Effect of Emotion on Marketing Landing Page Conversion

by

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December 2016

Presented to the

Division of Science, Information Arts & Technologies

University of Baltimore

In Partial Fulfillment

to the Requirements for the Degree of

Master of Science

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Abstract

Web users make decisions to click or not to click, to buy or not to buy, every day. The emotional impact of an invitation plays a key role in these decisions. When business goals align with the potential customer's expectations and desires, conversion is more likely. Therefore, designing the landing page for a marketing campaign to elicit positive emotions from consumers is the natural step to ensure the success of digital marketing campaigns. However, the perfect landing page is only crafted when designers can successfully elicit these positive emotions. User testing that measures users' emotional response can help designers understand the effects of their design choices. This experiment tests an emotional design model and measures the effect of emotion on landing page conversion, using physiological instruments to measure emotional arousal and a self-reported tool to measure emotional valence. Twenty-eight adult participants (both sexes) living in Peru, and randomly selected within the community of singles looking for a long-term relationship of Mi Media Manzana mobile app, were exposed to two landing pages. The relationship between their emotional response and their conversion decisions was measured. The data provide strong support for the hypothesis that marketing campaign landing pages with strong emotional appeals generate more conversions. The experiment also suggests that some methods for measuring emotional response to marketing landing pages are more reliable than others.

Acknowledgements

This thesis would not have been possible without the love, support, and encouragement that Raquel gave me unconditionally. Other many people collaborated in different ways along the process of this research: Gigi Román, Milagros Esquivel, Julio Guzmán, Freddy Linares and Wally Benavente. A special gratitude to Pedro Neyra and Nishme Castillo at Mi Media Manzana, whose trust and support, alongside the funds for the interview sessions, provided a vital motivation in a critical point.

I received an inspiring guide and mentoring from Kathryn Summers, and invaluable comments from Deborah Kohl in the early stages of the study. Illa Rocconi and the team of Fulbright Peru gave me the confidence and support to pursue the dream of studying this Masters, and also Nancy Kaplan at University of Baltimore, who saw in me the potential to learn and understand the fascinating field of Human-Computer Interaction.

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Chapter 1: Introduction

The evolution that marketing has followed in the latest years has created a natural alliance between the human-computer interaction (HCI) community and the world of digital businesses. Digital marketing professionals strive for marketing optimization and the highest *conversion rate* (Ash, 2008; Becker, Broder, Gabrilovich, Josifovski, & Pang, 2009), which means that more visitors become customers, and marketing campaigns generate more *return on investment* (ROI) (Gofman, Moskowitz, & Mets, 2009).

Although usability is a necessary foundation for predicting better digital marketing campaigns by improving the *user experience* (Bias & Mayhew, 2005; Nielsen, 1993; Nielsen & Molich, 1990), for interaction designers working in the marketing field it is currently necessary to go beyond functionality or even usability. In the digital age, in which businesses are competing online to win the customers' mind (Davenport & Beck, 2001), designing for emotion is essential to maximize conversion (Walter & Spool, 2011), since purchase decisions can be highly influenced by emotions (Damasio, 1994; Kotler, 1973).

Accordingly, new methodologies and instruments are being adopted by interaction design professionals to incorporate emotions in the user experience (Schall & Romano Bergstrom, 2014; Tullis & Albert, 2008). On the one hand, best practices in *emotional design* in digital products has matured enough to provide some guidance in real-world scenarios (Schall & Romano Bergstrom, 2014). And on the other hand, interest in learning more about cognitive and emotional processes in users' minds has ignited the use of physiological measurement tools in user studies, being integrated with traditional usability testing (Schall & Romano Bergstrom, 2014) and other methodologies.

Marketing landing pages are a recognized genre in web design, focused on receiving high traffic volume and increasing the chances that a visitor takes a particular action that businesses pursue, such as register, subscribe, or purchase (Ash, 2008; Kanagal, 2015). The attributes of a marketing landing page are a clear purpose, specific information, and only one possible action, so when this action is performed, it is said that a conversion has occurred (Ash, 2008). Furthermore, a way to measure the success of a particular landing page is to determine its conversion rate, which is the percentage of visitors who perform a specified action (Ash, 2008; Gofman et al., 2009; Kanagal, 2015). However, much remains to be learned about the effect of emotions on a successful landing page (Gofman et al., 2009).

Surprisingly, marketing landing pages have not been as thoroughly studied in academic contexts as might be expected, given their ubiquitous use and economic importance (Becker et al., 2009; Gofman et al., 2009). Because marketing landing pages are a very simple but straightforward business digital mean shaped to achieve clear marketing objectives, a landing page becomes the perfect artifact for experimenting with the influence of emotion on conversion.

Chapter 2: Emotion, Cognition and Behavior

The relationship among emotion, cognition, and behavior is very complex. Emotion, cognition and behavior are interdependent processes, and can affect each other on different levels and in different sequence (Scherer, 2005). In order to better understand the effect of emotion on landing page conversion, a rapid review of theories will be pertinent.

Emotion

Plato introduced the term "emotion" in history (Klein, 1985), describing emotion and reason as "two horses" pulling us in opposite directions. Descartes described a relationship between body and emotion in *Passions of the Soul* (1649). Similarly, Vives in the *Middle Ages* had already suggested a possible relationship between physiology and emotions (Fantazzi et al., 2008). Darwin identified emotions as an important factor in survival (1965), describing how emotions are expressed through physiological manifestations, highlighting facial expressions. James stated that emotions are perceptions of bodily change (1884), and claimed that the awareness of the physiological changes is the emotion. More recently, Tomkins proposed that different emotions are physiological differentiated and are represented by facial expression (1991). According to him, emotions are "stored" in the brain, and facial affective responses are linked to the subcortical areas in the brain, where reside "affect programs" for each emotion. Ekman et al categorized six facial expressions, and all of them are clearly distinguished and feature unique patterns of corporal manifestations (Ekman et al., 1987).

In 2003, Russell gave to emotion a dimensional approach (Figure 1), showing in his circumplex model as a visual representation of emotions (2003), putting “arousal” in one axis, and “valence” on the other (Figure 2). The *arousal* axis represents the strength of the emotional

response, and the *valence* axis represents the degree of pleasantness of the stimuli (Russell, 2003). Additionally, research has shown that emotions are consistent all over the world for most facial expressions (Ekman, 2003), so emotions can generally be universally recognized beyond verbal language.

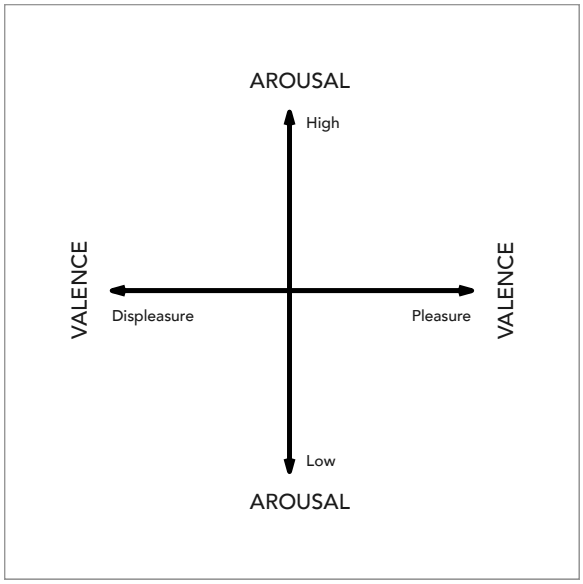

Figure 1. Dimensional approach of emotion (Russell, 1980).

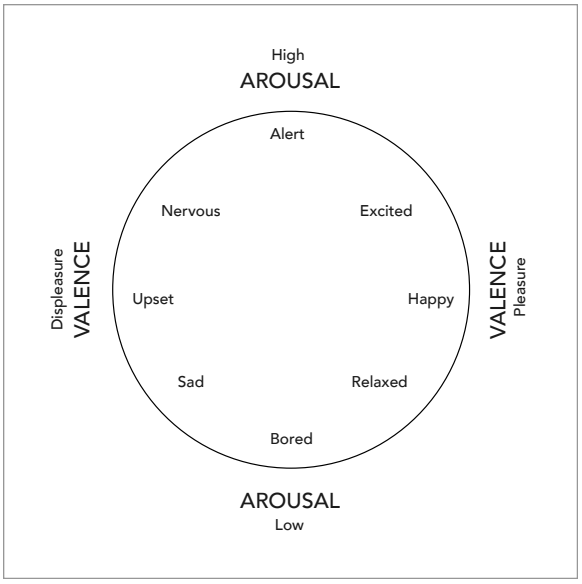

Figure 2. The circumplex model of emotion (Russell, 1980).

Emotions are determined partially by the reaction of the *sympathetic nervous system* (SNS), responsible to prepare the body to respond to threats, and one of the two main divisions of the *autonomic nervous system* (ANS). In opposition, the *parasympathetic nervous system* (PNS), is the part of the autonomic nervous system in charge of relaxing and resting. If the SNS is activated, the function of the PNS decreases, in order to redirect physiological resources to face the danger. When the SNS is activated we experience arousal (Damasio, 2006), also known as stress.

Arousal is always physiological and generally unconscious, and it is useful to measure the intensity of an experience. When a stimulation generates enough arousal the result is a focused attention on the experience, but when a stimulation is not enough to generate arousal the result may be a boring and unmotivated experience (Gorp & Adams, 2012). If the stimulation exceeds certain arousal levels, the result is *tunnel vision*, a selective attention in response to an overwhelming stimulation. Norman asserts that more stimulated people are better at taking action (that is, stimulated but not so stimulated as to trigger tunnel vision), but stimulated or aroused individuals are less efficient at solving problems that demand creative thinking (2004). On the other hand, valence is the result of a positive or negative value judgment that people make consciously or unconsciously about an experience. When people evaluate in awareness an experience, the value judgment is triggered by *appraisals* (Gorp & Adams, 2012).

To complete this short review about emotion, it is necessary to mention that this area of study is permanently evolving, and more recent research recognizes the overwhelming landscape of definitions, models and approaches in the area of affective science, and recognizes the need for continuing research (Scherer, 2005; Von Scheve & Von Luede, 2005).

Cognition

Cognition is the second element of our triad of emotion, cognition, and behavior. The term cognition refers to all mental processes involved in memory, learning, attention, decision making or perception. The bridge between cognition and emotion is an evolutionary result of survival needs (Damasio, 1994). For example, rats have a more lasting association of sickness and an ingested substance than other species, improving their chances of survival (Garcia, Kimeldorf, & Koelling, 1955). Researchers Nairne, Thompson and Pandeirada (2007) have shown that under a threat to one's survival, emotions work especially well to store memories.

However, any strong emotion will lead to stronger memory traces, which explains why we remember our first dog or car particularly well. Likewise, consumer behavior is influenced by emotional factors (Damasio, 1994), therefore a customer could choose to purchase a life insurance because a website leverages fear for their family's security as a sales argument. Although some researchers have tried to define whether cognition and emotion are completely separate processes in the brain that occur in separate areas, or whether cognition occurs before or after the experience of emotion (Ortony, Gerald L. Clore, & Allan Collins, 1988; R.B. Zajonc, 1980). One school of thought asserts that emotional response occurs prior to cognitive response (LeDoux, 1992; R.B. Zajonc, 1980; Robert B Zajonc & Forgas, 2000). Other researchers argue that emotion and cognition are so thoroughly interdependent that most, if not all, emotional responses involve some degree of cognition (Storbeck & Clore, 2007).

This connection between cognitive processes and emotion is of a major importance in this research because both cognitive and emotional processes generate physiological response; for instance, pupil dilation is affected by both cognitive and emotional processes (Loewenfeld & Lowenstein, 1999; Vo et al., 2008). Because marketing landing pages are optimized to adhere to a very focused message, with very low cognitive load in the effort to drive a potential customer to convert a purchase intention into an action, these landing pages become a good tool to compare the impact of differing degrees of emotional appeal. In other words, because landing pages intentionally avoid *cognitive friction*, the physiological measurement instruments would record mostly the differing emotional response in the experiment, allowing the confounding influence of the subjects' cognitive response to the stimuli. The study attempts to examine the differing emotional response to two stimuli, using physiological measures.

Behavior

The study also explores the relationship between emotion and behavior, as defined by an action or purchase intention. Damasio and colleagues (2005) proposed the *somatic marker hypothesis* (SMH) model, in which behavior –particularly decision-making– can be influenced or biased by emotional processes. The work of Damasio was funded on the triune brain model developed by MacLean (1952), which suggests that the human brain is a set of three structures, consisting of the *reptilian complex* (or "reptilian brain"), the *paleomammalian complex* (the limbic system or "mammalian brain") and the *neomammalian complex* (the neo-cortex or "primate brain"). Damasio argued that emotions bridge the rational assessment of the neo-cortex and the non-rational brain of the limbic system, thus "the apparatus of rationality, traditionally presumed to be neocortical, does not seem to work without that of biological regulation, traditionally presumed to be sub-cortical" (1994). Other researchers also support the SMH model when refer to the subject (Bagozzi & Dholakia, 2002; Shiv & Fedorikhin, 1999).

Consequently, if purchase decision-making is highly influenced by emotions (Damasio, 1994; Dormann, 2001; Nairne et al., 2007), it should be possible to run an experiment to measure the effect of emotions on a landing page conversion. Thus, in order to understand and measure the processes involved in the landing page conversion experience, a model has been created by the researcher (Figure 3).

PROCESS	EVENT	RESPONSE	MEASUREMENT
EMOTIONAL	Stimulation	Arousal Unconscious	Physiological
COGNITIVE	Appraisal	Valence Conscious and unconscious	Verbal
BEHAVIORAL	Decision	Purchase Intention Conscious	Action

Figure 3. Model of the landing page conversion experience.

There is a moment when the processes detailed above work together and operate in just a few moments between the exposure of the stimulus and the performance of the desired action.

Chapter 3: Emotional Design and Measurement

Design for emotion

With the previous understanding of how emotions work and relate to behavioral and cognitive processes, it is easy to predict the interest of design scholars and researchers in learning more about how design elements work to elicit particular emotions and how emotion may affect our cognitive processing and behavioral response to a design (P Desmet, 2002; Forlizzi, 2007; Gorp & Adams, 2012; Ho & Siu, 2009). Nowadays, concepts like *emotional design* and *emotion design* have become very popular among scholars and designers.

When interaction designers “design for emotion", they are attempting to design for an emotional response that increases the probability that a visitor will perform a desired behavior (Gorp & Adams, 2012). For a landing page, or any other digital product, to succeed in evoking an emotional response it must be designed to create emotion, and although all products – intentionally or unintentionally– generate an emotional response in people, user experience designers are strongly motivated to find ways to achieve planned emotional responses.

Different emotional design models are available now (Pieter Desmet, 2002; Gorp & Adams, 2012; Jordan, 2002; Norman, 2004), so designers are learning the science behind the emotional impact of design and are beginning to take advantage of these models. These models help to understand the multiple *design dimensions* that a product must possess in order to achieve an emotional response (Gorp & Adams, 2012). One model describes the attributes that focus the design of a digital product on to goals, expecting it to be *useful*, *usable* and *desirable* (Sanders, 1992). Another model divides the way people process emotions into the visceral, behavioral and reflective levels (Norman, 2004). A further model urges designers to think about the emotional

benefits of their design, and to plan their design messages according to three types of emotional benefits: *hedonic*, *practical* and *emotional* benefits (Jordan, 2002). Even though none of these models provides a sure recipe to craft user experiences, all these new approaches and methodologies, along with new affective computing technology, allow us to explore new paths in designing for particular emotional responses.

The ADI Model

This study uses a design model that combines the cognitive, emotional, and behavioral response to a marketing landing page. This emotional design model was developed ad-hoc by the researcher in the absence of a more suitable emotional design method for marketing purposes. The ADI model presents three stages: *attention*, *dialog* and *interaction* (Figure 4), and fits every stage of the *conversion funnel* that the customer undergoes. Its terminology is straightforward, and can guide designers and researchers through the emotional, cognitive and behavioral processes expected in a conversion funnel of an actual marketing campaign.

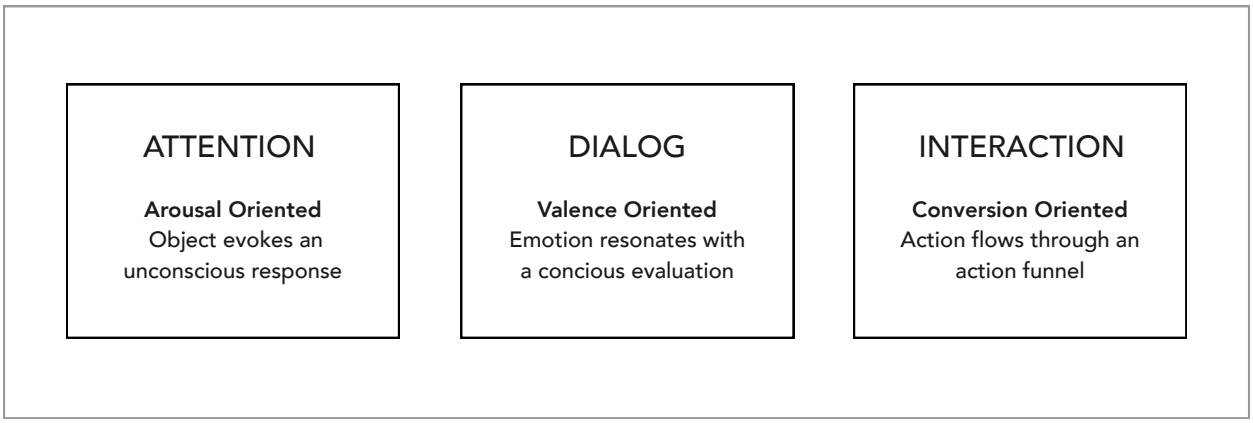

Figure 4. ADI Model, a Marketing-Oriented Emotional Design Model.

The model relies on two components: *a content strategy* and *an interaction design strategy* (Figure 5). On the one hand, the content strategy uses *emotional relevance* as a catalyst

to generate an emotional response (Wilson & Sperber, 2004), and on the other hand the *interaction design strategy* uses conversion flow to increase purchase intention.

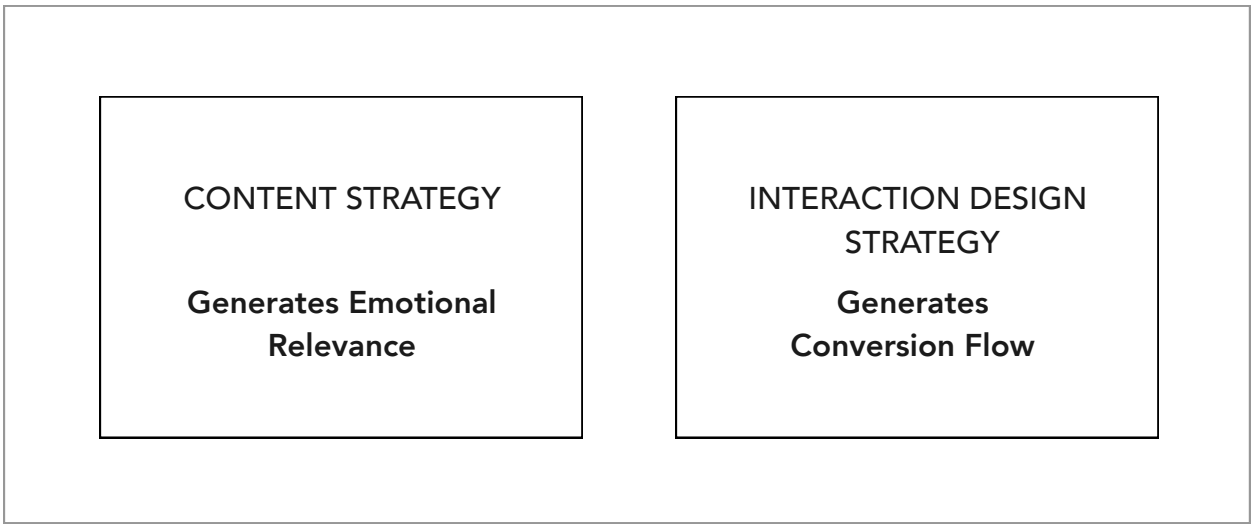

Figure 5. Components of the ADI Model.

In marketing, relevance is the importance given to a product, service or idea after the customer's appraisal (Schroeder, 2004; Wilson & Sperber, 2004), and only happens when the marketing information received interacts with the individual's unique beliefs and values (Wilson & Sperber, 2004), resonating with a potential customer and making a particular response feel profitable (Coville, 2014). Such appraisal is personal, and the importance, or intensity of the emotional response, varies among persons; hence what is sufficiently relevant to inspire action for one may not be judged equally relevant by another. However, the individual's perception of relevance is hindered by cognitive processing effort, and any processing effort required would have to be clearly outweighed in the prospect's mind by the value of what is offered (Wilson & Sperber, 2004). Successful designers must be able to understand user needs and goals through user research and strategic analysis, and designers must also have a deep understanding of the potential customers' emotional and cognitive processes.

As a result, within this paradigm, to generate emotional relevance, a *content strategy* is defined by the marketing campaign's *value proposal* and the *prospect (or customer) needs*. Communicating the value proposal means communicating the *unique selling proposition*, *features*, and *benefits* of the offer; and the prospect needs are defined by *igniters* and *barriers*, which are what motivate and what inhibit conversion (Figure 6).

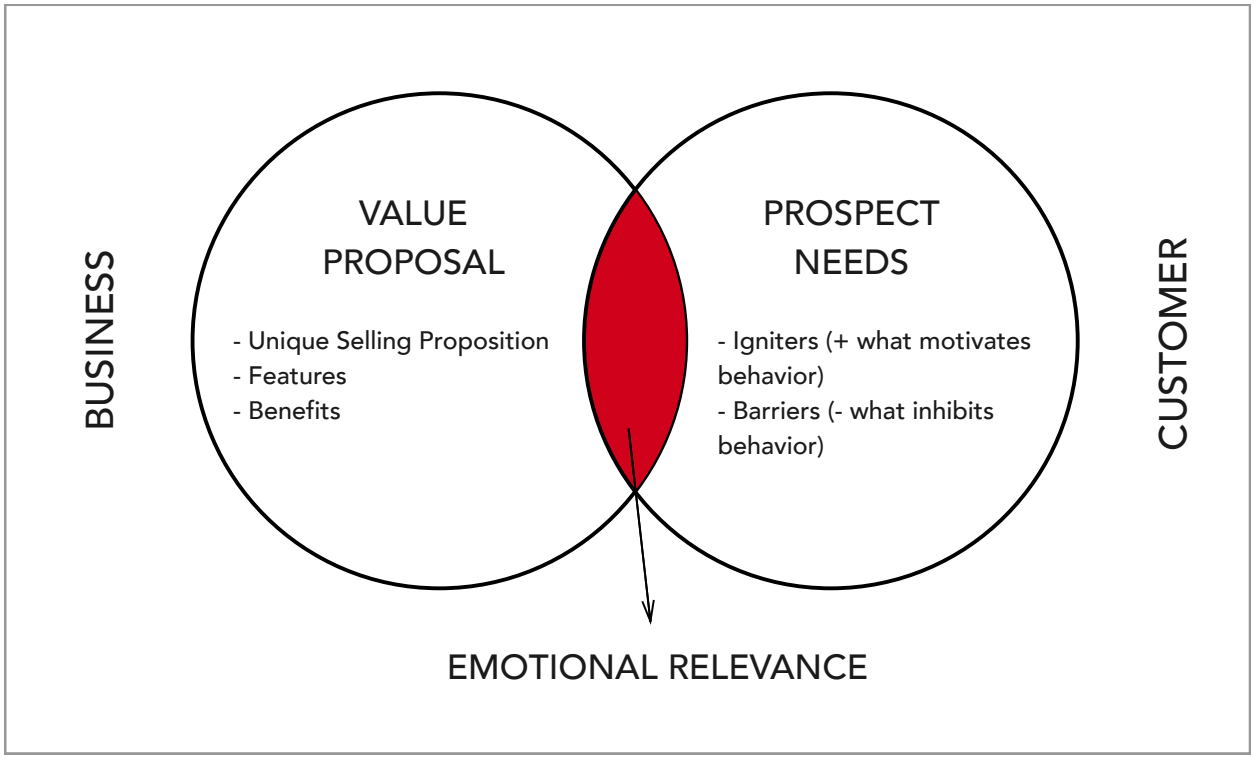

Figure 6. ADI Model's content strategy, the mean to generate emotional relevance.

Coville (2014) argues that relevance "changes minds but, importantly, changes behavior– and sustains that change". Thus, an effective interaction design strategy –inspired from Talia Wolf's methodology at Conversioner (2013)– will permeate landing pages with emotional appeals. The six components of this interaction design strategy are: *messaging*, *images*, *color*, *call to action*, *user interface*, and *psychology* (Figure 7).

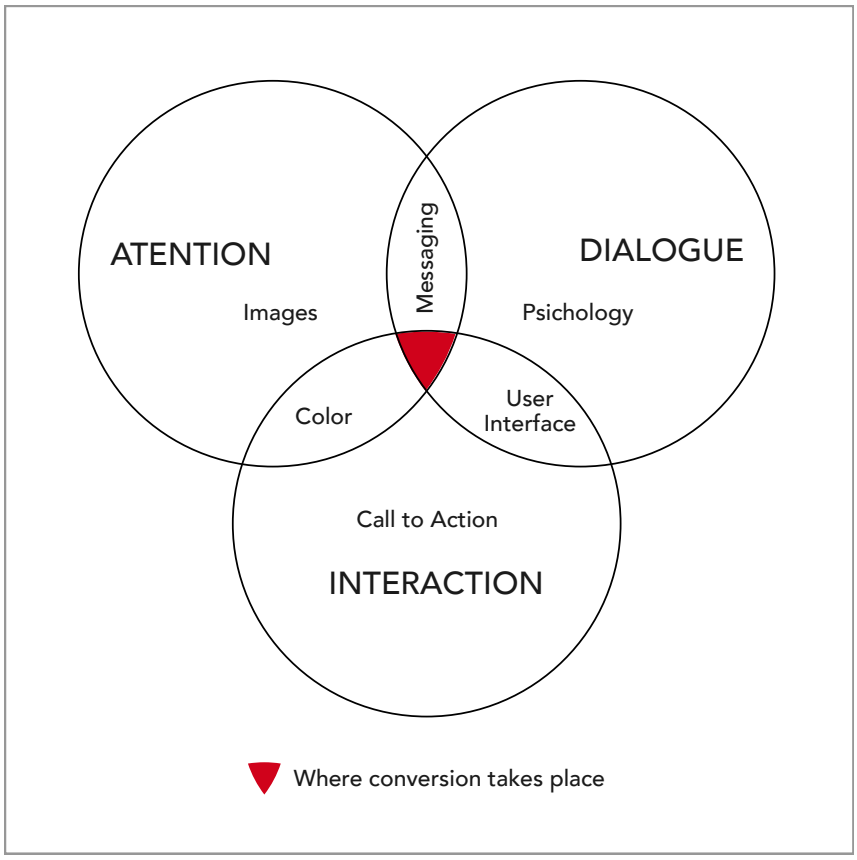

Figure 7. ADI Model's interaction design strategy, the mean to generate conversion.

Measuring emotions

If emotions are connected to physiological processes, then there is something to measure and observe (Hartson & Pyla, 2012). As emotions are a subject of interest in different disciplines, the instruments to measure emotions vary greatly in their focus, but in general, there are two main categories of emotional measurements: *self-reported* and *physiological*.

Self-reported, through which participants can report, rate and value their experiences, are described in Table 1.

Table 1. Self-reported emotional measurement instruments

SAM (Self-Assessment Manikin) (Bradley & Lang, 1994).	A non-verbal pictorial assessment technique that directly measures *pleasure*, *arousal*, and *dominance* associated with an individual's emotional reaction to a stimulus. It uses three-dimensional scales PAD (Mehrabian, 1996): • Pleasure-Displeasure Scale measures how pleasant or unpleasant an emotion may be. • Arousal-Nonarousal Scale measures how energized or soporific an emotion may be. • Dominance-Submissiveness Scale represents how controlling and dominant versus controlled or submissive an emotion may be.
PrEmo (Product Emotion Measurement Instrument) (Pieter Desmet, 2002)	PrEmo is a non-verbal self-report instrument that measures seven positive and seven negative emotions.
AttrakDiff (Hassenzahl, Burmester, & Koller, 2003)	AttrakDiff is an online tool that allows users to rate the usability and design of interactive products.
LEMtool (Huisman & van Hout, 2010)	LEMtool is a non-verbal pictorial assessment tool that allows users to rate a design with regard to eight specific emotions relating to aesthetics, usability, and liking.

Physiological measurements, through which devices measure autonomic and involuntary bodily responses, (Hartson & Pyla, 2012), are described in Table 2.

Table 2. Physiological emotional measurement instruments

Electrodermal activity (EDA) sensor.	• Used to measure arousal. • Used for lie detection. • Modern *electrodermal activity* (EDA) sensors are almost non-invasive. • EDA reads electrodermal resistance and conductance. When arousal increases sweat production, moisture in the skin increases as well, creating high electrodermal conductance and low electrodermal resistance. • EDA is directly related to activation of the sympathetic nervous system (SNS), therefore its measurement is independent from the parasympathetic *nervous system* (PNS) (Park, 2009). • EDA response latency is about 3 to 6 seconds from stimulus onset (Park, 2009).
Pupillometry, via Eye Tracker	• Used to measure arousal; excitement and engagement based on pupil diameter. • Modern eye trackers are non-invasive. • Pupil dilates (increases diameter) in response to emotional or cognitive stimulation. • Pupil diameter is controlled by the autonomic nervous system (ANS), *dilation* is controlled by the sympathetic nervous

	system (SNS) and *constriction* is controlled by the parasympathetic nervous system (PNS). • Pupil diameter is affected by *reflex* dilation of two kinds: light ("light reflex") and distance ("near reflex") (Loewenfeld & Lowenstein, 1999). Because these reflexes are unrelated to either cognitive or emotional responses, studies measuring emotion by pupil diameter should considered light and distance as confounding factors which must be controlled. • Pupil dilation by cognitive factors takes priority over arousal factors (Stanners, Coulter, Sweet, & Murphy, 1979). Studies measuring emotion by pupil diameter should minimize cognitive load in order to isolate the emotional response. In this case, cognitive response by pupil diameter is a potentially confounding factor . • If light reflex happens at the same time as an emotional or cognitive response, pupil dilation is counteracted by light reflex (Loewenfeld & Lowenstein, 1999).

There are more sophisticated ways to measure emotion (e.g. PET, fMRI, ERP) that make it possible to watch in more detail how the human neurology system articulates affective, social and cognitive processes. Such tools, however, are generally restricted to medical or research facilities and are not yet likely to be generally available to interaction designers and marketing professionals.

Physiological instruments will always report particular corporal responses articulated with other processes happening at the same time, so measurements cannot be interpreted in a unique and simplistic fashion (Loewenfeld & Lowenstein, 1999; Vo et al., 2008). Recently, in the enterprise environment has appeared many neuro-isms (*neuromarketing*, *neuropolitics*, *neuroeconomics*, etc.) that seem to promise that it is possible to reveal brain activity patterns and know the mysteries of different areas of interest for businesses, but the truth is that the human brain is a very complex, and neuroscience is still in a fairly early stage. At this time, each answered question in neuroscience only raises many more new inquiries. Although some research companies sell "neuromarketing studies" without disclosing many details about instruments, data analysis, methodology or control mechanisms, most of these research studies are essentially marketing efforts using the trappings of of science, designed more to impress than to expand knowledge. The truth is that using physiological measurement instruments—even the less sophisticated ones that are broadly available—requires training and a deep knowledge of human neurophysiological processes (Schall & Romano Bergstrom, 2014). This study confirms that even when physiological measurements are helpful, they can easily be misunderstood or misrepresented. Thus, even careful researchers should employ additional research methods to support real-world decision-making..

Although is not possible to "take a picture" of the brain and determine what users think, feel and desire (at least not yet), all these new instruments do make it is possible to know much more about the human brain than was possible a few years ago. Physiological measurement tools are becoming available to professionals working in interaction design at increasingly affordable prices (Bradley, Miccoli, Escrig, & Lang, 2008; Huisman, 2011; Pour & Calvo, 2011), consequently allowing us to explore new ways of direct observation of what happens in the mind

of digital consumers and providing increased insight into the emotional effects of actual designs (Schall & Romano Bergstrom, 2014).

As would be expected, there is increasing interest in the HCI community to study and understand all the emotional and cognitive aspects of the user experience. Insights into this area come from many other disciplines that until recently were unfamiliar to interaction designers, such as *neurosciences*, *physiology*, *affective computing*, *persuasion engineering*, etc. This interest can be explained because traditional usability (Standard, 2010) does not allow designers to envision all phenomena that occur when people interact with digital products. Effectiveness, efficiency and satisfaction remain valuable parameters when evaluating digital products, but it is necessary to understand the users' emotional responses to interactive products in order to make good design decisions (Norman, 2004). We must seek to understand what influences, entertains, engages, satisfies, inspires or stimulates users.

Despite the fact that professionals in interaction design are more familiar with observational or verbal methods, such as surveys, interviews, think aloud protocols or direct observation (Schall & Romano Bergstrom, 2014), it has become easier to use tools that until recently were confined to high-budget scientific investigation. This possibility has generated a growing interest in marketing professionals to design and validate digital products that have been demonstrated to elicit an emotional response from potential customers, in order to predict the success of digital marketing campaigns. Thus, it is worth encouraging the HCI community working in marketing projects to learn the use of these new instruments to improve the performance of marketing-oriented digital products.

At the same time, it is important to understand that many conclusions drawn from studies using physiological measurement tools can be achieved as well by using heuristics, traditional

usability testing, or A/B or multivariate testing. One of the goals of this study is to help interaction designers understand when it is pertinent to use such instruments, and how these studies can provide actionable insights.

Previous studies in the HCI community have used physiological instruments, or a combination of self-reported and physiological instruments, to measure emotional responses. However, there is no previous study that specifically measures emotional responses to marketing landing pages. Furthermore, since there is no a standard device available to measure people's emotional responses of people, a decision was made to use two physiological instruments to measure emotional arousal and one self-reported instrument to measure emotional valence in this research. In the future, it is to be hoped that more advanced—yet affordable—techniques for measuring emotional response will be developed (Gorp & Adams, 2012),

Stimulus–Organism–Response Model (S-O-R)

To complete this review, it is important to explain the S-O-R model (stimulus, organism, response), a well-known model in psychology that illustrates how different stimuli influence consumers' emotional states in a service environment, and how such lead to a response in consumers' behavior. The S-O-R model (Figure 8) is an update of the S-R (stimulus, response) model (Holland, 2008), also known as classical conditioning, but considers that the organism –in this case, the consumer– may behave differently in response to the same stimulus. In other words, one organism may respond differently to a particular stimulus than another organism. To be precise, this difference in the customers' response is due to their personal evaluation or determination of relevance based on the degree of emotional stimulus received. The relationship between an emotional response and an intention to purchase is well supported by Turley and

Milliman (2000), who compiled more than 60 scientific studies that corroborate the claim.

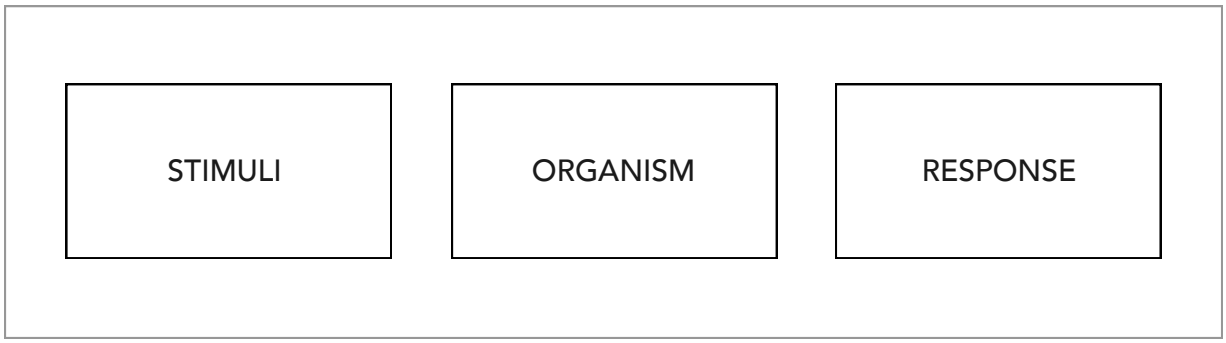

Figure 8. The S-O-R Model (Mehrabian & Russell, 1974).

Chapter 4: Methods

The present study employed a within-subject experimental design. Every participant was exposed to two conditions. Condition A was a landing page designed to have low emotional appeal, and condition B was a landing page designed to have higher emotional appeal. Level of emotional appeal was the independent variable. The dependent variable was defined to be conversion, measured both as a self-reported purchase intention and as a click on the 'buy' button.

A model to measure the effect of emotion on marketing landing page conversion

In the research design, an adaptation of the S-O-R model (Mehrabian & Russell, 1974) was applied. The stimulus was a marketing landing page, eliciting some level of emotional response from the organism, or participant, and the response was the action or intended action of purchase. This research model is defined in three stages that represent the conversion funnel of a marketing landing page (Figure 9). In the stimuli stage, the interaction design and content strategies –from the ADI model– were used to craft the marketing landing page. In the organism stage an emotional response is generated, and measured in both intensity (emotional arousal) and valence (positive or negative). Finally, in the response stage, the conversion was evaluated by an action and/or purchase intention.

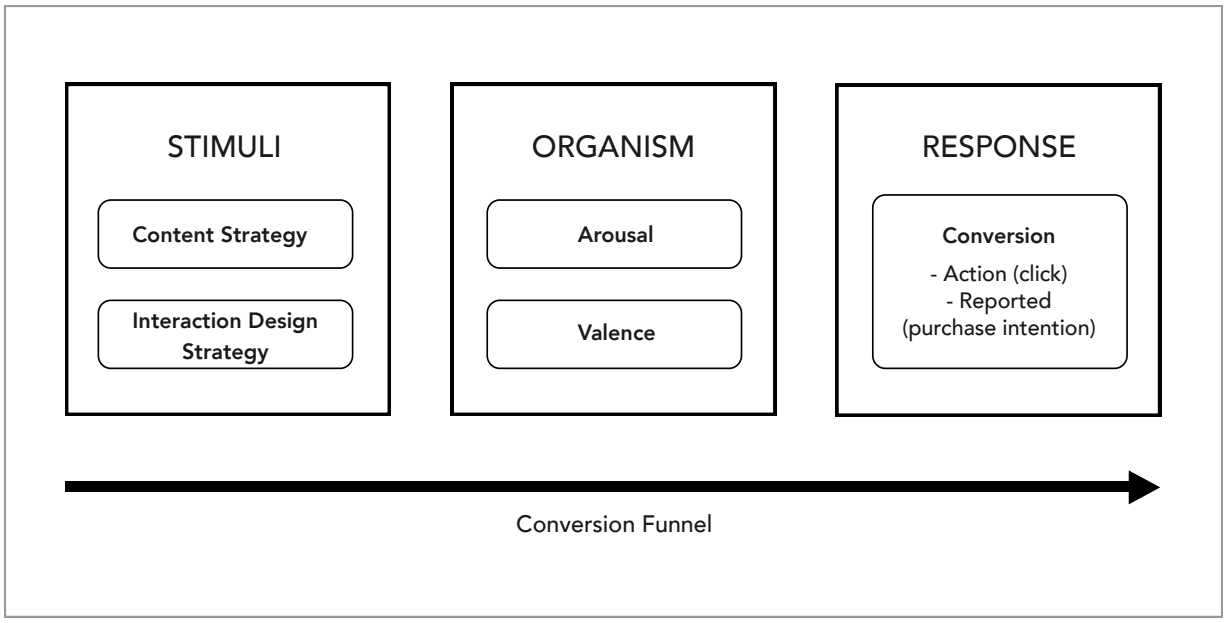

Figure 9. Research model for this experiment.

The selected instruments to measure physiological response were an eye tracker device that can measure pupil dilation and an EDA (electro dermal activity) sensor. The eye tracker was chosen because research indicates that emotional arousal increases pupil dilation in males and females, as a consequence of sympathetic and parasympathetic activity (Bradley et al., 2008; Partala & Surakka, 2003), and the EDA sensor was selected because of the relationship between emotional arousal and sympathetic activity as manifested in *skin conductance* characterized into *tonic skin conductance level* (SCL) and *phasic skin conductance response* (SCR). While phasic SCR is associated with short-term events registering abrupt increases or "peaks" in skin conductance, tonic SCL registers slow variations not associated with any particular event (Empatica Inc., 2016). Neither eye-tracking nor EDA sensors can determine the specific emotion that is being elicited by the stimulus –that is, they cannot determine emotional valence—hence, a self-reported tool was also used SAM (Bradley & Lang, 1994). Holmqvist, Nyström and Andersson (2011) state that a strong research approach is one that combines data from multiple

instruments at the same time, so that the weaknesses of one system can be compensated for by the strength of the other, an approach usually called methodological triangulation or cross-validation. This mix of self-reported and physiological tools offers a combination of low invasiveness and high objectivity during measurement.

Previous studies have physiologically measured the emotional response when people interact with digital products (Bradley et al., 2008; Partala & Surakka, 2003). However, most of these studies have focused on measuring emotional response over longer periods. Because the response time of an emotion varies and the time required by particular instruments to measure physiological response, we cannot ensure what exactly generated a particular physiological response that we observe. In light of this, and given that emotions occur quickly and may not last long, this research will measure the emotional response of the participants in just a few seconds after a landing page is presented.

To sum up, based on well-documented findings regarding emotion and its effect on conversion in the literature, it is suggested that different degrees of emotional design on a marketing landing page will have a measurably different influence on the emotional response of potential online customers, which will be manifested through emotional arousal and emotional valence. Consequently, the following hypotheses were developed.

Null hypothesis H0: Participants exposed to a marketing landing page with high levels of emotional appeal will have no measurable difference in emotional response than participants exposed to a landing page with low levels of emotional appeal.

H1: Participants exposed to a marketing landing page with high levels of emotional appeal are more likely to exhibit higher emotional arousal than those who are exposed to a marketing landing page with low levels of emotional appeal.

Likewise, much research supports that customers' behavior is influenced by emotion and that a marketing landing page that is emotionally relevant to the customers generates more conversion. As a result, the following hypotheses were developed.

Null hypothesis H0-2: Participants experiencing higher emotional arousal with a positive emotional valence will respond to the associated landing page with the same rate of conversion behavior as do participants who experience the landing page associated with neutral or negative emotional valence and lower emotional arousal.

H2: Participants experiencing higher emotional arousal with a positive emotional valence will respond to the associated landing page with a higher rate of conversion behavior, as opposed to participants who experience the landing page associated with neutral or negative emotional valence and lower emotional arousal.

Participants

Overall, data was collected from 28 participants (12 women, 16 men, age range: 30-50 years), with a mean age of 37 (SD = 5.89). Data from six of the original 34 participants were excluded, due to failure to record pupil information from some of the older participants. All participants were single and regular users of the mobile app Mi Media Manzana, a dating app. All the participants were considered potential customers of the premium service of Mi Media Manzana, since they were regular users of the app but none of them had yet purchased the premium service. The recruitment was through a push notification sent to all users of the app living in Lima, Peru, inviting them to fill a registration form to participate in the study. Participants were compensated 50 Soles (about $14.50) for their participation. All participants were asked to remove corrective eyewear and pass a reading test under a low light condition before being qualified to participate in the study (Wang, 2011).

Materials

Two versions of the marketing landing page of the premium service on Mi Media Manzana's Android mobile app were used as stimuli: condition A (original landing page) and condition B (manipulated landing page) (Figure 10). The primary emotional appeal and invitation to conversion of the original landing page is the opportunity to save money by purchasing the premium service for six months rather than one month. The manipulated landing page promises that the purchaser will go on a date with a person judged to be compatible within 15 days or their money will be refunded. This provides two powerful emotional appeals—the focus on going on a date, and the promise of a guarantee. (Guarantees of online purchases are very rare in Peru.)

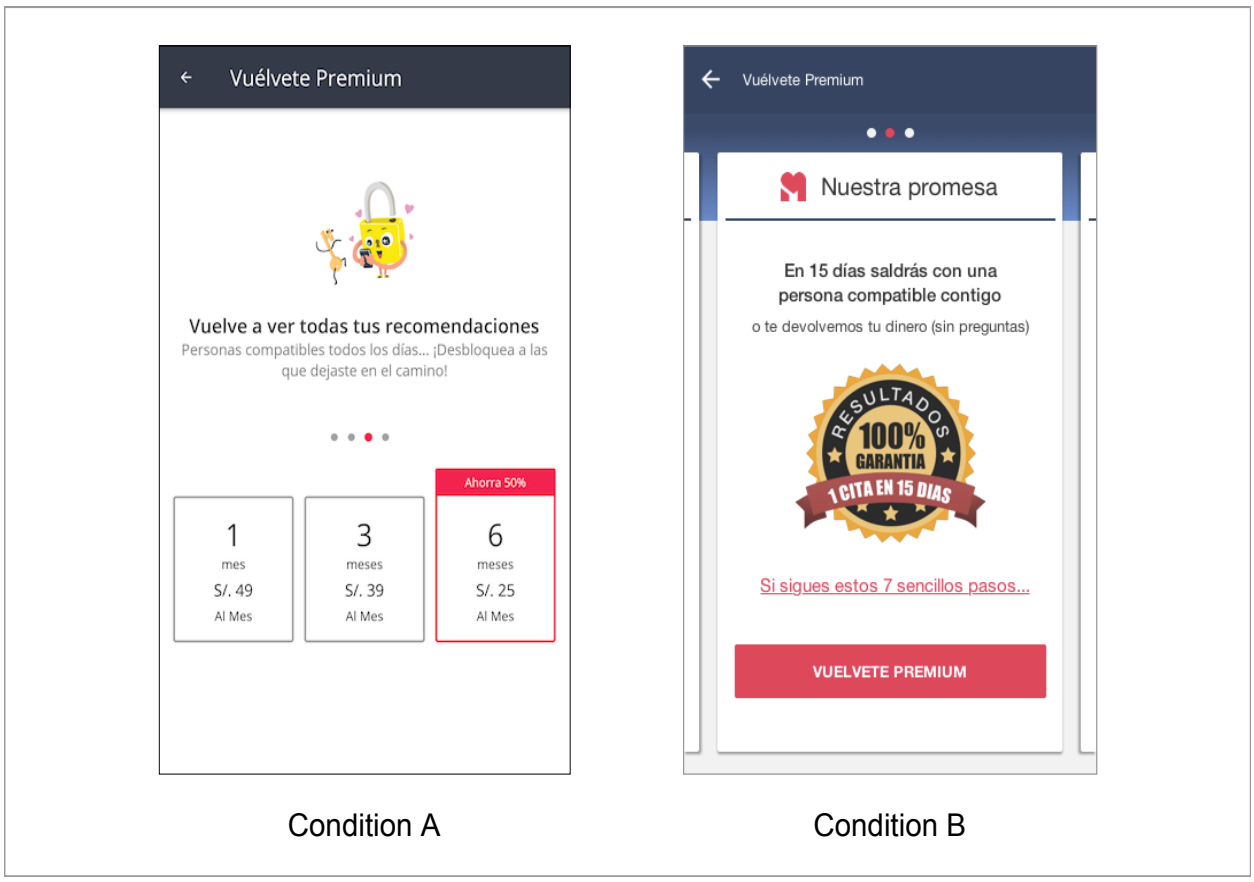

Figure 10. The two versions of the marketing landing page used as stimuli

A Mirametrix S2 eye tracker device was used to measure the pupil dilation of the participantss by infrared light. An Empatica E4 wristband EDA sensor was used to measure electrical conductance across the skin, attached to the wrist of the participants. A survey was used to record the self-reported emotional valence, using the pleasure measurement component Self-Assessment Manikin (SAM) Scale (Bradley & Lang, 1994), in the form of a Likert scale where 1 represented the most extreme negative emotion and 9 the most extreme positive emotion, and 5 represented no emotion at all (Figure 11). OGAMA (Vosskühler, Nordmeier, Kuchinke, & Jacobs, 2008), an open source software to analyze eye and mouse activity, was used to collect conversion through mouse "click" action, if participants decided to click on the 'buy' button. A survey was used to record the self-reported purchase intention on both landing pages, and the possible answers were *yes* or *no* for each version of the landing page (Figure 12). Both physiological and self-reported data were collected as each stimulus was shown. Sessions were held in Spanish, since the participants were native Spanish speakers.

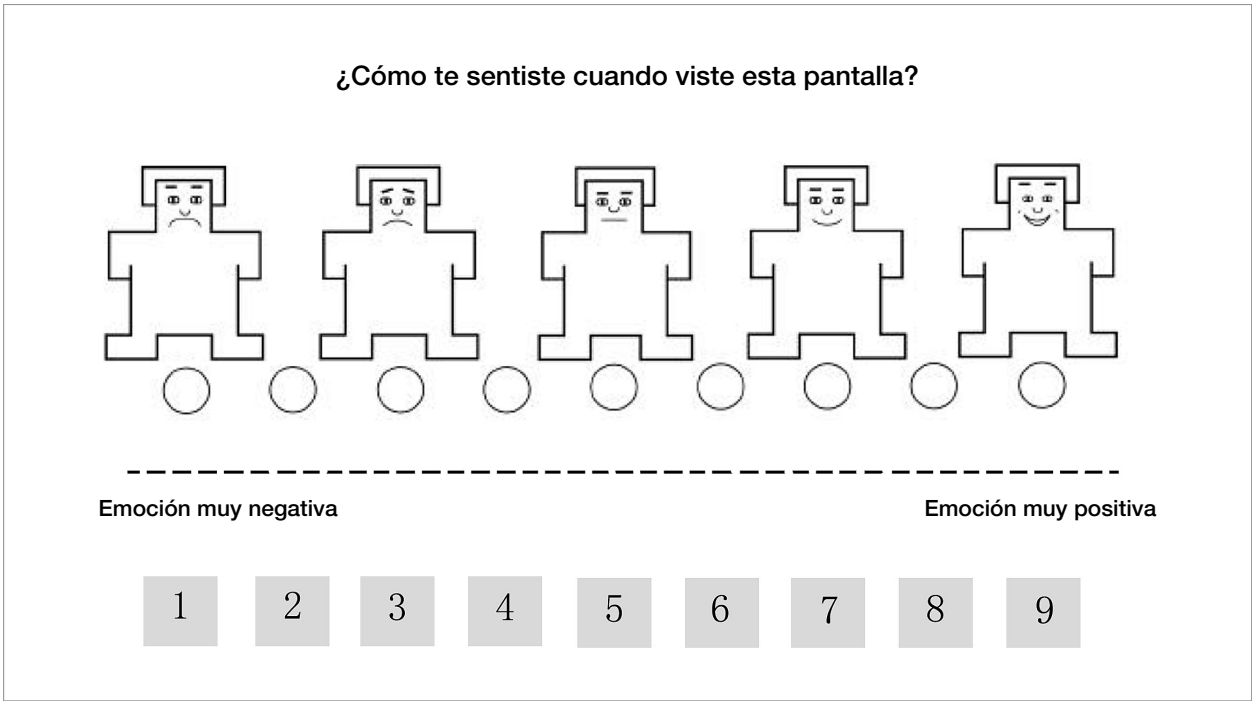

Figure 11. Self-Assessment Manikin (SAM) pleasure scale in Spanish, used in the study (Bradley & Lang, 1994).

Figure 12. Survey to self-report purchase intention. This screen showed the two landing pages, and asked if either of the pages would have motivated the participant to buy the service, or if neither screen would have convinced the participant to buy the service.

A PC (HP Compaq 6200 Pro Small Form Factor PC, Intel Core i5-2400 3.10 GHz, 6MB cache, 4 cores, 8GB 1333 MHz DDR3 SDRAM, Crucial MX300 256GB SSD) running Microsoft Windows 10 operating system in Spanish was used to present both stimuli on a LED monitor (BenQ GL-955 19") mounted in front of the participant, with one set of Creative Inspire T3300 2.1 speakers, with the volume set right in the middle. The session was observed by the interviewer using a second LCD monitor (Planar PLL2210W) connected to a secondary video card through an HDMI cord.

In every session, OGAMA was used to record the eye tracker feed including pupil dilation (Granholm & Steinhauer, 2004; Partala & Surakka, 2003; Wagner, Hirsch, Vogel-Farley, Redcay, & Nelson, 2013), a video with the participant's face (via a Logitech HD-720p webcam) and another video with the screen shown to the participants. The EDA feed was recorded by the Empatica Realtime App installed on an iPad Mini 3 64GB WiFi connected wirelessly through Bluetooth to the Empatica E4 wristband (Figure 13).

Figure 13. Empatica E4 wristband EDA sensor

On OGAMA, the instructions given in Spanish to the participant were as follows:

- Please follow all the directions presented on the screen.
- Some screens of the Mi Media Manzana app will appear on the screen. Please click on the 'buy' button if you feel a desire to purchase the service that is described.
- Breathe deeply and think about positive things. (This instruction appeared between the appearance of the two versions of the landing page.)
- Session completed, thanks for your participation.

Pilot studies

Several pilot studies were conducted in order to develop the experimental method. A first pilot study was conducted to develop a method and to generate actual data using the two physiological and one self-reported instruments selected to measure emotional arousal and valence. Three participants were invited to the laboratory to complete two versions of the same task –to log into a bank account. Each version of the same task challenged the participant in different degrees, and the intention was to generate an emotional response through a common online activity. The chosen instruments were a Tobii X2-30 eye tracker, an Ashametrics Wrist LifeBand EDA sensor and a Self Assessment Manikin (SAM). The results exposed many sources of confounding variables and measurement difficulties. Some of these issues are as follows:

- The resolution of EDA sensors varies among brands, affecting the quality of the data generated by the instrument. As a result, the decision was made to purchase an Empatica E4 wristband EDA sensor.
- Long tasks increase the chance to contaminate the emotional arousal record with cognitive activity, both of which are registered by pupillometry (Loewenfeld & Lowenstein, 1999; Vo et al., 2008). Consequently, a decision was made to study a shorter

and more emotional moment with less cognitive impact and less cognitive variation, thus a marketing landing page was selected to be the stimulus in the next pilot study.

- Light conditions must be carefully controlled in the laboratory in order to measure pupil diameter that is not contaminated by the pupil's response to light. The pupil dilation related to arousal could be affected by luminance from the stimulus itself, computer monitor or environment.
- Data entering tasks force participants to move their visual attention from the monitor to the keyboard, and correct pupillometry is compromised (Figure 14). Thus, a more passive task was sought to ensure that participants keep their eyes on the monitor.
- Eyeglasses had a large effect on measured pupillometry, therefore it was necessary to exclude people with vision limitations during recruitment (Figure 14). During the pilot, one participant felt so frustrated because he could not see clearly the monitor that the physiological measurements of emotional response was contaminated in both measurement instruments.
- Any movement by the participants also affects pupil diameter measurement, therefore a head support was manufactured and used in subsequent sessions.

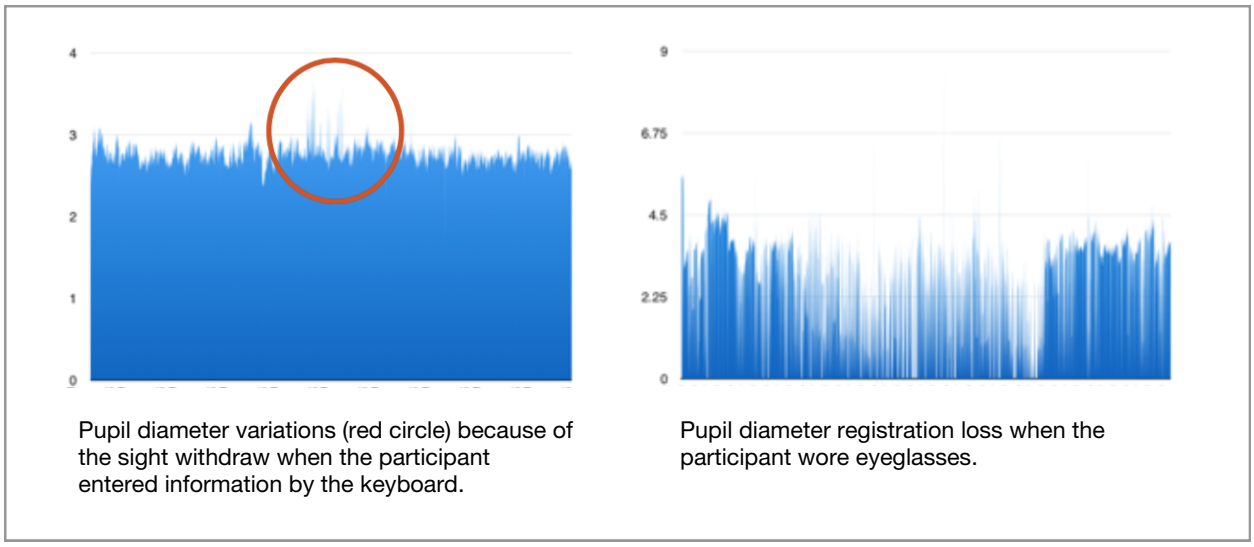

Figure 14. Compromised pupillometry records.

Once the measurement methods and the research questions had been refined, a second pilot study was conducted. The second pilot study led to more tightly controlled data recording conditions with regard to luminance, distance and movement. Braithwaite, Watson, Robert, & Mickey (2013) explain that a visual inspection of the data recorded by physiological instruments is needed to confirm its integrity. Accordingly, for the second pilot, twelve participants were invited to the laboratory, in exchange of 50 Soles (about $14.5), to evaluate both stimuli as described below in the procedure section. Progressive adjustments to the lighting and to the equipment were made to ensure correct pupillometry measurement (Figure 15). Furthermore, the data obtained from this evaluation returned feature values representing the level of activation of emotional response, as confirmed by the other two measurement instruments.

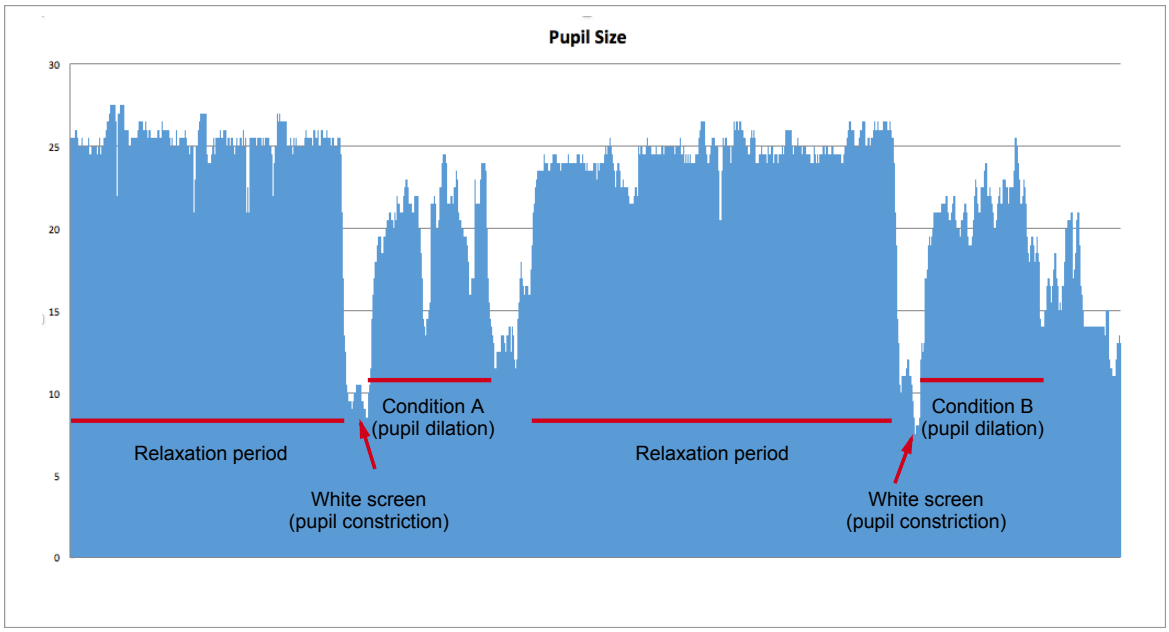

Figure 15. Pupillometry data clearly shows the stages of the experimental procedure. The data integrity is visually confirmed (Braithwaite et al., 2013).

Procedure

The model used to measure the effect of emotion on marketing landing page conversion and the instruments used is described in Figure 16. For measuring the emotional response, two physiological and one self-reported tools were chosen to measure arousal and valence, respectively. Finally, conversion was measured by the expected behavior performed clicking on the "buy" button or by a reported purchase intention (Damasio, 1994; Dormann, 2001).

PROCESS	EVENT	RESPONSE	MEASUREMENT	INSTRUMENT
EMOTIONAL	Stimulation	Arousal Unconscious	Physiological	Pupilyometry EDA
COGNITIVE	Appraisal	Valence Conscious	Verbal	SAM
BEHAVIORAL	Decision	Conversion Conscious	Action	Click-through Purchase intention

Figure 16. Research model and instruments.

The data were collected in two experimental conditions (low emotional design and high emotional design) within-subjects to generate conversion. The order of the stimuli was counter-balanced, with half of the participants (6 women and 8 men) exposed first to condition A and then to condition B, and the other half (6 women and 8 men) exposed first to condition B and then to condition A.

In order to manipulate the emotional arousal for condition B, a more emotional stimulus was created following the ADI model described above, regarding two components: emotional relevance and ease of action.

The content strategy to create emotional relevance was defined using the findings unveiled in a qualitative study done earlier by Mi Media Manzana to identify their customers' priorities and concerns. Among those, the researcher chose the need of a guarantee to manipulate the independent variable emotion (condition B), which said that in a market (such the Peruvian) where consumers rarely make Internet purchases and distrust the effectiveness of a dating platform, a service guarantee may be a good catalyst to raise an emotional response. Hence, the value proposal was defined as: the unique sale proposition was the "effectiveness" of the app, the

main benefit was “to date someone compatible within 15 days” (providing potential partners in a short time), and the feature was the premium service itself. The two components of the prospect needs were defined as follows, the fueled igniter was a “company commitment” (a guarantee, almost never seen in the Peruvian digital business scene) and the reduced barrier was ‘fear to lose’ (by promising a refund). To summarize, the guarantee stated that the buyer would date someone compatible within 15 days (if a number of steps were followed, such as interacting properly with potential dates and making their user profile complete), otherwise Mi Media Manzana would refund 100% of the payment, no questions asked.

The visual design strategy to create ease of action followed the criteria of the ADI model, among them: concise copywriting, visual trust building (the guarantee badge), more color balance, a clean layout, clear affordance on the user interface (a single click button), empathetic psychology, and a simple call to action.

One important consideration in the visual design was the luminance variation potentially created between both stimuli once presented on the computer monitor. Pupil measurement demands a careful selection of the stimuli to minimize confounding effects due to varying light conditions, hence both stimuli were designed to maintain similar luminance when presented on the computer monitor (Bojko, 2013; Loewenfeld & Lowenstein, 1999; Wang, 2011). In order to measure and compare luminance of both stimuli, the LightMeter Free Android app was used, although a more trustable method (Bojko, 2013) was found in an advanced stage of the study.

Because the interaction with landing pages creates cognitive load along with emotional arousal, it can be difficult to isolate the effect of emotional arousal versus cognitive response when trying to measure physiological response—particularly pupil dilation. Thus, the stimuli were both designed to have low cognitive load.

It is also very difficult to identify the precise moment when an emotional response is triggered. Although emotional responses to affective content take place in a fraction of a second (Cuthbert, Schupp, Bradley, Birbaumer, & Lang, 2000), there is a response latency of around 3 to 6 seconds before either pupil dilation or electro dermal conduction reactions become measurable (Chanel, Kierkels, Soleymani, & Pun, 2009; Park, 2009). To allow for this latency, this study aimed to measure through physiological instruments what happened within the first 15 seconds of emotional response after the landing page onset. The researcher considered that such time frame is sufficient to generate enough physiological response data and to allow for a decision to click or not click, which was considered one indication of conversion.

Participants carried out the experiment individually after being informed that the study concerned "emotional response and purchase intention on the Mi Media Manzana's mobile App" (See Appendices for the interview guide in English and Spanish). Before the study, the participant was prepared for the experiment with an introductory explanation of the procedure. All participants were given opportunities to ask questions before and after the study, all participants signed a consent form (see Appendices for consent form in English and Spanish), and the consent form explained that their psychometric reactions would be recorded if they agreed to participate. Some demographic information was requested, such as full name, age and occupation. As a practice trial, a printed sample of a mobile app screen similar to the stimulus was presented to the participant and instructions were given to click on the "buy" button if the stimulus generated an intention to purchase, which was accounted as conversion.

Then the laboratory was introduced to the participant, which consisted of one room with an incandescent light bulb of 100 Watts installed on the ceiling, being the only light source during the session; every outdoor light source was blocked to avoid confounding effects due to

light conditions. The participant was comfortably seated in a non-rolling chair in front of the computer monitor and asked to turn off their mobile phone(s). Again, the participant was invited to ask questions in order to reduce any stress caused by the new environment and situation. The participant was instructed to rest their chin on the head support (with a distance of 65 cm from the eye tracker) to avoid head movements and minimize any other potential confounding effect (Wang, 2011), such as distance variations between the eye tracker and the participants' eyes and avoiding pupil diameter variations within the session due to participants' movements (Loewenfeld & Lowenstein, 1999; Wang, 2011) (Figure 17).

Figure 17. A head support was installed in front of the eye tracker/monitor to restrain participants' movements.

In order to be able to measure participants' pupil diameter without any focal distortion, it was necessary to ask participants to remove their glasses. As part of the pre-test qualification, an

image with typography equal to the typography used on the stimuli was shown on the screen. The participant was asked to remove their reading glasses and invited to read the text on the screen while placing their chin on the head support at a distance of 65 cm from the eye tracker. If the participant could not read the text without glasses, a compensation of 20 soles (about $6) was given, and the session concluded.

If the participant was able to read the text without eyeglasses, then the Mirametrix Tracker software was presented and the eye tracker aligned according to the participant's height. The Empatica E4 wristband was attached (Dufresne, Prom Tep, Senechal, & Courtemanche, 2010) to the wrist of the non-dominant hand, for instance: if the participant was right-handed the wristband was placed on the left wrist, or vice versa. The interviewer ran OGAMA on the computer and recorded the video feed on the webcam but not the audio feed, since the audio was unnecessary to record. The Empatica E4 wristband was initiated and synced to the Empatica Realtime tablet app that recorded the EDA signal. On OGAMA, an eye tracker calibration process was set and the participant was told to follow the instructions on the screen. The sampling rate of the eye-tracking system was 60 Hz. The interviewer initiated the recording on OGAMA and a last synchronization signal was triggered on the wristband in front of the webcam in order to visually match the eye tracker data and the EDA data, to ease the further data analysis phase. In order to record baseline measurements of both EDA and pupil diameter, two pre-experimental measurements were taken. An EDA baseline measurement was taken from a relaxation period of three minutes (Braithwaite et al., 2013) in which the participant was encouraged to relax by calm music and instructions on the screen to breathe deeply and think on positive things. A pupil diameter baseline measurement was taken from physically forcing the participant's pupil constriction by showing a full white screen just before the stimuli exposition.

Both stimuli, A condition and B condition, were presented sequentially in a counter-balanced order. Each trial lasted 15 seconds on the screen, enough time to generate and record physiological emotional arousal.

To complete the experiment, participant's answered a self reported questionnaire . First, the participant reviewed both stimuli in printed form, and then reported the valence of the emotion generated by each stimulus using Self- Assessment Manikin (SAM), a non-verbal pictorial assessment technique. Finally, the participant reviewed a printed paper with both stimuli and a third "none of the above" option and were asked to choose which stimulus, if any, would have generated an intention to purchase, which was counted as conversion.

As a session debrief, the aim of the experiment was explained in detail and the participant had the opportunity to ask additional questions. The compensation was given to the participant, who signed a receipt. In order to increase confidentiality, the participant was invited to leave the facility using a back door.

A data reduction process using Microsoft Excel was applied to the pupil diameter information recorded by the eye-tracker (in pixels, PX.) and the SCR recorded by the EDA sensor (in microsiemens, μS), adapted from the procedure described by Bradley et al. (2008). The process used for the data analysis from each trial was as follows:

For eye tracking:

- Conveniently, during the recording, OGAMA filled out automatically missing pupil diameter entries due to blinking, which made easier data preprocessing.
- A mean of both pupils was calculated.

- A 1-s pre stimulus baseline average was computed as a maximum level of pupil constriction –when the full white screen was presented–, a natural constriction reaction of pupils to initial light (Loewenfeld & Lowenstein, 1999).
- Pupil response to the stimulus, after initial light, was calculated as the mean change from baseline, in a window from 2 to 15 s after post stimulus onset.
- A subtraction of pupil diameter response to the stimulus from baseline determined pupil diameter variation for each condition.

For the EDA sensor:

- EDA values were computed for each trial, including tonic EDA and phasic EDA, as recorded by the E4 Empatica wristband.
- A 3-min pre stimulus –the relaxation period– onset baseline average was computed (Braithwaite et al., 2013).
- The maximum change between 4 and 15-s post stimulus onset was calculated as the mean change from baseline, and, since the baseline EDA differs from one individual to another, a normalization procedure was performed, after a log transform (log [SCR+1]), to analyze variance (Braithwaite & Watson, 2015).
- A subtraction of maximum change in SCR to the stimulus from baseline determined EDA variation for each condition.

Additional data preprocessing:

- Dichotomous variables were created to identify measurement of the participants who registered higher emotional arousal and positive emotional valence (SAM between 6 and 9).

Chapter 5: Results

Descriptive and parametric statistics are reported for analyses of the two null hypotheses and alternate hypotheses, using an alpha level of .05 for the following statistical tests. The quantitative information was analyzed in IBM SPSS.

Hypothesis 1: effect of stimulus manipulation on emotion

On the quiz, the 28 participants had a mean score in pupil diameter when they were exposed to the condition A (low emotional design) of 9.26 PX. (SD = 3.88) and a mean score in pupil diameter when they were exposed to the condition B (high emotional design) of 9.67 PX. (SD = 4.03) (Table 3). Likewise, they had a mean score in the EDA (SCR) when they were exposed to the condition A (low emotional design) of 2.02 μS (SD = 1.57) and a mean score in the EDA (SCR) when they were exposed to the condition B (high emotional design) of 2.12 μS (SD = 1.67) (Table 4).

Table 3. Scores in pupil diameter when were exposed to the condition A and B

	Pupil diameter in condition A (low emotional design)	*Pupil diameter in condition B (high emotional design)*
M	9.26 PX.	9.67 PX.
SD	3.88 PX.	4.03 PX.

Note: M = mean; *SD* = standard deviation; *n* = 28 in both conditions

Table 4. Scores in EDA (SCR) when were exposed to the condition A and B

	EDA (SCR) in condition A (low emotional design)	*EDA (SCR) in condition B (high emotional design)*
M	2.02 μS	2.12 μS
SD	1.57 μS	1.67 μS

Note: M = mean; *SD* = standard deviation; $n = 28$ in both conditions

Analysis of the data of pupil diameter using the related t test (Table 5) indicated that emotional arousal did not show significant difference among those exposed to a landing page with low emotional design (condition A) than those exposed to a landing page with high emotional design (condition B), $t(27) = -0.89$, $p = 0.38$ (two-tailed test).

In contrast, analysis of the data of EDA (SCR) using the related t test (Table 6) indicated that there is a statistically significant in the emotional arousal among those exposed to a landing page with low emotional design (condition A) compared to those exposed to a landing page with high emotional design (condition B), $t(27) = -2.14$, $p = 0.04$ (two-tailed test).

These results suggest that only one of the two instruments used to measure emotional response shows a statistically significant difference when measurements of the condition A versus condition B are compared. Specifically, my results suggest that participants exposed to a marketing landing page with high emotional design tend to exhibit higher emotion when emotional response is measured using an EDA (SCR) sensor.

Table 5. Related t test – Pupil Diameter mean comparison condition A and B

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair Pupil diameter A - Pupil diameter B	-,40250	2,38357	,45045	-1,65056	,84556	-,894	27	,379

Table 6. Related t test – EDA (SCR) mean comparison condition A and B

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair Pupil diameter A - Pupil diameter B	-,10254	,25358	,04792	-,20086	-,00421	-2,140	27	,042

The results indicate that the null hypothesis must be rejected, and H1 must be accepted. The results also suggest that EDA (SCR) data is more successful in identifying an emotional response to short-term stimuli such as marketing landing pages.

Hypothesis 2: effect of positive and higher emotion on conversion

In addition, the 28 participants had a mean score of 6.21 (SD = 1.62) and a mode score of 5 in SAM when they reported emotional valence in the condition A (low emotional design), and had a mean score of 7.43 (SD = 1.55) and a mode score of 9 in SAM when they reported emotional valence in the condition B (high emotional design) (Table 7).

Table 7. Scores in SAM for the condition A and B

	SAM	*SAM*
M	6.21	7.43
SD	1.62	1.55
Mo	5	9

Note: M = mean; *SD* = standard deviation; *Mo* = mode; *n* = 28 in both conditions

Likewise, of the 28 participants, 6 reported a positive intention to purchase and 22 reported a negative intention to purchase for condition A (low emotional design). In contrast, for condition B (high emotional design) 20 participants reported a positive intention to purchase and 8 reported a negative intention to purchase (Table 8). Also, 10 participants clicked the "buy" button and 18 did not click the "buy" button in condition A (low emotional design), and in condition B (high emotional design) 20 clicked the "buy" button and 8 did not click the "buy" button (Table 9).

Table 8. Scores in self-reported purchase intention in condition A and B

	Condition A (low emotional design)	*Condition B (high emotional design)*
No	22	8
Yes	6	20

Note: Yes = positive purchase intention; *No* = negative purchase intention

Table 9. Scores in click the "buy" button in condition A and B

	Condition A (low emotional design)	*Condition B (high emotional design)*
No	18	8
Yes	10	20

Note: Yes = clicked the "buy" button; *No* = did not click the "buy" button

Further analysis of the data for conversion using chi square for the self-reported intention to purchase and the behavioral response of clicking the "buy" button revealed that conversion was significantly associated with positive emotional valence (SAM pleasure) when participants were exposed to a landing page with high emotional design, either by a self-reported intention to purchase, $X^2(1, N = 28) = 9.70$, $p = .002$ or by clicking the "buy" button, $X^2(1, N = 28) = 5.18$, $p = .023$.

Hence, those who reported more positive emotional valence when they were exposed to a landing page with high levels of emotional appeal tended to report more positive intentions to purchase and were more likely to click on the "buy" button, whereas those who reported neutral or negative emotional valence when they were exposed to a landing page with low levels of emotional appeal tended to report less positive intentions to purchase and were less likely to click on the "buy" button.

In conclusion, analysis of the data of those who reported an intention to purchase and who clicked on the "buy" button using chi-square revealed that the proportion of those who reported a positive purchase intention when they were exposed to a landing page with low emotional design is significantly different from those who reported a positive purchase intention

when they were exposed to a landing page with high emotional design, $X^2(1, N = 28) = 19.09$, $p = .000$ (Table 10).

Table 10. Crosstabulation of conversion and condition A and B

Conversion (self-reported purchase intention)	*Condition A (low emotional design)*	*Condition B (high emotional design)*	X^2
Yes	6 (.000)	20 (.000)	19.09*
No	22 (.000)	8 (.000)	

*Note. *= $p < .05$. Adjusted standardized residuals appear in parentheses below group frequencies.*

These results suggest that a marketing landing page with high emotional design is likely to generate more conversion. My results also suggest that participants exposed to a marketing landing page with high emotional design are more likely to express a self-reported intention to purchase than they are likely to click a "buy" button. This discrepancy seems likely to reflect the circumstances of the testing itself, since participants knew that clicking would not actually lead to a purchase. Likewise, the statistically significant difference between the self-reported intention to purchase and the behavior of clicking the "buy" button could have been generated by the research method itself, since it was observed in the session that some participants felt unable to click the "buy" button because they felt that 15 seconds was not enough time to make a purchase decision. By the time participants were asked if they had the intention to purchase, they were seeing the landing pages for a second time, and had experienced extra time to consider their decision.

Chapter 6: Discussion

The first prediction of this study suggested that a marketing landing page with high emotional design will have a quantifiable effect on emotion, and was designed to increase the internal validity within the experiment. The use of two physiological measurement tools allows to trust the chosen instruments to measure emotion and the conclusions resulting from this research; even though just EDA (SCR) reported statistically significant differences and pupillometry did not. However, analyzing descriptively pupil diameter, 64% of the participants showed higher values of pupil diameter when they were exposed to the condition B (manipulated) than the condition A. This study does confirm that emotional response can be measured physiologically as other studies indicate (Bradley et al., 2008; Huisman, 2011; Partala & Surakka, 2003; Pour & Calvo, 2011; Schall & Romano Bergstrom, 2014). Nevertheless, physiological instruments require specialized training and practice before planning research intended to measure emotional response. Preparation for this study required extensive review of other research using similar instruments and the research method was refined with two medium-scale pilot tests. Other researchers planning to use physiological instruments should be aware that such research demands skills in unfamiliar fields like physiology or neuroscience. Academic programs may need to provide training for interaction design researchers in using EDA and pupillometry before these methods can be widely used.

It is important to consider that research like this can be affected by many confounding variables, such as the difficulty in isolating emotion from cognition, the effects of environmental luminance conditions, and variations in participant vision. Thus not every research question can or should be addressed using physiological measurement tools. It is also worth noting that most

practical questions comparing the conversion rate for two different landing pages can be answered using standard A/B testing. However, this study does suggest that the combination of EDA, self-report measures, and behavioral measures can provide accurate information about the level and valence of emotional response, allowing a deeper understanding of the conversion behaviors that can be measured using other techniques.

A second important component of this research was the ADI model, created to guide the design of marketing landing pages for emotional response. Although the validity of this model is still in the development stage, it will be improved and tested iteratively in future research projects.

The triangulation of emotional arousal, emotional valence and conversion happened as the researcher expected, and it is congruent with the literature supporting the role of emotion on decision-making (Bagozzi & Dholakia, 2002; Damasio, 1994; Dormann, 2001; Nairne et al., 2007; Shiv & Fedorikhin, 1999). Future research could test this relationship using different classes of stimuli and perhaps shorter time periods—especially if improved tools for measuring emotional response were to become available in the next few years. The researcher hopes to continue this research by studying the role of emotional response on conversion in a mobile environment and measuring emotional response emotion in only 2 or 3 seconds. Testing persuasion models in mobile environments is exactly the challenge that marketing professionals are facing nowadays.

In conclusion, this study supported previous research suggesting that the landing page with high emotional design (condition B) led to higher conversion rates, generating 70% of an intention to purchase compared to 21% of an intention to purchase generated by a landing page with low emotional design (condition A).

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Appendix A: Interview Guide

English Version

You have been invited to participate in this research because you are a user of the Mi Media Manzana mobile app. This research is aimed to find out the emotional response of people like you to the premium service screen of the Mi Media Manzana mobile app. This session has two parts. The first part will be while you sit down in front of a computer and the second part will basically be a short interview about what you saw. Feel free to ask about anything that concerns you at any point of the session, ok? If I cannot answer a question now, you may feel certain that I will do it once the session finishes.

I need to make sure first whether you can read words that are this size without your glasses (if participant wears glasses).

- Can you read the letters on the screen?

An image with letters similar to the ones used on the stimulus is shown on the screen. If the participant fails this test, a compensation of 20 soles is given and the session concludes. If the participant passes the reading test, the interview continues.

I will need now to ask you a few questions about you:

- What is your full name?
- What is your age?
- What is your occupation?
- Are you right-handed or left-handed?

Part 1

During this part of the session, two versions of the Mi Media Manzana pricing mobile screen will be presented to you on the computer. Before every screen is presented, you will have a relaxation period of 3 minutes, during which you can breathe deeply and think about positive things while the music plays. This is an example of the screen you will be presented on the experiment (the mobile screen example is shown). If one of the screens presented is convincing, and you feel a desire to purchase, you can click on the “buy” button by using the mouse. For example, on this screen sample, you can click on this button (the mobile screen example is shown). I will measure your emotional response using the dilation of your pupils while you watch the screens on the monitor by using this eye tracker. Additionally, you will wear this

wristband which will register your electro dermal activity. Both devices are safe and non-intrusive, so you will not feel anything during the session.

Please sit down in front of the computer and turn off your mobile(s) and remove your glasses. Because I need to register your pupil dilation while you watch the screens presented on the monitor, I need you to restrain your head with aid of this head support. It is important while the experiment runs that you do not move your head, otherwise the data will be lost. Allow me please to set the light of the room now. I will need you to adjust the eye tracker position according to your height.

- Please, find a body position in which you can feel comfortable during the session.
- Now keep still and look at the screen while I adjust the tracker.
- May I attach this wristband on your arm? (the wristband is placed on the non dominant arm.)

I will now calibrate the eye tracker while you follow the moving dot on the screen with your eyes. After that I will begin to record the session.

- Any questions so far?

Once the recording begins, I will press a button on the wristband in front of the webcam. Remember, this whole part will last about five minutes.

- Are you ready to begin?

The eye tracking recording is turned on by using OGAMA and the wristband is turned on and synced with the Empatica Realtime App, the recording of the EDA signal begins as well.

- Please follow the instructions on the screen.

The interviewer approaches the participant and presses the sync button in front of the webcam, then returns to the second monitor located on the other side of the room and follows the script presented by OGAMA taking notes of relevant observations. Once the slideshow finishes, the participant is invited to answer questions in a follow-up interview.

Part 2

During this second part of the session, you will be asked a few questions about what you have just seen. We can speak about your concerns right after we complete this part. Please, be succinct when replying to these questions.

- Regarding this scale, when this left side is negative emotions and this other side is positive emotions, how did you feel when you saw this screen?

Both screens are presented with a randomly inverted order , and the participant rates their emotional response to each screen using the Self-Assessment Manikin (SAM) scale.

- Now tell me which of the screens that you saw could have generated a purchase intention? Please consider saying “none” if none of the screens made you feel like you would make the purchase.

Both screens shown on the computer are presented on a printed paper.

Ok, we are done now, please feel free to ask any final questions you may have. Any questions?

Spanish Version

Has sido invitado a participar en esta investigación porque eres usuario de la aplicación móvil Mi Media Manzana. Esta investigación tiene como objetivo conocer la respuesta emocional de la pantalla de compra del servicio premium de la aplicación móvil Mi Media Manzana en personas como tú. Esta sesión tiene dos partes. La primera parte será mientras estás sentado frente a esta computadora y la segunda parte será básicamente una breve entrevista sobre lo que viste. Siéntete libre de preguntar algo que te intrigue en cualquier momento de la sesión, ¿ok? Si no puedo contestar alguna pregunta ahora, puedes estar seguro que lo haré una vez que termine la sesión. Necesito asegurarse primero de puedes leer correctamente este tamaño de letra.

- ¿Puede leer estas letras en la pantalla?

Una imagen con letras similares a las utilizadas en el estímulo se muestran en la pantalla. Si el participante falla en esta prueba, se da una compensación de 20 soles y la sesión concluye. Si el participante pasa la prueba de lectura, la entrevista continúa. Necesitaré ahora hacerte algunas preguntas sobre ti:

- ¿Cuál es su nombre completo?
- ¿Cual es tu edad?
- ¿Cuál es su ocupación?
- ¿Eres diestro o zurdo?

Parte 1

Durante esta parte de la sesión, dos versiones de la pantalla móvil Mi Media Manzana se te presentarán en el ordenador. Antes de cada pantalla se presente, se te llevará a un período de relajación de 3 minutos, puedes respirar profundamente y pensar en cosas positivas mientras que la música suena. Este es un ejemplo de la pantalla que se presentará en el experimento (se muestra un ejemplo de pantalla móvil). Si una de las pantallas presentadas es convincente, y sientes un deseo de compra, puede hacer clic en el botón "comprar" mediante el uso del ratón. Por ejemplo, en este ejemplo de pantalla, puede hacer clic en este botón (se muestra un ejemplo de pantalla móvil). Mediré tu respuesta emocional registrando la dilatación de sus pupilas mientras miras las pantallas en el monitor usando este eye tracker. Además, llevarás esta pulsera que registrará tu actividad electrodérmica. Ambos dispositivos son inofensivos, por lo que no se sentirás nada a lo largo de la sesión. Por favor, siéntese frente a la computadora, apaga tu(s) teléfonos móviles (s) y retira tus gafas. Permíteme por favor ajustar la luz de la habitación. Debido a que necesito registrar la dilatación de la pupila mientras observas las pantallas presentadas en el monitor, fijarás tu cabeza con ayuda de este soporte de cabeza. Es importante

que mientras se ejecuta el experimento no muevas la cabeza, de lo contrario los datos se perderán. Permíteme por favor ajustar la luz de la habitación ahora. Necesitaré ajustar la posición del eye tracker según tu estatura.

- Por favor, encuentra una posición corporal en la que te sientas cómodo a lo largo de la sesión.
- Ahora continúa mirando la pantalla mientras yo ajusto el eye tracker.
- ¿Puedo colocar esta pulsera en tu brazo? (La pulsera se coloca en el brazo no dominante).

Ahora calibraré el eye tracker mientras sigues el punto en movimiento en la pantalla y luego comenzaré a grabar la sesión.

- ¿Alguna pregunta hasta ahora?
- ¿Listo para comenzar?

Una vez que empiece la grabación, me acercaré a ti y presionaré un botón en la pulsera delante de la webcam. Recuerda, toda esta parte durará unos cinco minutos.

- ¿Estas listo para comenzar?

El registro del eye tracker se inicia utilizando OGAMA y la pulsera se enciende y se sincroniza con la Empatica Realtime App, la grabación de la señal EDA comienza también.

- Sigue las instrucciones que aparecen en la pantalla.

El entrevistador se acerca al participante y presiona el botón de sincronización delante de la webcam, luego regresa al segundo monitor situado al otro lado de la habitación y sigue el guión presentado por OGAMA tomando notas de observaciones pertinentes. Una vez finalizada la presentación, se invita al participante a una entrevista.

Parte 2

Durante esta segunda parte de la sesión, se te harán algunas preguntas sobre lo que acabas de ver. Podré contestar tus preguntas justo después de completar esta parte. Por favor, sé sucinto cuando respondas estas preguntas.

- Respecto a esta escala, estando en este lado las emociones negativas y en este otro lado las emociones positivas, ¿cómo te sentiste cuando viste esta pantalla?

Ambas pantallas se presentan con el orden invertido aleatoriamente entre participantes, y el participante califica su emoción generada por cada pantalla usando la escala Self-Assessment Manikin (SAM).

- Ahora dime cuál de las pantallas que viste podría haberte generado una intención de compra? Por favor considera decir “ninguna” si ninguna pantalla generó una intención de compra.

Se presentan ambas pantallas mostradas en el monitor y una opción adicional de “ninguna”.

Ok, ya hemos terminado, por favor, siéntete libre de hacer todas las preguntas que tengas. ¿Alguna pregunta?

Appendix B: Consent Form

English Version

CONSENT FORM FOR PARTICIPATION IN RESEARCH ACTIVITIES

Whom to Contact about this study:
Principal Investigator: Juan-Francisco Reyes
Telephone number: (+51) 941 717 798
Email: paco@talamica.com

Protocol of the research about effect of emotion on landing page conversion on Mi Media Manzana Mobile App

I. INTRODUCTION/PURPOSE:

I am being asked to participate in a research study. The purpose of this study is to know the effect of emotion on landing page conversion. I am being asked to volunteer because I am a current user of the mobile app Mi Media Manzana, a community of Peruvian singles looking for long-term relationships. My involvement in this study will begin when I agree to participate and will continue until 12/02/2016. 30 persons will be invited to participate.

II. PROCEDURES:

As a participant in this study, I will be asked to follow the research procedure as follows: During the first part of the session, two versions of the Mi Media Manzana pricing mobile screens will be presented to me on one computer. In order to make it possible to measure my pupil dilation while I watch the screens presented, my head will be restrained with aid of a head support. It is important while the experiment runs that I do not move my head, otherwise the data will be lost. Additionally, it is needed to register my electrodermal activity by using a wristband, therefore, I will wear a wristband during the session. During the second part of the session, I will be asked a few questions about what I just saw.

I have been asked to come to Calle Cajamarca 417, Barranco, Lima, Peru. My participation in this study will last not more than 30 minutes, in just one visit, and the session will be video recorded. Additionally, it will some physiological data will be recorded using an eye tracker and an EDA sensor.

III. RISKS AND BENEFITS:

My participation in this study does not involve any significant risks and I have been informed that my participation in this research will not benefit me personally, but the results will be useful for Mi Media Manzana (Dating LATAM SAC) and Juan-Francisco Reyes, the researcher, who is developing his Master's thesis. Finally, the findings of this research will expand the knowledge of the human-computer interaction community.

IV. CONFIDENTIALITY:

Any information learned and collected from this study in which I might be identified will remain confidential and will be disclosed ONLY if I give permission. All information collected in this study will be stored in a locked file cabinet in a locked room. Only the investigator and members of the research team will have access to these records. If information learned from this study is published, I will not be identified by name. By signing this form, however, I allow the research study investigator to make my records available to the University of Baltimore Institutional Review Board (IRB) and regulatory agencies as required to do so by law.

Consenting to participate in this research also indicates my agreement that all information collected from me individually may be used by current and future researchers in such a fashion that my personal identity will be protected. Such use will include sharing anonymous information with other researchers for checking the accuracy of study findings and for future approved research that has the potential for improving human knowledge.

☐ Yes, I give permission to use my image in scientific publications or presentations.

☐ No, I do not give permission to use my image in scientific publications or presentations

V. SPONSOR OF THE RESEARCH:

Mi Media Manzana (Dating LATAM SAC) is partially funding this research study.

VI. COMPENSATION/COSTS:

My participation in this study will involve no cost to me. I will be paid for my participation 50 soles (Peruvian currency).

VII. CONTACTS AND QUESTIONS:

The principal investigator, Juan-Francisco Reyes has offered to and has answered any and all questions regarding my participation in this research study. If I have any further questions, I can contact Juan-Francisco Reyes at phone 941 717 798, paco@talamica.com or Kathryn Summers, ksummers@ubalt.edu.

For questions about my rights as a participant in this research study, I can contact the UB IRB Coordinator: 410-837-6199, irb@ubalt.edu.

VIII. VOLUNTARY PARTICIPATION

I have been informed that my participation in this research study is voluntary and that I am free to withdraw or discontinue participation at any time.

I will be given a copy of this consent form to keep.

IX. SIGNATURE FOR CONSENT

The above-named investigator has answered my questions and I agree to be a research participant in this study. By signing this consent form, I am acknowledging that I am at least 18 years of age.

Participant's Name: _____ Date: _____

Participant's Signature: _____ Date: _____

Investigator's Signature: _____ Date: _____

Spanish Version

FORMULARIO DE CONSENTIMIENTO PARA LA PARTICIPACIÓN EN LA INVESTIGACIÓN

A quién contactar acerca de esta investigación:
Investigador principal: Juan-Francisco Reyes
Número de teléfono: (+51) 941 717 798
Correo electrónico: paco@talamica.com

Protocolo de la investigación sobre el efecto de la emoción en la conversión de landing pages en la aplicación móvil Mi Media Manzana Mobile

I. INTRODUCCION/PROPOSITO:
Se me ha pedido participar en un estudio de investigación. El propósito de este estudio es conocer el efecto de la emoción en la conversión de landing pages. Se me pide ser voluntario porque soy un usuario actual de la aplicación móvil Mi Media Manzana, una comunidad de solteros peruanos buscando relaciones a largo plazo. Mi participación en este estudio comenzará cuando acepte participar y continuará hasta el 12/02/2016. 30 personas serán invitadas a participar.

II. PROCEDIMIENTO:
Como participante en este estudio, se me pedirá seguir el procedimiento de investigación: Durante la primera parte de la sesión, dos versiones de la pantalla de compra del plan Premium de la versión móvil Mi Media Manzana se presentarán en un ordenador. Debido a que se necesita registrar la dilatación de mi pupila mientras observo las pantallas presentadas, fijaré mi cabeza con ayuda de un soporte de cabeza. Es importante que mientras se ejecuta el experimento no mueva la cabeza, de lo contrario los datos de la sesión se perderán. Además, tendrán que registrar mi actividad electrodérmica usando una pulsera, por lo tanto, se necesitará que use una pulsera durante la sesión. Toda la primera parte durará unos cinco minutos. Durante la segunda parte de la sesión, se me harán algunas preguntas sobre lo que recién vi.
Se me ha pedido que venga a la Calle Cajamarca 417, Barranco, Lima, Perú. Mi participación en este estudio durará 30 minutos, en una sola visita, y la sesión será grabada en video. Además, se grabará alguna data fisiológica a través de un eye tracker y un sensor electrodérmico.

III. RIESGOS Y BENEFICIOS:
Mi participación en este estudio no implica riesgos significativos y he sido informado de que mi participación en esta investigación no me beneficiará personalmente, pero los

resultados serán útiles para Mi Media Manzana (Dating LATAM SAC) y Juan-Francisco Reyes, el investigador, que está desarrollando su tesis de maestría. Finalmente, los hallazgos de esta investigación ampliarán el conocimiento de la comunidad de interacción humano computadora.

IV. CONFIDENCIALIDAD:

Cualquier información obtenida y recolectada de este estudio en la que pueda ser identificado permanecerá confidencial y será revelada SOLAMENTE si doy permiso. Toda la información recogida en este estudio se almacenará en un archivo protegido en una habitación cerrada con llave. Sólo el investigador y los miembros del equipo de investigación tendrán acceso a estos registros. Si la información obtenida de este estudio se publica, no se me identificará por mi nombre. Sin embargo, al firmar este formulario, permito que el investigador del estudio de investigación ponga mis registros a disposición de la Junta de Revisión Institucional de la Universidad de Baltimore (IRB, por sus siglas en inglés) y las agencias reguladoras, según lo requiera la ley.

El consentimiento para participar en esta investigación también indica mi acuerdo de que toda la información recopilada de mí puede ser utilizada por investigadores actuales y futuros de tal manera que mi identidad personal será protegida. Tal uso incluirá el compartir información anónima con otros investigadores para comprobar la exactitud de los resultados del estudio y para futuras investigaciones aprobadas que tengan el potencial para mejorar el conocimiento humano.

☐ Sí, doy permiso para usar mi imagen en publicaciones científicas o presentaciones.

☐ No, no doy permiso para usar mi imagen en publicaciones científicas o presentaciones.

V. SPONSOR DE LA INVESTIGACION:

Mi Media Manzana (Dating LATAM SAC) está financiando parcialmente esta investigación.

VI. COMPENSACION/COSTOS:

Mi participación en este estudio no implicará ningún costo para mí. Me pagarán por mi participación 50 soles (moneda peruana).

VII. CONTACTO Y PREGUNTAS:

El investigador principal, Juan-Francisco Reyes ha ofrecido y respondido a todas y cada una de las preguntas relacionadas con mi participación en este estudio de investigación. Si tengo más preguntas, puedo contactar a Juan-Francisco Reyes al teléfono 941 717 798, paco@talamica.com o a Kathryn Summers, ksummers@ubalt.edu).

Para preguntas sobre los derechos como participante en este estudio de investigación, comuníquese con el Coordinador de la UB IRB: 410-837-6199, irb@ubalt.edu.

VIII. PARTICIPACION VOLUNTARIA

Me han informado que mi participación en este estudio de investigación es voluntaria y que estoy libre de retirarme o interrumpir mi participación en cualquier momento.

Se me dará una copia de este formulario de consentimiento para mi archivo.

IX. FIRMA DE CONSENTIMIENTO

El investigador arriba mencionado ha respondido a mis preguntas y estoy de acuerdo en ser un participante de investigación en este estudio. Al firmar este formulario de consentimiento, reconozco que tengo al menos 18 años de edad.

Nombre del participante: _____ Fecha: _____

Firma del participante: _____ Fecha: _____

Firma del investigador: _____ Fecha: _____

Appendix C: IRB Approval Letter

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UNIVERSITY
OF BALTIMORE

Office of
Sponsored
Research

t: 410.837.6191
f: 410.837.5249
www.ubalt.edu

January 5, 2017

Juan-Francisco Reyes
University of Baltimore
1420 N. Charles Street
Baltimore, MD 21201

RE: **IRB Protocol UB17-46 – Exempt Approval**

Dear Juan-Francisco Reyes:

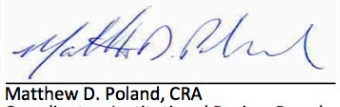
This letter serves as official confirmation of the Institutional Review Board's review of your protocol for a study entitled "Effect of Emotional Design on Landing Pages Conversion," submitted for review on December 5, 2016.

The Institutional Review Board considered your request and concluded that your protocol poses no more than minimal risk to participants. In addition, research involving the use of widely acceptable survey/interview procedures where the results are kept confidential and the questions pose minimal discomfort to participants is exempt from IRB full-committee review per 45 CFR 46.101 (b) (2). As a result, the Institutional Review Board has designated your proposal as exempt.

Investigators are responsible for reporting in writing to the IRB any changes to the human subject research protocol, measures, or in the informed consent documents. This includes changes to the research design or procedures that could introduce new or increased risks to human subjects and thereby change the nature of the research. In addition, you must report any adverse events or unanticipated problems to the IRB for review.

If you have any questions, please do not hesitate to contact me directly by phone or via email.

As authorized by P. Ann Cotten, C.P.A., D.P.A.
Chair, Institutional Review Board



Matthew D. Poland, CRA
Coordinator, Institutional Review Board

Cc: Dr. Kathryn Summers

University of Baltimore
1420 N. Charles St.
Baltimore, MD 21201-5779