through our four empirical studies, we found that the adapted psychological distance scale was largely validated. It generated a good level of internal consistency, albeit having to remove several items.

Our results lend supporting evidence to remove some items permanently to improve the scale's validity score. These items were mostly reverse coded. While including reverse-coding items was recommended for better validity (Churchill, 1979), this practice might cause survey fatigue and increase the error rate (Krosnick and Presser, 2010). This occurred

in our empirical studies. In all studies, we introduced the psychological distance scales starting with spatial dimension, followed by social dimension, temporal dimension, and hypothetical dimension, respectively. All individual distance scales had at least one reverse-coding item. We noticed that the Social dimension scale and temporal dimension scale, the two in the middle, seemed to suffer from participants confusing the questions' wording. To realize the reverse-code required concentration from the participants since they are manipulated mostly by including a single "not" to change the meaning. Unlike PC participants having access to a large display device, the mobile offers only a tiny piece of screen to read a large amount of information. It is no surprise to see many participants misread several words. Nevertheless, we had to remove these items to retain acceptable Alpha Cronbach values, both of which were reverse-coded. Surprisingly, the Hypothetical dimension, which had the greatest number of reverse-coding items, was introduced last and had consistently good interval validity even with the reverse coded items. Considering the order of presentation, our participants should have to get used to the wordings at the end of the section. Therefore, the issue of low Alpha Cronbach value might not be relevant to the number of reverse-coding items but rather to how participants read them. Because the mobile survey is subjected to higher measurement error (Lugtig and Toepoel, 2016), we attempted to address this problem by breaking the four scales into two separate sections in Studies 2 and 3. We observed small improvement but the issues with reverse-coding items are still presented. At the end, the ultimate solution was to remove these reserve coded items.

One aspect that many researchers might ignore is the device on which the respondents answer the questionnaire. The mobile is very particular because of its smaller size. Most survey were obviously constructed on PC and then automatically resized for mobile, with limiting modifying options set by the platforms. The mobile screen does not have enough space to display a lot of information without making the respondents scroll up and down. In our early version of the survey, the attention check was presented in two paragraphs spaced from each other five lines to detect respondents speeding through the questions.

The upper paragraph debriefed the requirement of the attention check, while the lower paragraph contains the trick question. However, this format happened to hide the haft of the content in the hidden part of the screen. It caused a spike in our failed attention check case for mobile. The obvious discrepancy between the two studies guided us to find a more appropriate scale for the context of mobile.

In short, our attempts to adapt the four psychological distance measurement scale clearly improved the original scale of Wang et al. (2019). In the higher error-laden and restrictive environment of mobile, the scale still scored a good internal validity score. When we compared the revised scale with the original construction of Spence et al. (2012), it is clear that the current one is a better fit for the handheld devices.

2.2. Validating Attachment to Mobile scale

Our studies found valid support for this scale as a valid measurement scale in cross-device research. The scale was an improvement on the 24 items scale of Konok et al. (2016) and contained 15 items, with four sub-constructs: Safe Haven, Secure Base, Separation Anxiety, and Separation Insecurity. The Attachment to Mobile Questionnaire proved to be a valid assessment tool of Attachment to Mobile. It scored an excellent internal validity score: over 0.9 alpha Cronbach value. This score was consistent across all empirical studies and with multiple groups of respondents. It works well with both mobile and PC. The Attachment to Mobile Questionnaire (Konok et al., 2017) was originally tested on PC in a traditional laboratory setting. So, its compatibility with surveys distributed and completed on mobile was a concern. The current dissertation provides evidence that Attachment to Mobile Questionnaire is suitable to be deployed on mobile.

Even though PC is still and will be the main device for answering web surveys, other devices, such as mobile, are increasing in proportions (Brosnan et al., 2017; Lugtig et al., 2016). Unlike the PC, mobile's small screen limits the amount of information that can be

displayed at the same time. For instance, a typical Qualtrics survey screen contains 30 rows of text. Respondents answer each question and scroll down to advance. On mobile, due to limitation of space, items are collapsed into the questions and only exposed themselves when tapped. When respondents indicate their answer, the items retract again to allow for the next question to show their items. The input device is also different. PC users use a mouse and keyboard, while mobile users have only fingers. Therefore, the experience is entirely distinct. For Attachment to Mobile research, this difference is critical, especially when questionnaire experience influences data quality (Sanchez, 1992). A very important proponent of Attachment to Mobile is the sensory feeling mobile users have when using their preferred device. Not only the visual experience but also the sensory response they received when fondling the device contributes to the overall emotional attachment to the mobile (Vincent, 2006). Having a valid measurement tool that works in both devices is critical for cross-device research.

Similar to the psychological distance scale, the Attachment to Mobile scale (or Adult Attachment Scale) employed reversed coding items. In our studies, we encounter internal consistency issues with these items. When including the reverse-coding items, the Alpha Cronbach for the sub-constructs was lower than 0.6, which indicates low-quality response and participants' confusion (hair et al., 2001). Our Alpha Cronbach value improved significantly when removing all reversed coding items. This occurs in both devices, PC and Mobile. The difference between our sample and Konok et al. (2017) might be the reason for this. The Attachment to Mobile Questionnaire was developed on Hungarian student sample, while ours were native English speaker adults from online recruitment platforms like Mturks and Prolifics. Past research has indicated that Mturks respondents are comparable to other populations (e.g., Hanser et al., 2018; Paolacci et al., 2010). So, the issue might lie with our control for attentiveness. In this dissertation, we employed several types of attention control, such as self-report questions or time. However, these measures often fall short of the environment in a laboratory setting, where researchers have direct observation over the participants. The ones from Konok et al. (2017)'s studies were

especially effective since they used biometric devices to capture the participants' reactions and behaviors. But such rigorous may not be applicable in business studies. The current research examines the validity of the Attachment to Mobile Scale as an assessment tool in a usual business research setting. We recommend removing these reverse coding to retain a satisfactory level of alpha Cronbach.

2.3. Lending Evidence to Field Testing Using A/B Testing by Facebook

Conducting field testing is always a challenge. Not only the organization and administration of the test are time-consuming, the limitation of the budget as well as the availability of measurement always is a concern to researchers. In our empirical study, we have chosen to utilize the A/B Testing function provided by Facebook, to test a part of our theoretical model on real consumers in their most natural environment. Our results demonstrated that even in the most constraint condition possible, Facebook A/B Testing seems to fit our predictions. In this way, we confirm the proposal of Orazi and Johston (2020) on the implication of Facebook A/B testing as valid. Facebook A/B makes up for its lack of ability to integrate measurement tools with affordable cost, an enormous reach, and the ability to tailor the stimulus.

Finance-wise, the actual cost of our Facebook A/B testing pales in comparison to the Mturk approach. For online recruitment platforms such as MTurk or Prolifics, researchers pay their participants at least minimum working hours, plus the fee imposed by the operators. The distribution fees are exorbitantly high. Mturk charges the most with 40% of each participant's payment, plus supplementary fees for each filter employed. Other platforms require a lower fee, but they are also not cheap by any standard. For instance, Prolifics demand 30% of each participants' fee and provides most respondents' filter free of charge. For the same amount of funds, we achieved ten times as many participants in the study compared with Mturk experiments.

It is important to remind that Facebook A/B testing is more than just a simple delivery platform. Previous attempts to utilize Facebook for social research tend to approach it as a respondent's recruitment tool (e.g., Kosinski et al., 2015). Because Facebook's algorithm dictates the kind of information every user sees on their account, these attempts encounter internal validity issues, such as the lack of random assignment or selection bias. Respondents answering the requests to survey might not be selected by chance but rather chosen by the system instead. The issue appears severe if researchers opt to do cross-device or cross-culture studies. Because there is no public information on how Facebook's algorithm decides the displayed information, the researchers have no idea how to ensure their groups are equivalent and how to amend for the difference, if any. Facebook A/B Testing function negates these shortcomings by providing a proper experimental platform with random assignment and a set of statistic results. Our field test obtained a similar number of participants over the tested groups, as well as a basic comparison table. The analysis procedure proposed by Orazi and Johnston (2019) worked as intended and yield good quality results. The biggest concern with Facebook A/B testing is that researchers cannot integrate their own measurement or control for stimuli. However, it allows for custom manipulation of stimulus. We demonstrated that Facebook A/B testing is a good complementary study for the usual laboratory experiments. In general, the results from the field matched our online experiments.

Of course, Facebook A/B testing is not an omnipotent technique capable of replacing other experimental methods. But its high ecological validity provides exciting opportunities to cross-check the proposed theoretical models to see whether researchers can replace their results outside of the lab environment.

3. Managerial Implication

The managerial implications of this dissertation concern many parties. Foremost, as advertising research, our results have much use for general advertisers in how to design and communicate their advertisement to mobile users. And our climate change context gives environmentalists, activists, or governments suggestions to improve their campaigns to increase public awareness.

3.1. For Climate Change Communication

The results of this doctoral dissertation have important implications for climate change communication. As consumers are spending more and more time on mobile, it became a critical communication channel in the fight against climate change. The Mobile distinguishes itself from other mediums, such as the television or the PC, in its emotional relationship between the device and its users. The current research has shown that such a relationship is influential to how consumers perceive information on Mobile. Therefore, Mobile deserves dedicated approaches to maximize persuasion effectiveness. In a way, our results agree with Wang and her colleagues' (2019) suggestions that the application of conventional advertising communication may not work for climate change-specific topics. The solution for effective communication is sometimes counterintuitive.

Firstly, we have demonstrated that targeting attached to mobile audience could be inefficient due to their negative perception of credibility and lower engagement rate. The more attached to mobile, the less likely they will engage with the content. Thus, advertisers should readjust their strategy to target the right audience in order to achieve their objectives. Granted, it is not so obvious to localize the attached to the mobile audience and the current major advertising platforms do not allow advertisers to implement any form of custom measurement. The only option is to rely on the provided filters and work our way around it. As our Facebook field test has demonstrated, the audience with the same

demographic and behavioral characteristics did show the predicted outcomes as in our online experiments. This makes our results much more relevant to advertising practitioners.

Secondly, when targeting mobile users, our results suggest that using abstract ads, such as framing climate change using abstract terms, rather than concrete way (focusing on the hard facts), can mitigate the negative effect of Attachment to Mobile on consumer engagement. For instance, Climate Outreach, one of Europe's leading climate change communicators, advised practitioners to frame climate-related subjects with metaphors to illustrate messages (Corner, Shaw, and Clarke, 2018). They also discouraged the use of hard-fact, which they deemed insufficient to engage consumers. Our online experiments and field test both demonstrated that this approach would work well with attached to mobile respondents. In Study 2, messages using a vulgarized approach ("the second warmest year") were actually perceived as less credible than simply showing the actual temperature ("increased 11 degrees Celsius"). And consumers in the field experiment engage more to the black and white version of the advertisement.

Given the narrow improvement shown in our experiments, a question may arise: "Does this little increase in performance worth all the efforts?" We would argue that climate change communication has been facing stagnation. The fact that one-third of our population still neglect the severity of climate change-related issues and that figure has not changed significantly in six years (Ipsos, 2020) demonstrates that the current persuasive approach needs to change. This is especially important in the face of the emboldening of climate change deniers, even among the leading public figures, such as the former U.S. President. Consequently, the climate-change message is not welcoming in many parts of the world. Communicating unwelcoming messages has been highly challenging. The current research highlights the importance of employing evidence-based messages to reach these individuals.

3.2. For General Advertising and Retailers

Our contributions do not limit themselves in climate change-related communication. Understanding how to effectively communicate a message has implications in general advertising as a whole and, to some extent, retailers.

Our results suggest that as consumers advance through their consumer journey, as they encounter the advertised elements at each touchpoint, their reactions might be very different. Even though the number of mobiles is exploring among consumers, it is not, and will not be, the only device they will ever use. In fact, consumers tend to own and utilize a mix of multiple digital devices, be it mobile, PC, tablet, or even smart TV. One size obviously does not fit all. In the case of Mobile, the emotional relationship between the Mobile and its users prompts distinct behaviors when consumers surf the web and/or do their shopping on the said device versus when they are not. So, the same advertisement can achieve a a very different outcome when seen in a a separate medium. The problems do not limit to the form factors of the advertisement, but also the message itself and how it is framed to get the best out of each view. Since every impression cost money, it is advisable for advertising practitioners not to launch large-scale campaigns targeting everyone. A better approach would be to create dedicated advertising materials and distributing them to the most suitable platform. Better yet, advertisers should invest in a mix of advertising materials to achieve equal effectiveness across different mediums.

When designing a mobile ad, advertisers ought to take into consideration whether the framing of the ad message fits the targeted audience. Our research showed that attached to mobile consumers perceived the advertised subject on Mobile at a further distance when it is described abstractly than when it is shown concretely. Consisting with the principle of distance congruency in extant literature (e.g., Kim et al., 2019), the ad would be more effective with an abstract message. Therefore, products featured on the mobile ad should have been described using metaphors or imaginative terms to take advantage of this effect.

For instance, when car manufacturers choose promotional messages for a high-performance vehicle, they should opt for materials featuring words such as "light speed," "technological marvel," or "really fast," instead of going for concrete numbers like "increasing from one to sixty km/h in 10 seconds" or "250km/h speed".

3.3.   A Connection between Academia and The Industry

The idea of a gap between academic research's output and what the industry is seeking is not new. Granted, at the end of every research article is the managerial implications, just like this doctoral dissertation. They are, however, not directly useful for advertising practitioners. These results are often taken for granted. Researchers are not as familiar with business practices. We only speak on behalf of our data while the industry understands the market and its customers. And often, their data is taken directly from the market and contains much potential. However, it does not mean academic research has no practical contribution. Academia has been actively guiding the industry forward and will continue to do so. But there is a long way from the latest scientific findings to operational measures.

The first barrier is the results themselves. It takes years of training to understand technical research papers. But such investment is a privilege in most organizations. Terms such as "Attachment to Mobile" or "psychological distance" may seem obvious to the authors but are oblivious to the outsiders. Even within academia, our research findings are not always understood by our peers. The obstacle is even higher for business practitioners. A dedicated managerial implication is a remedy for that, albeit an imperfect one. One of the surmounting difficulties when applying research findings to an actual business decision is the lack of a connecting medium. The constructs that advertising researchers employed to reflect the effectiveness of the ad are often alien to business people. When our daily tools are attitude, purchase intention, or perceived credibility, their crafts include ad impressions, conversion rate, or ad engagement. The current research provides means for the advertisers to utilize the latest research results directly without investing in dedicated in-house research

teams. Matching demographic and behavioral characteristics of studies' samples to the advertising platforms' selection filters have shown to provide similar outcomes. Ours is not a perfect example, but we argue that it is one of the first to make the bridge toward a more relevant scientific publication.

4. Limitations

Not everything is perfect, and so is this doctoral dissertation. Many of these limitations have been identified and addressed to some extent in each study. In this section, we reflect on the five empirical studies and discuss their limitations as one large research unit.

Our first limitations lie in the use of online respondents recruited from two major websites: Prolifics and Mturk. Although they have been shown to be comparable to the general population (Paolacci et al., 2010; Buhrmester et al., 2011; Bentley et al., 2016), certain differences still exist. Firstly, Mturk workers and Prolifics users are professional participants who participate in scientific studies for money. They completed more studies than an average person and can remain on the platforms for an extended period. Even when we compare them to the student population, which is the usual target sample for scientific studies, online respondents are not limited by the university's time. Thus, they are obviously more familiar with research experiments than an average person. Non-naivete to scientific experiments is a concern because repeated participation in a specific paradigm may give our participants experience or knowledge that influences how they perceive and respond to our experiments. It has been shown that experience with a paradigm can lead the respondents to learn the researchers' true objectives or to develop new behaviors unique to this population (Hauser et al., 2018). Secondly, our knowledge of online respondent platforms is limited. Mturk is the first, and the largest recruitment website and the common subject of most comparative studies (e.g., Paolacci et al., 2010; Bentley et al., 2016), but fewer is known about the other platform, Prolifics, aside from the findings of Peer et al., (2017). The population of Mturk or Prolifics is also smaller than one would expect (e.g.,

Hauser et al., 2018; Chandler et al., 2019). Either platform allows users from all over the world to register, but they are still very Anglophone-centric. Most of the Mturk population lives in the U.S., and Prolifics has a large portion of European respondents.

Another issue with our research is the over-reliance on the online experiment. An important component of Attachment to Mobile is the physical separation of the Mobile from the attached respondents. In a more traditional experimental setting, previous studies, such as Konok et al. (2017) or Clayton et al. (2015), enforced this separation very rigorously by taking the Mobile away from their respondents. Unfortunately, this was not possible online. Our participants actually announced the location of their Mobile, either voluntarily via self-report questions or unknowingly by their device's metadata. However, their Mobile could still be in their hand without us knowing. This leads to the control for attentiveness. Detecting inattentive respondents is extremely complicated online. In this research, we employed a multitude of instruments to make sure our participants see the stimuli and read the questions correctly. For instance, they were obligated to see the ad for a minimum period and had to pass the attention checks to validate their response. But they are not perfect. Because we did not observe the participants, we have no control over whether they really see the ad or other content. And passing the attention check questions does not automatically mean they read the others properly, especially considering their experience with scientific studies.

The findings also shed a bit of light on how intense emotional state (or rather the lack of it) plays an important role in accentuating the consequence of attachment related behavior. Previous studies on attachment mobile mostly tried to draw out the attachment-related behavior by manipulating their participants' emotional state. For instance, Konok et al. (2016; 2017) forced participants to sit on a chair far away from the mobile, or Melumad and Pham (2020) had the participants passed a stress induction phase. While these methods were effective in making the attached to mobile participants to express the desired behaviors, they were still artificially triggered. Unfortunately, we did not explore this

aspect since emotional conditions of the participants were not judged as a critical comportment in the proposed mechanism. This limitation should be studied in the future studies.

There are some ethical concerns that we tried to address. The first involves the fair remuneration of participants' time and effort. Limited by our budget, we paid our respondents at least a minimum working salary, or on average, 7.5 euros per hour. However, each participant has a different reading speed and response time. The fast reader is not always good for our results, although it has a positive impact on our own tiny budget. Sometimes, fast reading speed can be the sign of a speeder who skimmed through the questions without significant thought and bombed our data quality. We relied only on the completion time indicated in the raw dataset to adjust the remuneration. However, from the participant's perspective, they have to spend a bit more time on the survey platform themselves. There are menial tasks to complete before our clock can start clicking, such as study selection, description reading, requirements checking. It is very relevant to our study since many of our experiments include the use of Mobile. In the case they want to participate in our study, PC users have to change device, log in, and find the corresponding study. All of these steps cost time and effort. Moreover, many respondents tend to skip the initial warning out of habit. Unfortunately, we have to reject these responses, thus wasting their time and efforts.

Finally, our field test using Facebook Advertising only addressed a portion of our proposed theoretical model due to the limitation of available measurements. This doctoral dissertation examined the effect of Attachment to Mobile on consumer's perception of ad credibility. But Facebook Advertising only allows us to target consumers using behavioral and demographical selection filters and measure ad effectiveness with their own set of metrics. We went around this limitation by using demographical characteristics similar to those of our participants from previous empirical studies and post engagement as a proxy to Attachment to Mobile and credibility, respectively. Even though this conveniently

allowed us to adapt our theoretical model to the Facebook platform, it still failed to examine the mediating effect of psychological distance, one of our significant contributions.

Furthermore, the output of Facebook Ads was under the influence of the platform's own optimization algorithms. Experimental contamination is inevitable, though it gives credentials to the high ecological validity of our model. Therefore, our results would be reflecting the effect of "optimization + stimulus 1" vs. "optimization + stimulus 2" rather than the pure influence of the proposed conditions. The details of these algorithms are not published, so we have no way to isolate the two stimuli to prevent contamination.

5. Suggestion for Future Studies

After discussing the limitations of this research, we would take an outlook of potential research agendas that could be initialized based on the current findings. There are two research alleys that we believe to be potentially fruitful to understanding Attachment to Mobile and advertising effectiveness.

5.1. Determinant of Attachment to Mobile

As described in earlier chapters, Attachment to Mobile is remarked by the emotional relationship between the users and their device. Consumers relied on the mobile as a gateway to their social contacts. Moreover, this attachment relationship is said to be transferable when consumers change a new mobile (Vincent, 2006). So, it is plausible that the attaching element is not the device itself but the interaction from the mobile. Several questions arise:

Consumers use a mix of multiple devices for different purposes. Some even own more than one mobile, one for casual conversation and the other for business purposes. Extant literature suggests that there are varying psychological comforts deriving from different

types of mobile activities, with leisure/entertainment generating more positive benefits than business/work (Melumad and Pham, 2020). In these cases, if the said consumer developed an attachment relationship with his/her mobile, which would be the target? Moreover, there is more than one type of social exchange between people to people. For instance, the insensitiveness and frequency of sending and receiving messages to one's lover would be much higher than that of an acquaintance. Will the consumer become attached to the business mobile or to the casual one?

Nowadays, mobile is more likely to be complemented by one or several digital accessories, such as a smart sport band, a smartwatch, or even a smart glass. The idea is to extend the functionalities of the mobile to these devices so that mobile users feel less the need to reach their phones. In these settings, the mobile still plays the role of central hubs, connecting and controlling all these accessories. But consumers interact not with the mobile directly but indirectly through the additional devices. For instance, rather than opening the mobile, one can simply raise his/her arm to see time, check messages, or even make a phone call with a new Apple Watch. Thus, the interaction usually occurred between the mobile and the users is now transfer partly, if not primarily, to other supporting devices. To the extent that consumers benefit from psychological comfort from establishing an attachment to their own mobile, how does this attachment relationship play out within the mix of digital devices surrounding the mobile?

Technology advancement blurs the line between a PC and a mobile. In terms of functionality, there is not much that can distinguish one from another, except for mobility. In the old days, PC is bulky and stationary, while mobile is small and carriable. Now, the smartphone is getting bigger in size, to the point some newly launched devices will not fit into one's pocket. A laptop, technically a moving PC, offers the same set of functionalities as a smartphone and still very slim and light to carry around. Then we have the iPad, which is essentially an enlarged smartphone, being the mutant of both PC and Mobile. If the defining characteristics of mobile over the PC are the ability to fondle the device in the

hands, to carry around, and to have access to the Internet everywhere, then any of the above-mentioned devices are capable of the same thing. Yet, Attachment to Mobile is a rising issue and has taken attention from many scientific fields, from medical research to social science. Why does attachment relationship not manifest on laptop or tablet but grow so significant with mobile?

Another area for future research might be to investigate whether the attachment relationship in the younger population differs from the older generation. Mobile is so popular now that nearly everyone owns one. And Attachment to Mobile is very popular among the young (e.g., Konok et al., 2016; Walsh et al., 2011). But the younger generation, such as generation Z, born after 1995, is said to be more technologically fluent than their parents and earns the nickname "digital native." We can assume that their behaviors on mobile would differ from those of the older people. Yet, our results on older consumers arrive at the same conclusion as with previous studies on younger individuals (e.g., Bart et al., 2014; Pham et al., 2011), in which certain types of messages work better on mobile. Researchers should look for which kind of factors distinguish the attachment relationship between consumers from different generations.

5.2. Antecedents of Psychological Distance

The current research has shown that the digital context can determine the psychological distance. More specifically, changing the device causes the consumers to perceive climate change differently. Our empirical studies were bound to the measurement of the psychological distance to climate change. However, past research has found that the established relationship in psychological distance does not always work as predicted (Wang et al., 2019), and manipulating psychological distance to affect pro-environmental perception is hard because personal belief can obscure the intended effect (McDonald et al., 2015). Future studies should explore whether the same effect can be replicated in

another context by developing a more versatile instrument to measure the psychological distance to any subject.

One of the defining characteristics of the mobile over the PC is its small form factor and the touch screen, which allows consumers to hold and fondle. This physical contact fosters a sense of psychological closeness between consumers and the product (Wakslak and Kim, 2015). Similarly, engaging with the touch screen also reduces the psychological distance between consumers and the featured products (Maglio, 2019). These functions used to belong exclusively to the mobile. However, the advance of technology has brought them onto every device possible. A laptop can be equipped with a touch screen, yet small enough to hold comfortably and significantly bigger than a typical mobile. On the other hand, a smartwatch is much smaller than a mobile and still offers the same set of functionalities, from answering the call to read the news. Both those two types of devices are very similar to the mobile in terms of functional characteristics but differ significantly in terms of usage and form factor. For instance, mobile usage implies more time pressure and fosters psychological distance closeness via the narrow attention effect (Barque-Durant et al., 2017). Therefore, additional research is needed to examine whether the principle of psychological distance on mobile depends on the specific digital context? Furthermore, our results suggest that attached to mobile would see themselves further away in compared with PC. And other studies also indicated that mobile users would be in a psychologically comfortable state (Melumad and Pham, 2020), which is related to long psychological distance. However, physical contact is supposed to do the opposite (e.g., Wakslak and Kim, 2015; Maglio, 2019). This contradiction prompts future research to explore further the perception of distance on mobile and the idea of close or further distance.

And finally, the current dissertation demonstrated a relation between personal attachment style and psychological distance. Individual characteristics seem to be important determinants of how psychological distance is dictated. This paves the way for future work to investigate how the cultural backgrounds of consumers dictate their distance perception.

For example, individualists like to distance themselves from others in terms of social distance, while collectivists are the opposite (Maglio, 2019). There are obviously some parallels between the attachment styles here. Thus, separation from the mobile, which acts as the gateway to social interactions (Vincent, 2006), seems very relevant. Moreover, it suggests interesting outcomes from the combination of anxiety attachment style and

5.3.   Cross-device advertising effectiveness

A typical consumer may not own multiple pieces of hardware, but they would, at least, be exposed to many. It can be the mobile in hand, a laptop at work, and the tablet at home. To simply create a single piece of advertisement and distribute it to all the available platforms seem unwise. A typical day of a consumer may start by reaching for the mobile in the morning, continue with the laptop in the afternoon, and end with the same mobile in the bed. One issue worthy of attention is how consumers' preferences and perceptions change as they move through different devices, a subject briefly explored by Barque-Durant et al. (2017). However, the scope of our research did not include cross-device phenomenon. We suggest several research avenues to explore further:

- While consumers see advertising on a wide range of devices, but there is still unclear when or where they will finalize their purchase and what mechanism dictates such decision. Thankfully, current technology enables researchers to track the consumers regardless of which device they are on. For instance, Facebook gives detailed reports on cross-device advertising effectiveness, from impression counts to conversion rates. This data is readily available to any advertisers and provides great opportunities to grasp the understanding of how consumers behave throughout the digital space. However, utilize these data raises privacy concerns.
- Our empirical study (Study 3) has shown that congruency between consumers' perceived distance and the ad's construal level would lead to better ad performance. Consequently, each platform demands a specific type of ad and/or message to take advantage of this effect. We know quite a few about the performance of each

individual ad, but their combined performance is still unknown. Does the mind change its mindset fast enough just by the act of changing the device? Or does the perception of distance still linger for an extended period of time after the switch?

- Consumers seeing ads on different devices also means repeated ad exposure. It is important to note that consumers may continue to consume content on mobile in parallel with another device. For instance, it is perfectly normal to watching TV and occasionally check the message on mobile. In these multitasking situations, the mind is likely to be too occupied and may fail to process the ad content properly. Can multiple ads complement the weakness of a single ad, knowing that repeated exposure

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Table Index

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Appendix – Measurement Scales

BIF (Vallacher and Webner, 1987)					
Your task is to choose the identification, a or b, that best describes the behavior for you. Simply place a checkmark next to the option you prefer. Be sure to respond to every item. Please mark only one alternative for each pair. Remember, mark the description that you personally believe is more appropriate for each pair.					
1	Making a list	Getting organized * Writing things down	13	Voting	Influencing the election * Marking a ballot
2	Reading	Following lines of print Gaining knowledge *	14	Climbing a tree	Getting a good view * Holding on to branches
3	Joining the Army	Helping the Nation's defense * Signing up	15	Filling out a personality test	Answering questions Revealing what you're like *
4	Washing clothes	Removing odors from clothes * Putting clothes into the machine	16	Toothbrushing	Preventing tooth decay *

					Moving a brush around in one's mouth
5	Picking an apple	Getting something to eat * Pulling an apple off a branch	17	Taking a test	Answering questions Showing one's knowledge *
6	Chopping down a tree	Wielding an axe Getting firewood *	18	Greeting someone	Saying hello Showing friendliness *
7	Measuring a room for carpeting	Getting ready to remodel * Using a yard stick	19	Resisting temptation	Saying "no" Showing moral courage *
8	Cleaning the house	Showing one's cleanliness * Vacuuming the floor	20	Eating	Getting nutrition * Chewing and swallowing
9	Painting a room	Applying brush strokes Making the room look fresh *	21	Growing a garden	Planting seeds Getting fresh vegetables *
10	Paying the rent	Maintaining a place to live * Writing a check	22	Travelling by car	Following a map Seeing countryside *
11	Caring for houseplants	Watering plants Making the room look nice *	23	Having a cavity filled	Protecting your teeth* Going to the dentist
12	Locking a door	Putting a key in the lock Securing the house *	24	Talking to a child	Teaching a child something * Using simple words
			25	Pushing a doorbell	Moving a finger Seeing if someone's home *
* Higher level alternative.					

Attachment to Mobile Questionnaire (Konok et al., 2017)				
Sub-construct	Label	Items	Reverse code	Remove
SH (Safe Haven)	In a tense situation, I take out my phone	Attach_1		
	If I feel uneasy/tense in a company, I take out my phone.	Attach_10		
	If I am nervous, dealing with my phone does not calm me down.	Attach_12	X	X
	I am nervous/tense when I leave my phone at home.	Attach_2		

SA (Separation Anxiety)	I am nervous/tense when my phone runs out of battery.	Attach_4		
	If I left my phone at home, I would be willing to go home for it even from a distance (more than 5 min away from home).	Attach_7		
	It does not bother me when I leave my phone at home/it runs out of battery.	Attach_14	X	
SI (Separation Insecurity)	If I am stressed, I take out my phone to calm down.	Attach_5		
	If I do not have my phone on me, I do not feel safe.	Attach_8		
	If my phone runs out of bettery, I do not feel safe.	Attach_9		
	If I leave my phone at home, I do not feel safe	Attach_11		
	If I lost my phone, I would not feel really safe for long.	Attach_13		
SB (Secure Base)	If my phone is in my hand, I can behave more easily/unreserved.	Attach_3		
	If my phone is in my hand, I feel more confident.	Attach_6		
	I am not more confident/easygoing if I have my phone with me.	Attach_15	x	x

Adult Attachment Scale (Collins, 1996)		
Please read each of the following statements and rate the extent to which it describes your feelings about close relationships.		
Please use the scale below by placing a number between 1 and 5 in the space provided to the right of each statement.		
Not at all characteristic of me	1--------------2--------------3--------------4--------------5	Very characteristic of me

(1) I find it relatively easy to get close to others. (Closeness)

(7) I do not often worry about someone getting too close to me. (Closeness)

(9) I am somewhat uncomfortable being close to others. * (Closeness)

(13) I am comfortable having others depend on me. (Closeness)

(15) I am nervous when anyone gets too close. * (Closeness)

(17) Often, love partners want me to be closer than I feel comfortable being. (Closeness)

(removed)

(3) I find it difficult to allow myself to depend on others. * (Depend)

(6) I am comfortable depending on others. (Depend)

(8) People are never there when you need them. * (Depend)

(14) I know that people will be there when I need them. (Depend)

(16) I find it difficult to trust others completely. * (Depend)

(18) I am not sure that I can always depend on others to be there when I need them. *

(Depend)

(2) I do not often worry about being abandoned. * (Anxiety)

(4) I often worry that my partner does not really love me. (Anxiety)

(5) I find others reluctant to get as close as I would like. (Anxiety)

(10) I often worry that my partner will not want to stay with me. (Anxiety)

(11) I want to merge completely with another person. (Anxiety)

(12) My desire to merge sometimes scares people away. (Anxiety)

---

* = *reversed coding*

Psychological Distance (Wang et al., 2019)

Dimension	Items	Reversed code	Remove
Spatial	I feel geographically far from the effects of climate change		
	Serious effects of climate change will mostly occur in areas far away from here		
	My local area will be affected by climate change	X	
	Climate change will have consequences for every region, including where I live	X	

Social	I don't see myself as someone who will be affected by climate change		
	Serious effects of climate change will mostly affect people who are distant from me		
	My family and I will be safe from the effects of climate change		
	I can identify with victims of climate related disasters	X	X
Tempo	Climate change is happening now	X	
	We will see the serous effects of climate change in my lifetime	X	
	If climate change is to happen, it will happen in the remote future		
	The region where I live is already experiencing serious effects of climate change	X	X
	Climate change will not change my life, or my family's life anytime soon		
Hypothetical	Climate change is virtually certain to affect the world	X	
	It is almost certain that climate change will change my life for the worse	X	
	It is extremely unlikely that climate change will affect me		
	My local area is very unlikely to be affected by climate change		
	It is virtually certain that my family will be safe from the effects of climate change		X

Ad Credibility (Mackensie & Lutz, 1989)

Please indicate your opinions of the above ad:

Convincing						Unconvincing
Believable						Unbelievable
Biased						Unbiased

Linear Regression H1a

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.360[a]	.130	.123	1.17508

a. Predictors: (Constant), Attach

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.354	1	26.354	19.086	.000[b]
	Residual	176.745	128	1.381		
	Total	203.099	129			

a. Dependent Variable: CE
b. Predictors: (Constant), Attach

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	15.679	.408		38.441	.000
	Attach	.485	.111	.360	4.369	.000

a. Dependent Variable: CE

PROCESS output H1b

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5
*****************


        Written by Andrew F. Hayes, Ph.D.
www.afhayes.com
    Documentation available in Hayes (2018).
www.guilford.com/p/hayes3


**************************************************************
**********
```

```
Model  : 1
    Y  : CE
    X  : Attach
    W  : Consent_

Sample
Size:  130

*************************************************************
**********
OUTCOME VARIABLE:
 CE

Model Summary
          R         R-sq        MSE           F          df1
df2          p
      .4034       .1628     1.3496      8.1645      3.0000
126.0000      .0001

Model
             coeff         se           t          p        LLCI
ULCI
constant    13.0669     1.2518     10.4387      .0000     10.5897
15.5441
Attach       1.1955      .3389      3.5271      .0006      .5247
1.8662
Consent_     1.7889      .8097      2.2093      .0290      .1865
3.3914
Int_1        -.4884      .2209     -2.2112      .0288     -.9254
-.0513

Product terms key:
 Int_1    :         Attach    x        Consent_

Test(s) of highest order unconditional interaction(s):
      R2-chng         F         df1         df2          p
X*W      .0325     4.8895      1.0000    126.0000      .0288
----------
    Focal predict: Attach    (X)
         Mod var: Consent_  (W)

Conditional effects of the focal predictor at values of the
moderator(s):

   Consent_      Effect          se           t          p
LLCI       ULCI
```

```
     1.0000       .7071       .1484       4.7636       .0000
.4133       1.0009
     2.0000       .2187       .1635       1.3375       .1835       -
.1049       .5424


*********************** ANALYSIS NOTES AND ERRORS
***********************


Level of confidence for all confidence intervals in output:
  95.0000


------ END MATRIX -----
```

Test outputs for H2b

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.176a	.031	.016	.83391	.031	2.149	2	135	.121
2	.232b	.054	.033	.82695	.023	3.284	1	134	.072
a. Predictors: (Constant), Tempo, Type									
b. Predictors: (Constant), Tempo, Type, TYPExPD									
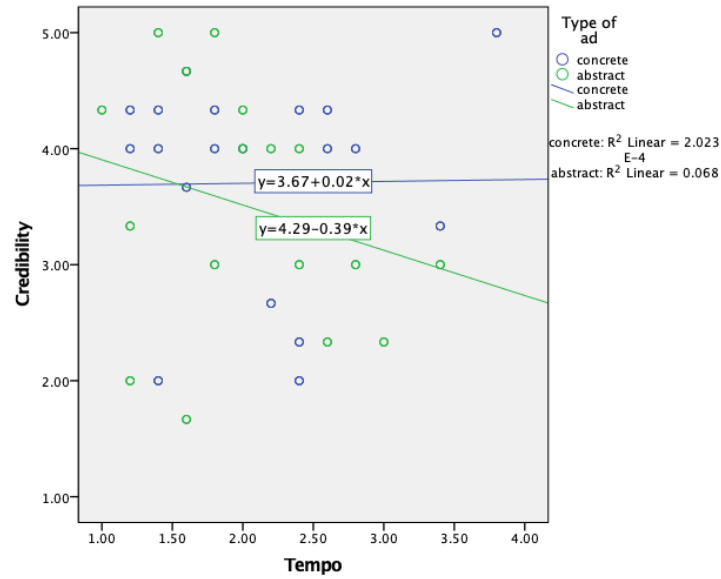
Study 3 Output - Normality Test

	Tests of Normality					
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Credibility_1	.251	424	.000	.805	424	.000
Credibility_2	.246	424	.000	.804	424	.000
Credibility_3	.180	424	.000	.881	424	.000
CE_1	.234	424	.000	.845	424	.000
CE_2	.222	424	.000	.884	424	.000
CE_3	.220	424	.000	.883	424	.000
CE_4	.209	424	.000	.865	424	.000
CE_5	.218	424	.000	.864	424	.000
CE_6	.228	424	.000	.848	424	.000
Attach_1	.233	424	.000	.893	424	.000
Attach_2	.261	424	.000	.877	424	.000
Attach_3	.229	424	.000	.893	424	.000
Attach_4	.240	424	.000	.883	424	.000

Attach_5	.230	424	.000	.895	424	.000
Attach_6	.222	424	.000	.895	424	.000
Attach_7	.242	424	.000	.880	424	.000
Attach_8	.245	424	.000	.887	424	.000
Attach_9	.221	424	.000	.894	424	.000
Attach_10	.242	424	.000	.889	424	.000
Attach_11	.207	424	.000	.900	424	.000
Attach_12	.213	424	.000	.905	424	.000
Attach_13	.225	424	.000	.888	424	.000
Attach_14	.198	424	.000	.902	424	.000
Attach_15	.205	424	.000	.903	424	.000
Geo1R	.200	424	.000	.898	424	.000
Geo2R	.207	424	.000	.893	424	.000
Geo_3	.230	424	.000	.873	424	.000
Geo_4	.243	424	.000	.853	424	.000
Socio1R	.197	424	.000	.887	424	.000
Socio2R	.174	424	.000	.898	424	.000
Socio3R	.192	424	.000	.897	424	.000
Socio_4	.224	424	.000	.895	424	.000
Hypo_1	.233	424	.000	.819	424	.000
Hypo_2	.237	424	.000	.878	424	.000
Hypo3R	.186	424	.000	.892	424	.000
Hypo4R	.181	424	.000	.895	424	.000
Hypo5R	.174	424	.000	.904	424	.000
Tempo_1	.274	424	.000	.822	424	.000
Tempo_2	.241	424	.000	.862	424	.000
Tempo3R	.190	424	.000	.903	424	.000
Tempo_4	.256	424	.000	.877	424	.000
Tempo5R	.187	424	.000	.899	424	.000
a. Lilliefors Significance Correction						