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The Effects of Hope and Anxiety in Driving Consumer Intentions to Adopt New Product Solutions

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ABSTRACT

New products are often associated with uncertainty. On the one hand consumers may hope that innovative offerings will produce goal-congruent outcomes, while on the other hand, they may be anxious about the possibility that the product will result in goal-incongruent ones. In four studies, I demonstrate the intriguing finding that anxiety about a new product boosts (rather than reduces) the positive effect of hope on adoption intentions. This effect is observed when using different populations of consumers from around the globe, when using products and services, and in contexts that involve different types of consumption goals – i.e., functional, aesthetic, experiential and social goals. I test defensive pessimism and confidence in achieving goal-congruent outcomes as a serial mediation process explaining this effect. The proposed mechanism remains significant, even after accounting for alternative explanations including pain/gain inferences and motivated reasoning. This thesis highlights the crucial role of hope and anxiety in driving consumer intentions to adopt new product solutions and offers important insights that may have implications for both research and practice.

Keywords: anxiety, defensive pessimism, goal congruence, hope, product adoption

DECLARATION

I declare that this thesis submitted for the degree of Doctor of Philosophy is my own composition. Unless otherwise referenced and specified, the material presented herein is my own original work.

DEDICATION

For my beloved mom and dad

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Andreas, could not be more sincere and I am forever indebted to you for bringing me so far along the road.

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Yuting, London

30 October 2018

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"Let our advance worrying become advance thinking and planning."

Winston Churchill, British Prime Minister

1   Introduction

1.1   Motivation and Research Questions

Consumers can experience both feelings of hope and feelings of anxiety when contemplating the adoption of a new marketplace offering. For example, an aging consumer might experience strong feelings of hope when she learns about a new product on the market that claims to create a goal-congruent outcome: having a more youthful looking appearance. This outcome is desirable to this consumer and it is important to her. The possibility that she might attain a youthful appearance from it, of course, is uncertain because the product is new and untried; however, because the product's newness makes it seem possible, she experiences strong levels of hope that her purchase will make her appear more youthful. Also, when a product is new and untried, consumers may be anxious about it in that it might produce unintended negative outcomes, such as irritated skin, facial discoloration or allergic reactions. Such a consumer might feel strongly anxious because her anxiety reflects the fact that she cares about the outcome and does not want to experience any goal-incongruent consequences. Such an occurrence would be undesirable and of huge importance. How, therefore, do consumers respond when they experience both strong feelings of hope and strong feelings of anxiety about the potential outcomes of a new product?

Although one might anticipate that feelings of anxiety about potentially negative consequences from adopting a new product should dampen new product adoption intentions, this thesis makes the counterintuitive prediction that adoption intensions regarding a new

product are greatest when individuals strongly hope that it can bring goal-congruent outcomes, *while they are also feeling anxious* about whether its outcomes might prove to be goal-incongruent. This phenomenon can be commonly observed, since some hospital patients are still willing to undertake surgery in spite of feeling anxious about the operation. Compared with the condition where hope is strong and anxiety is weak, greater adoption intentions may be observed in the situation where hope is strong *but* anxiety is strong.

If the combination of strong hope and strong anxiety facilitates adoption decisions, why and when such strong anxiety might counterintuitively boost (rather than reduce) the effects of hope on adoption? The process mechanism that accounts for an interactive effect between hope and anxiety on adoption intentions, and the boundary condition that leads to such a proposed effect are two additional principle research questions that this thesis will aim to answer. Specifically, this thesis will argue that strong feelings of hope about positive outcomes from a new product motivate individuals to confront their anxieties head on and consider ways in which negative outcomes can be avoided. This anxiety management process is called defensive pessimism, which is a cognitive strategy by which individuals simultaneously manage feelings of hope and anxiety by considering actions that can support the attainment of goal congruence while minimising the possibility of goal incongruence. Consequently, planning ways in which goal-congruent outcomes can be attained while avoiding the opposite results makes individuals more confident that the outcomes they hope for can be attained. If defensive pessimism – and the confidence it induces – does indeed mediate the effect of hope and anxiety regarding adoption intentions, efforts to minimise the cognitive processing associated with it should eliminate the interactive effect of hope and anxiety. Figure 1 shows the conceptual framework.

Figure 1. Conceptual Model


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                    ┌─────────────────┐
                    │   Processing    │
                    │  Opportunity:   │
                    │  high vs. low   │
                    │   (Study 4)     │
                    └────────┬────────┘
                             │
┌─────────────────┐         │
│     Hope:        │         │
│ strong vs. weak  ├───┐     │
│ (Study 1, 2, 3, 4)│   │     ▼
└─────────────────┘   │  ┌──────────┐   ┌──────────────┐   ┌──────────────┐
                      ├─►│Defensive │──►│Confidence in │──►│  Adoption    │
┌─────────────────┐   │  │Pessimism │   │Goal-Congruent│   │  Intentions  │
│    Anxiety:      │   │  │(Study 2,3)│   │  Outcome    │   │(Study 1,2,3,4)│
│ strong vs. weak  ├───┘  └──────────┘   │ (Study 2, 3) │   └──────────────┘
│(Study 1,2,3,4)   │                     └──────────────┘
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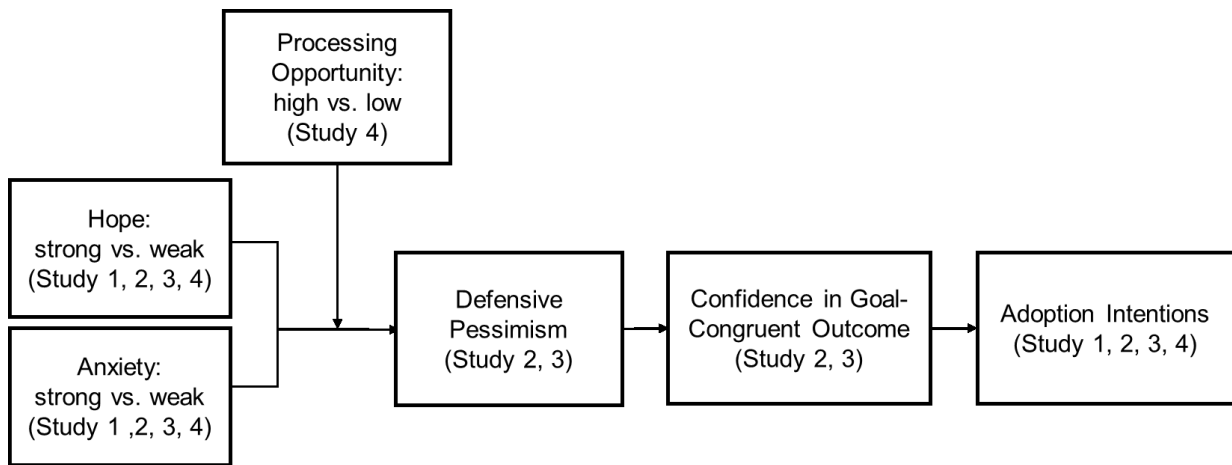
1.2 Summary of Thesis and Main Findings

By way of its four studies, this thesis demonstrates that adoption intentions for new products are greatest when hope for, and anxiety about, outcomes of using the new product are both strong. The studies use diverse products and services involving distinctly different consumption goals – i.e., functional, aesthetic, experiential, and social goals; different methods – i.e., a field study and experiments; respondents from various socioeconomic brackets and regions around the globe.

Study 1: is a large-scale field study involving vulnerable populations in developing countries. This study establishes the effects that intentions to adopt a new medicine designed to provide functional goals – i.e., the avoidance of HIV/AIDS – are greatest when feelings of hope and anxiety are both strong.

Study 2: replicates the interaction between hope and anxiety among college students in a controlled laboratory setting. This study involves the adoption of an appearance-related treatment designed to fulfill aesthetic goals – i.e., attaining a beautiful smile from orthodontic

treatment. This study also tests a serial mediation of defensive pessimism and confidence in the relationship between hope and anxiety on adoption intentions, while controlling for alternative explanations.

Study 3: replicates this effect by using a product designed to fulfil experiential goals – i.e., by way of a travel experience – and by assessing other potential explanations for the results.

Study 4: the effect is replicated by using a service relevant to social goals – i.e., online dating. Here I test and find support for the proposed boundary condition by manipulating consumers' opportunities to engage in defensive pessimism.

All the studies assess and account for potentially competing explanations, including lay beliefs about the need to accept pain in order to achieve gain, and motivation reasoning.

1.3   Summary of Contribution

Overall, this thesis makes several theoretical contributions to the extant literature. Firstly, this thesis adds to the research on the motivational effects of anxiety. Prior literature suggests that anxiety can cause individuals to reject products because of uncertainty about whether product outcomes will be negative (Lee et al. 2011; Meuter et al. 2003; Thomas and Tsai 2012). However, this thesis shows that anxiety can, in some cases, enhance adoption intentions, in that, rather than making consumers shy away from negative outcomes as described in existing works (Chandran and Menon 2004; Lee et al. 2011), anxiety motivates individuals to engage in defensive pessimism so as to proactively manage their environment to attain goal congruence.

Secondly, this thesis adds to the limited literature on hope (MacInnis and de Mello 2005; Poels and Dewitte 2008) and mixed emotions (Williams and Aaker 2002). A body of work links hope to motivated reasoning (De Mello et al. 2007; MacInnis et al. 2004; Reimann et al. 2014). Other research has examined hope through the lens of self-regulatory goals, revealing that prevention-focused (vs. promotion-focused) hope ads enhance consumers' willingness to try an advertised product (Henthorne et al. 1993; Kim et al. 2012; Poels and Dewitte 2008; Winterich and Haws 2011). I suggest another motivational role for hope. When it involves a new product, strong hope for goal-congruent outcomes of using a new product can induce a state of defensive pessimism when hope is accompanied by strong anxiety about possible goal-incongruent outcomes.

Thirdly, this thesis adds to the literature on defensive pessimism. Research in marketing has given limited attention to the defensive pessimism construct. The few studies that have examined defensive pessimism, regard it as an individual difference variable (e.g., Nenkov et al. 2007; Walchli and Landman 2003) as opposed to a situationally-induced state induced by strong hope and strong anxiety. Moreover, prior research in consumer behaviour has not considered the role of defensive pessimism in motivating adoption intentions, making my study of hope, anxiety, and defensive pessimism, novel. This thesis, therefore, shows that defensive pessimism can be evoked situationally when consumers both strongly hope that a product's outcomes will be goal-congruent, and when they are anxious about the potential for goal-incongruent outcomes. Additionally, this thesis adds to the consumer behaviour literature on consumer confidence. Whereas prior research suggested that confidence that a goal-congruent outcome can be achieved, or a goal-incongruent one can be avoided, should enhance adoption intentions (Laroche et al. 1996), my studies focus on a novel factor that influences confidence perceptions (i.e., defensive pessimism).

Managerially, the results of this thesis suggest that practitioners can shape adoption intentions regarding new products by both composing communications that stimulate hope, anxiety and encouraging defensive pessimism. The results of this thesis also have implications for the effect of negative social media posts on new product adoption. Negativity in online reviews might well create less impact on adoption intentions if consumers have strong levels of hope about the new product. In order to activate such hope, marketers could design hope appeals by emphasising a product's relevance to the important and desirable goal-congruent outcomes.

This research also raises interesting questions for future research, including the possibility that strong hope and strong anxiety might influence adoption intentions through both thoughtful/systematic processing (e.g., defensive pessimism) and heuristic processing (e.g., pain/gain inferences). This possibility offers a potential for richer insights into the role of emotions such as hope and anxiety on dual routes to persuasion.

2   Literature Review

2.1   Emotions and Decisions

Emotion are intense mental states arising from appraisals of environments and one's own thoughts (Bagozzi et al. 1999). In the late 20th century, a growing body of literature on appraisals articulated diverse dimensions, such as valence and arousal (ref. circumplex model by Russell 1980), five dimensions (ref. Roseman 1984: the motivational, situational, probability, legitimacy and agency framework), six core appraisal dimensions (ref. Smith and Ellsworth 1985: pleasantness, certainty, perceived controllability, attentional activity, anticipated efforts and agency), action tendencies (Frijda 1986), goal congruency (Lazarus 1991) to name but a few. Although these scholars have developed various appraisal theories, all contend that emotions arise from the events depending on how individuals both interpret the events and evaluate their own thoughts to respond that event.

In marketing, appraisals based on emotions that influence decisions may be broadly divided into two categories. Firstly, through the content of appeals and marketing activities – e.g., advertising and brands, in order to induce *integral emotions* that subsequently influence the judgement of the objects or events. Secondly, through unrelated activities or events that occur prior to decisions being taken. For instance, after watching a horror movie, what type of food the audiences are more likely to consume? In addition to unrelated activities or event, individual traits and environmental factors may also elicit *incidental emotions*, carrying over actions which tend to influence decisions. Recently an integrated view presented by Achar, So, Agrawal and Duhachek (2016) invites future research to examine the joint effects between integral and incidental emotions on decision making. My thesis focuses on the integral emotions of hope and anxiety that are elicited directly by marketing stimuli, which

are pertinent to the goals associated with related products or services.

In 2000, the seminal work by Lerner and Keltner took a dramatic approach proposing the influence of emotions on decision making was beyond valence. Particularly, the sources of such emotional experiences they studied were incidental rather than integral, which promisingly expanded the scope of emotions studies. Their appraisal tendency framework (ATF) becomes the fundamental framework in emotions literature thereby bridging the gap from various appraisal theories to a specific predication about the effect of emotions on subsequent judgement and choices (Han et al. 2007; Lerner and Keltner 2000; Lerner and Keltner 2001). For instance, they found that anger and fear – despite having the same negative valence – differ in appraisal dimensions, and that they can yield very different ways of evaluating risks. Thereafter, studies of emotions have become richer by offering a more nuanced understanding of how emotions significantly influence consumer behaviour.

An impressive work conducted by Andrade (2005) offered an integrative view by consolidating two key affect research streams to one overarching theoretical umbrella called affect-based evaluation and regulation (AER): affective evaluation (e.g., mood congruency) and affective regulation (e.g., mood management). In the former stream, affect influences behaviour via cognitive mediator in the sense that consumers' evaluation, judgement, actions are consistent with the mood. Thus, when consumers have positive affects, they are more likely to generate favourable evaluations, which may result in a facilitative or proactive approach. Conversely, when consumers experience negative affects, they tend to have less favourable evaluations leading to an inhibitive or passive action. In the latter stream, affect influences behaviour via a motivational mediator, which may produce a completely opposite action. The disaccord between current and future affects being aroused can function as

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motivators to guide behaviour. When consumers show positive affects, they are more likely to

refrain from actions in order to maintain their currently favourable moods (i.e., no action to

avoid mood-threatening). In contrast, when consumers experience negative affect, they

exhibit proactive approach in an attempt to stop present threats so as to experience positive

affect afterwards (i.e., take action to obtain mood-lifting)[1].

However, AER raises the critical question: under what situation the influence of affect

on action can mediate through affective evaluation or affective regulation? Andrade (2005)

proposes a number of moderators but suggested the most pivotal explanation is whether the

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[1] In emotion literature, little consistency can be found in the use of terminologies including affect, mood, emotion and attitude. These are used interchangeably at times, but they can also stand for specific meanings across works. Not to mention when it comes to operationalisation, there is a chance for inconsistency. In attempt to clarify the distinction, here I summarise the definitions based on the works by Bagozzi, Gopinath and Nyer (1999) and by Allison and Stewart (2005).

Affect is often conceived as an overarching umbrella term including moods, emotions and possibly attitude.

Compared to mood, emotion is shorter and more intense mental state. The difference between mood and emotions is not easy to recognise or describe. But they cannot be interchanged. Normally we would not say, 'She's in a bad emotion today', but we would say, 'She is in a bad mood' (and it could last all day and even she might not know why she is in a mood – she just is). Moreover, in English we might have heard the phrase 'she must have got out of the wrong side of the bed'. Whereas we could say 'She is in an emotional state' meaning, perhaps, she is just been told that her dog has died – i.e., there's a recognisable reason for it. Thus, emotion typically is intentionally evoked by certain events and usually coupled with action tendency (which is the focus of this thesis).

Lastly, attitude does not necessarily involve arousal, but emotion does. Emotions directly activate volition and initiate action, whereas the connection of attitudes to volition and action is less strong and less direct. Attitude normally is operationalised as dichotomous classifications such as like and dislike, pleasant and unpleasant, interested and bored, happy and sad. Arguably, this might be one of the reasons why research in last two decades revolves around emotion since the effect of emotions on decisions can involve more nuanced processes which consist of cognitive appraisals, neuropsychology, physiological processes and potentially physical expressions such as sweating, dilated pupils, trembling, etc. Studying such specific and discrete emotions helps marketers specify their particular tactics in terms of crafting communications or designing multimedia content.

behavioural activity to be enacted can be associated with mood-changing properties. When mood-changing cues are not salient, affect is more likely to process through cognitive mediators, which lead people to follow a mood congruent route and to evaluate an action that is in consistent with their current mood. By contrast, when mood-changing cues are salient, affect has the propensity to be mediated by a motivator resulting in an affective regulation route.

Although these findings provided a new direction to resolve disparate results by indicating situations where appraisals and non-appraisals are the mechanisms that explain opposite action tendencies, a challenge to Andrade's integrative theory (2005) is that AER does not easily explain the natural settings that people often simultaneously experience multiple emotions. Mixed positive and negative emotions may occur at the same time as a result of emotion-focused coping, whereby an initial negative emotional response is altered by attempts to find a "silver lining" and to focus on goals that are more likely to be achieved (Johnson and Stewart 2005). Thus, it is critical for consumer researchers to study *goal congruence* in the appraisal process, since appraisal is the critical origin of emotions, and people use products (or services, brands, activities, ideas, etc.) in order to respond to their emotions while pursuing a wide range of consumption goals.

Lazarus (1999) pointed out when evaluating the degree of goal congruence (i.e., evaluating the extent to which the situation meets the desired state), reality is perceived not only from personal perceptions, needs, wishes and beliefs, but also by appraising the circumstances that influence an individual's survival and well-being. In the appraisal process, Lazarus (1999) further states, "We negotiate between two seemingly opposing frames of reference" (pg. 658). Thus, on one hand, the individual attempts to evaluate a situation realistically in order to manage it as effectively as possible, while, on the other hand, he/she

attempts to put a favourable twist on it in order to remain positive. It is normal for such opposing appraisal-centred frames of reference to co-exist. Individuals attempt to find a balance between the two frames of reference, oscillating between an illusion or harsh reality with a mixture of hope and anxiety. This particularly holds true when consumers have to make decisions involving uncertain possible outcomes when adopting a new product.

In my thesis, I consider new products with innovative features, such as different compositions, business models or operational procedures, which require consumers to either change, or discontinue, past behaviours (Castaño et al. 2008). Consumers believe that, once they adopt innovative products, they will more likely achieve their goals by entering more promising new futures. As MacInnis and de Mello (2005) stated, these possibilities may exist in the product, the person or the process of goal pursuit, thereby invoking a sense of hope. Conceptually, this type of new product is categorised as a 'credence good' that could possibly transform individual from *who they are* to *who they want to be* – i.e., a similar concept to 'self-focused transformative consumption' (Price et al. 2018). Since the qualities of such a product cannot be observed until after purchase makes it difficult for consumers to assess their utility outcomes, thus stimulating the feelings of anxiety.

Up to the present, a majority of emotion theories revolve continually around the nature of appraisals – such as examining interactions between appraisal dimensions or identifying new appraisals – and how appraisals serve as a variety of functions regarding the shaping of judgements by providing information, priming goals and activating mind-sets. So et al. (2015) offer a compact summary of review and future directions. One of previously unstudied but rising areas of interest illuminated in their reviews is to build an interface between theories of information processing and a related concept 'emotions' in the social-cognitive literature by applying a dual process model, or heuristic-systematic modes of processing to a

diverse and broader judgemental domain (Chen and Chaiken 1999). In this thesis, to echo this call, and to apply it to decision making in new product adoption, I shall explore the two emotions – hope and anxiety – from this angle in order to bridge them with information processing in directing adoption intentions. General discussion will further illustrate my contribution to the existing knowledge. The following sections will spell out the theoretical underpinning for 'hope' and 'anxiety' by creating a comprehensive framework, which will include, (i) how I define the emotions, (ii) what hope and anxiety are, or are not, (iii) the psychological processes triggered by their appraisals, and (iv) the existing related empirical evidence for them in marketing and the consumer psychology domains.

2.2   Hope

Hope is defined as an emotion that reflects the extent to which an individual yearns for an outcome whose occurrence is appraised as goal-congruent and uncertain (MacInnis and de Mello 2005). Thus, consistent with appraisal theories of emotion (Averill et al. 2012; Lazarus 1991; Scherer et al. 2001) two critical appraisal dimensions underlie hope: goal congruence and uncertainty (or possibility). Goal congruence is defined as the extent to which an outcome is positive from the standpoint of the individual because it is consistent with what they regard as important and desirable. Uncertainty is defined as the extent to which the outcome is known in advance. In the case of new products, uncertainty is generally high, since consumers lack experience with, and prior knowledge about, the products. Hope might be regarded as a formative construct, such that it is evoked only in contexts where outcomes are appraised as goal-congruent, thus desirable and important but uncertain. When an outcome is uncertain, the more desirable its occurrence is and the more important its

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occurrence is judged to be, the stronger the feelings of hope one will have for that outcome (see Table 1). For instance, the consumer yearning for a new product may think, 'I really hope that this product will make me look more attractive'. Thus, uncertain outcomes appraised as highly desirable (being beautiful is a very desirable outcome for me), and important, (it's important for me to look beautiful), activate greater degrees of hope – what I call 'strong hope' – than do outcomes considered to be less desirable and/or less important – what I call 'weak hope'.

Products are often depicted as instrumental to achieving goal-congruent outcomes (see Table 1 in MacInnis and de Mello 2005, pg. 3). Individuals who strongly hope to look beautiful may regard a product (e.g., cosmetics) or service (e.g., cosmetic surgery) as a vehicle for achieving for the goal of looking beautiful. Hence, new products may appear particularly attractive since their newness implies that they might be more effective than existing products on the market. It might reasonably be surmised that intentions when adopting a new product will naturally be greater when consumers strongly hope that it will produce the outcomes they desire. Hence, as a researcher, I am less interested in the main effects of feeling strong vs. feeling weak hope on adoption intentions. Instead, my interest centres on the interaction between feelings of 'strong hope' and feelings of 'strong anxiety' and why this interactive effect can motivate adoption intentions. I theorise and demonstrate (i) a serial mediation of defensive pessimism and confidence and (ii) a moderating role of processing opportunity, as depicted in Figure 1 on page 3.

Table 1. An Appraisal Theory Perspective on Hope and Anxiety

How outcomes are appraised:

		Goal-Congruent (Desirable and Important)	*Goal-Incongruent (Undesirable and Important)*
Outcomes are appraised as:	*Uncertain*	Feelings of Hope	Feelings of Anxiety
	Certain	Feelings of Joy, Pride, Love, Relief	Feelings of Fear, Regret, Sadness, Anger

Note. Feelings become stronger (e.g., individuals experience greater hope, anxiety, joy, fear) as the goal congruences/incongruences of outcomes increase.

Distinguishing Hope from Hopefulness. 'Hope' is differentiated from an often-confused construct called 'hopefulness', which De Mello and MacInnis (2005) define as the perceived likelihood that a goal-congruent outcome will occur. One becomes more hopeful (or optimistic) about a goal-congruent outcome as one regards its occurrence as being more likely. For example, one may say that I am hopeful that this product will solve my problem (e.g., there is a reasonably high likelihood that it will). Whereas, with hopefulness what varies is the *perceived likelihood* of a goal-congruent outcome occurring. This is different from hope, which may vary by the degree to which the outcome is desirable and important – i.e., its *degree of goal congruence*. Therefore, whereas both constructs involve assessments that a goal-congruent outcome is possible, 'hope' varies as a function of the appraisal dimension of goal congruence, whereas 'hopefulness' varies as a function of the appraisal dimension of expectedness, or the perceived likelihood. Hope and hopefulness can be orthogonal. For example, an individual might strongly hope that the political environment will change for the better, but he/she may not feel exceptionally hopeful that it will. Therefore, the focus of this thesis will be on hope and not hopefulness. I differentiate

between these constructs here in order to clarify what I am, and what I am not, studying. See

below Figure 2 for the definitions used in this thesis. It should be noted that the distinction

between 'hope' and 'hopeful' could be extremely subtle. I agree there are cases that they can

be used interchangeably. In this thesis I aim to highlight the potential differences of

interpretations according to prior works and bring up the distinction between 'possibility' and

'probability' of a particular outcome. A consumer may want an outcome to occur irrespective

of the probability of its occurrence.

Figure 2. Differentiating Hope, Anxiety, Hopefulness and Hopelessness

Differentiating Hope from Anxiety
- The degree of hope/anxiety varies as a function of how good or bad the outcome is appraised to be possible (i.e., possibility)
- Appraisal dimension is goal congruence

Outcome is

	Good (Goal Congruent)	Bad (Goal Incongruent)
Might happen	**Hope**	Anxiety
Might not happen	Anxiety	**Hope**

Uncertainty about the outcome

FOCUS OF THIS THESIS IS HERE

Differentiating Hopefulness from Hopelessness
- The degree of hopefulness/hopelessness varies as a function of how good or bad outcome is expected to occur (i.e., probability)
- Appraisal dimension is certainty

Outcome is

	Good (Goal Congruent)	Bad (Goal Incongruent)
Is expected to occur	**Hopefulness/ Optimism**	Hopelessness/ Pessimism
Is not expected to occur	Hopelessness/ Pessimism	**Hopefulness/ Optimism**

Probability of the outcome

FOCUS OF THIS THESIS IS NOT HERE
(Although defensive pessimism might affect hopefulness operationalized by confidence in the outcome's occurrence or non-occurrence)

Distinguishing Hope from Other Similar Constructs. These include wishing, expectation

and involvement, which have also been widely discussed in prior research, in some situations

could be confusing. Firstly, while hope reflects a yearning for important results, wishing is

more likely to denote fantasising about impossible circumstances (Kappes et al. 2013).

Wishing can refer to both the future and the past in a way that is largely beyond an

individual's control; while hope only refers to the future and provides at least some possibility of personal control of the outcome. Secondly, hope is an emotion attached to a goal that involves a possibility; whereas expectation is a belief based on probability. One example is that, despite the probability of winning a lottery being low, it is still possible for an individual to win that lottery. Lastly, involvement defines as perceived importance and interest of a product class or a decision (Mittal 1995). Involvement is a state of being reactive to stimuli, such as advertisements, reflecting the extent of arousal and energy that a consumer experiences. However, 'hope', which is more than an energy or arousal, refers to a positive emotion attached to a goal to be achieved instead of being attached to an advertisement , a message, a brand or a medium (MacInnis and de Mello 2005). Most importantly, involvement relates to things in the present, whereas hope is always associated with the future.

2.3   Anxiety

Anxiety is defined as an emotion that reflects the extent to which an individual contemplates a possible *goal-incongruent* outcome (Lazarus 1991). Just as hope varies as a function of the extent to which the outcome is goal-congruent (i.e., important and desirable), anxiety varies as a function of the extent to which the outcome is goal-incongruent (i.e., important and undesirable). The more goal-incongruent the outcome, the more anxious one becomes about its possible occurrence. Notably, anxiety is distinguished from fear, which is felt in response to a known or definite threat (Lazarus 1991; Perkins et al. 2007). For example, whereas one might be anxious about whether one *might* see a bear in the woods, *actually seeing* a bear in the woods induces a state of fear.

Prior research suggests that state-anxiety can cause users to reject an offering so as to

avoid possible goal-incongruent outcomes (Lee et al. 2011; Meuter et al. 2003; Thomas and

Tsai 2012). These findings suggest that anxiety should reduce adoption intentions. However,

anxiety, has also been found to increase vigilance in contexts such as sports (Hanin 2010), the

workplace (Perkins and Corr 2005), and online reviews (Yin et al. 2014), and to motivate

information seeking (Locander and Hermann 1979). These results suggest that in some

situations anxiety can induce an approach (vs. an avoidance) response. To date, knowledge

about factors that drive an approach (vs. an avoidance) response to anxiety is limited.

In the latter part of this section, I firstly elaborate on a body of research which suggests

that anxiety has also been found to influence facilitative behaviour in addition to traditional

view of deleterious features. Such supporting evidence may give rise to an 'approach'

response to situational anxiety, effects which might increase adoption/purchase intentions.

Table 2 summarises the relevant studies about anxiety in marketing and consumer behaviour

research since there are conflicting evidence to show the facilitative or detrimental part of

anxiety. The Table includes the following headings, (i) whether anxiety is integral to the task

at hand – as is true with my thesis – or incidental, (ii) what people are anxious about, such as

social rejection or negative consumption outcomes, (iii) how anxiety affects behavioural

consequences, (iv) theoretical rationale for the proposed consequences, (v) whether the

rationale has been tested in empirical studies, and (vi) how anxiety is used in this study, as an

independent variable denoted as 'IV', a dependent variable denoted as 'DV', a mediator or a

moderator.

In general, anxiety influences decision making in four major ways: colouring, repairing

mood, providing specific information, and interfering information processing.

Firstly, anxiety is like other negatively valenced emotions that impact on people's

decision-making by colouring the contents of their thoughts. For instance, negativity may

taint their perceptions, thoughts and judgements in ways that they may interpret as amounting to dislike or dissatisfaction, which in turn, may result in tinged judgements – an effect known as mood congruency (e.g., Isen et al. 1978).

However, to what extent might 'mood congruency' be paradoxically conducive to *favourable* behaviour? Because, instead of escaping from the anxiety invoking stimuli, individuals could deliberately 'paint their thoughts' with *other* colours. Findings have suggested the importance of reappraisal, a form of cognitive change in a way that alters its emotional impact, by drawing a distinction between re-evaluating the *situation* vs. re-evaluating one's *internal state*. A classic example lends support to the notion that anxiety can serve as a beneficial component to function efficiently is in the context of sport, where a well-known concept termed as 'individual zone of optimal functioning (IZOF)' is used (Hanin 2010). IZOF emphasises within individual variation in the reactions to anxiety. For instance, elite athletes perform better when their pre-competition anxiety is in IZOF – i.e. whereby a dynamic spectrum of intensity levels and zones shift over time due to consistent practicing. The theory suggests that when their state of anxiety is high the probability of their future successful performances is also high; but when their pre-competition anxiety falls outside their established zone, their performances will deteriorate. Interestingly, therefore, some athletes prefer to experience strong feelings of anxiety, since they will have developed a unique set of resources that they can utilise in order to cope with a demanding environment. Thus, highly skilled athletes can use anxiety to their advantage in order to master goal orientations by perceiving such intense feelings as being pleasant states. Consequently, this *perception-based* strategy rather than meta-experience directs physical and mental resources in optimal (vs. dysfunctional) state to positively impact on athletic performance.

Similarly, recent research has shown that *reappraising* anxiety is an effective mean of

reducing its negative effect, rather than by trying to supress it (Hofmann et al. 2009), and that it is more beneficial to construe it as excitement, rather than as calmness, due to consistency of arousal (Brooks 2014). Indeed, consumers might be able to restore their subjective time perception when they reappraise their anxiety/stress that has been induced by goal conflicts. (Etkin et al. 2015).

Secondly, in addition to changing perceptual interpretations, negatively valenced emotions can function as motives to direct decision makers to take part in actions that can restore mood. Motives are heightened concerns involving in elevating or repairing one's moods. For instance, motivational forces aroused by sadness are related to the rehabilitation of feelings, or the lifting of mood to a 'feel good' state, which is a similar process to mood management (Andrade 2005). 'Reactive approach motivation' (RAM) – which is a displacement that relieves anxiety – is in accord with this notion (McGregor et al. 2010). In order to either reduce or suppress anxiety, threat or uncertainty, individuals can activate palliative – rather than curative – short-term 'approach-motivated' states, by pursuing concrete incentives (e.g., potato crisps, gummy bears Haribo, or gambling). However, pursuing abstract incentives, such as ideals and ideologies, may prove to be more palliative, since such philosophical beliefs can be relatively effortless and engaged within the privacy of an individual own mind, free from exertion, conflict, risk of failure, or adverse consequences. Just as people escape from anxiety by engaging in concrete and immediate experiences (Heatherton and Baumeister 1991), RAM proposes that people can also use ideals to effectively surpass anxiety. In both cases, 'approach-motivational' processes are involved, whereby attention becomes limited to the domain of the incentive, or cultural, worldview, such that anxiety is down-regulated and unrelated anxieties disappear (ref. Arndt et al. 2004 how materialism or conspicuous consumption buffers against death anxiety; ref. Liu and

Smeesters 2010 how preferring domestic brands maintains consumers' patriotism in a media context that invokes death anxiety). In sum, these findings suggests "idealistic meanings may be an essential element of human self-regulation that shields people from torment over conflicts, uncertainties, and insecurities of the human condition (Prentice and McGregor 2014 pg. 212)".

Thirdly, the way that anxiety provides specific information influencing decisions is congenial to a 'mood repair' explanation. For instance, individuals experiencing sadness and anxiety are inclined to take actions that may somehow make them feel better. However, compared to anxiety, sadness primes an implicit goal of reward replacement (vs. uncertainty reduction) to seek for high risk/high reward options (vs. low risk/low reward) (Raghunathan and Pham 1999; Raghunathan et al. 2006). These findings demonstrate content that is distinctly associated with negative emotions, such as the informational properties that relate to anxiety and sadness, by yielding specific preferences – a route driven by an 'affect-as-information' process.

Fourthly, it is widely known that anxiety is more likely to interfere with information processing. Gloomy affective states tend to either disrupt people's ability to process information or burn out the processing opportunity/working memory. As a result, anxious individuals tend to process information less systematically in their judgements and decision-making. Nonetheless, this argument has been challenged and there is evidence that shows anxiety may not impact on processing performance when it leads to the use of compensatory strategies, such as increased efforts and processing resources (see Eysenck et al. 2007 for a great review).

Although the predominant viewpoint in the literature is that anxiety influences information processing through a cognitive pathway, in this thesis I argue that focusing solely

on cognitive resource in the form of cognitive interference limits knowledge, as it is likely to consist of both cognitive and motivational pathways. The effects of situational anxiety on information processing are inconclusive without taking motivation into account (Chaiken and Trope 1999; Cheng and McCarthy 2018; Corr 2013). It is true that anxiety tends to harm cognition and performance, since it drains working memory and limits information processing to rumination or worrying instead of focusing the task (Eysenck et al. 2007). Yet, research published recently found that anxious individuals are more likely to engage in mindful and systematic information that involves considerable cognitive effort, including deliberation and reasoning. For instance, an anxiety embedded review is more helpful because readers perceive anxious, as opposed to angry, writers as being effortful and vigilant commentators in sharing reviews (Yin et al. 2014). Likewise, anxious workers are expected to make much more cognitive efforts, including seeking more information, calculating the possibility of negative outcomes and being more vigilant (Perkins and Corr 2005).

Therefore, in Section 2.5, based on such an integrated approach, I will explore a concept called defensive pessimism (Norem and Cantor 1986b) in further detail and elaborate on its relevance to hope, anxiety and behavioural intentions in regard to new product decision-making .

Table 2. Review of Selected Findings on Anxiety

Articles	Integral/ incidental	Source of anxiety	Manipulation	Behavioural consequences	Theoretical rationale	Empirical studies	Role of anxiety
Arndt, et al. (2004)	Incidental	Mortality	Not applicable as no empirical studies	Increase materialism and conspicuous consumption	Existential anxieties increase materialism as a way to enhance self-esteem and affect decisions that support cultural worldview	N	IV
Chandran and Menon (2004)	Integral	Health risk	Measured. "I felt anxious, worries, tense, fearful, and uptight"	Increase concern and anxiety about hazard/risk	Every day framing makes risks appear more proximal and concrete than every year framing	Y	Mediator
Chitturi, Raghunathan, and Mahajan (2007)	Incidental	Trading functionality for hedonic product attributes leads to anxiety	Measured. "I experienced anxious"	Prefer functionally superior option in choice task (vs. evaluation tasks such as WTP)	Behaving in a safe and secure manner	Y	Mediator
Etkin, et al. (2015)	Integral	Goal conflict	Measured. "I felt stress and anxiety"	Feel more time constrained	Goal conflict heightens stress and anxiety	Y	Mediator

Articles	Integral/ incidental	Source of anxiety	Manipulation	Behavioural consequences	Theoretical rationale	Empirical studies	Role of anxiety
Garvey, Aaron M., Frank Germann, and Lisa E. Bolton (2016)	Integral	Task performance	Measured. "I felt anxious"	Increase test performance	Positive brand performance placebo heightens self-esteem and reduces anxiety	Y	Mediator
Heimbach, Irina and Oliver Hinz (2016)	Integral	Article evokes anxiety	Measured. Two coders assessed in a five-point Likert scale based on definition on Wikipedia	Share more content that arouses anxiety than sadness	Replicate study by Berger and Milkman (2012) in German news	Y	IV
Lee, et al. (2011)	Integral	Stereotype threat	Measured – "I am tense", "I feel at ease (reverse coded)", "I am presently worrying over possible misfortunes"	Reduce intentions to transact with out-group (vs. in-group)	Stereotype activation heightens anxiety	Y	Mediator
Liu and Smeesters (2010)	Incidental	Mortality	Measured. PANAS (Positive and Negative Affect Scale; Watson et al. 1988)	Consumers prefer domestic (vs. foreign) brand	To cope with anxiety, consumers seek what verifies their cultural worldview because culture provides a means to buffer concerns by structuring the work with meaning, order and standards of valued behaviour	Y	IV

Articles	Integral/ incidental	Source of anxiety	Manipulation	Behavioural consequences	Theoretical rationale	Empirical studies	Role of anxiety
Locander and Hermann (1979)	Integral	Choice and resulting perceived risk	Measured. Trait anxiety	Increase information seeking	By seeking information to restore self-confidence	Y	DV
Raghunathan and Pham (1999)	Incidental	Potential harmful outcomes and feelings of being unable to alter the course of event	Participants imagined that their doctor had called to meet with him/ her immediately because some urgent news had to be divulged. It was hinted that the person might have cancer, but the outcome was not revealed after the doctor's visit (thus increasing the sense of uncertainty)	Bias preference toward low-risk/ low-reward options	Anxiety is associated with risk/ uncertainty reduction, whereas sadness is associated with reward replacement	Y	IV
Raghunathan, et al. (2006)	Incidental	High uncertainty and lack of control	Same as Raghunathan and Pham (1999)	Prefer options that are safer and provide a sense of control	Driven by an affect-as-information process, which is most pervasive when the source of anxiety is not salient	Y	IV

Articles	Integral/ incidental	Source of anxiety	Manipulation	Behavioural consequences	Theoretical rationale	Empirical studies	Role of anxiety
Verbeke and Bagozzi (2000)	Integral	Social rejection	Measured four dimensions of social call anxiety	Reduce 1) communication effectiveness; 2) sales volume	Self-reinforcing anxiety process 1) negative self-evaluations, 2) perceived negative evaluations from customers, 3) imagined physiological symptoms, and 4) urges to perform protective actions	Y	IV
Wakefield and Wakefield (2018)	Integral	Creation of eWOM after a negative brand experience	Measured. "I felt anxious, apprehensive, worried and nervous related to the message"	1) Increase more positive words to alleviate conflict; 2) Shorten message availability	Impression management	Y	Mediator

Articles	Integral/ incidental	Source of anxiety	Manipulation	Behavioural consequences	Theoretical rationale	Empirical studies	Role of anxiety
Yin, et al. (2014)	Integral	Anxiety-embedded reviews	Retrieve historical reviews at the Yahoo! Shopping website. In the anxiety condition, the review began with the sentence "My experience with this seller has caused a lot of anxiety." In the anger condition, the review instead began with the sentence "I was very angry after everything that happened." The review in the control condition contained no additional up-front sentence	Increase perceived reviewer cognitive efforts (i.e., helpful reviews)	Employ systematic, mindful and deliberative process as a means of reducing a sense of uncertainty	Y	IV

2.4   Interaction between Hope and Anxiety

Whereas hope and anxiety are distinct emotions that reference outcomes of opposing valence (i.e., goal-congruent vs. goal-incongruent ones), hope and anxiety can co-occur. Accordingly, both the negative emotions of anxiety and the positive emotions of hope (Lazarus 1991; Richins 2007) can be present in situations where outcomes are uncertain, yet possible, which may be particularly true in the case of new products (Castaño et al. 2008). On the one hand, new products promote benefits that purport to achieve goal-congruent outcomes better than, or different from, existing products. On the other hand, when products are new, as Hoeffler (2003) pointed out, when products are new, consumers are unfamiliar with them, thus they will be uncertain about whether they might produce goal-incongruent outcomes. For example, whereas consumers might strongly hope that a new product or service will make them look more beautiful, they may also be uncertain about whether the product might actually make them look worse. Contemplating possible goal-incongruent outcomes, therefore, should enhance their anxiety about the new product or service.

It might be anticipated that such anxiety would weaken the effect of hope on adoption intentions. Indeed, prior consumer behaviour research suggests that consumers may wish to distance themselves from anxiety-inducing outcomes (Castaño et al. 2008; Lee et al. 2011; Meuter et al. 2003). Consequently, anxiety might be expected to weaken adoption intentions by interfering with the ability to process new product information (Miller and Bichsel 2004; Suri et al. 2013), since impaired information processing may make it a challenge for consumers to imagine how, or even whether, goal-congruent outcomes could be obtained.

However, as noted earlier, research has also found that anxiety can sometimes induce compensatory strategies, such as heightened information searches, vigilance and effort,

thereby increasing the use of processing resources and the discovery of more in depth information processing (Eysenck et al. 2007; Locander and Hermann 1979; Perkins and Corr 2005; Yin et al. 2014). Anxiety signals that the stimulus, and/or consequences that arise from it, are important and require consideration (Jones 1995; Locander and Hermann 1979). If something is unimportant, we will not feel anxious at all. Thus, instead of discounting anxiety-evoking information and fleeing from actual anxieties, consumers may take anxiety-arousing information into account (Pham and Avnet 2004; Poels and Dewitte 2008). Specifically, anxiety might motivate individuals to exert effort in order to consider anxiety evoking outcomes and be vigilant in ensuring that goal-incongruent outcomes are minimised.

Such processing may be particularly true when hope is strong vs. weak. When hope is weak, strong anxiety may deter adoption intentions because possible goal-incongruent outcomes loom large when compared to the weakly hoped-for goal-congruent ones. Hence, in such circumstances, anxiety will tend to thwart adoption intentions. In short, the positive effect of anxiety on increasing information processing and adoption intentions may be limited to situations where hope is strong. Accordingly, I propose:

H1: New product adoption intentions are greatest when both hope and anxiety are strong.

2.5   Defensive Pessimism

Why would strong anxiety enhance adoption intentions when hope is also strong? I theorise that strong hope and strong anxiety induce a state called defensive pessimism (DP). Norem (2008) defines it as a coping mechanism that individuals use to prepare for uncertain future events (Chang 2001; Norem and Cantor 1986b). Specifically, when outcomes are uncertain (as is true when hope and anxiety are activated) defensive pessimism acts as "a

cognitive [self-regulatory] strategy that helps people manage their anxiety and pursue their goals" (i.e., what they hope for) (pg. 121). In this thesis, DP is conceptualised as a situationally-induced state, rather than an individual difference variable, activated by strong hope and strong anxiety (Chang 2001), see Figure 1 in Section 1.1 on page 3.

It is important to note that DP is different from an established construct called 'elaboration on potential outcomes' (EPOs) by Nenkov et al. (2007) in terms of its preventive actions. Nenkov et al. (2007) proposed that EPO, which encompasses four conceptually distinct dimensions of the degrees to which individuals: (i) generate potential consequences of their behaviours, (ii) evaluate the likelihood and importance of these consequences, (iii) encode anticipated end states with a positive focus, and (iv) encode them with a negative focus. While both constructs touch upon dimensions such as the evaluation of outcome expectancies and relative positive/negative outcome focuses, DP channels the negative thinking prompted by anxiety into specific plans that lead to specific actions. Norem (2008) illustrated that DP helps individual to get from 'I want …' to 'this is what I need to do in order to get …', which is in line with previous research on goal pursuit, suggesting that people are more likely to realise goals if they break down larger goals into specific, concrete and smaller pieces. It seems that the foci of EPOs are more about the consequences of the actions, whereas DP is involved in the process of planning actions in order to ensure good and avoid bad outcomes so that the goals can be realised.

In the next section, this thesis proposes that the process of being defensively pessimistic operates both on the goal-congruent outcome(s) that are hoped for and the anxiety experienced regarding possible goal-incongruent ones.

Defensive Pessimism and Hope. Individuals who engage in defensive pessimism try to manage their hope by acknowledging that the outcome they hope for might be less goal-

congruent than they would like it to be. Thus, a consumer contemplating a transformational effect from cosmetic surgery might behave defensively by considering that it might not make her beautiful, but that it might make her look slightly better than she does right now. This defensively pessimistic perspective enhances her emotional preparedness for a disappointing outcome.

DP also introduces a planning element, such that individuals contemplate what actions and activities they can undertake to ensure that outcomes are as goal-congruent as possible. Thus, a consumer who strongly hopes that cosmetic surgery will result in a significantly improved appearance might think about what she can do to ensure that the outcomes are as good as she hopes for. She might, for example, engage in an extensive search to find a doctor whose patients' comments suggest that their surgery has had transformational effects on their appearances.

Defensive Pessimism and Anxiety. DP can also help individuals negotiate their anxiety (Norem and Cantor 1986a). Specifically, when they act in such a way, they use their anxiety to think through how they can avoid goal-incongruent outcomes. By considering what negative outcomes could happen and what could go wrong, they can develop plans to ensure that goal-incongruent outcomes are avoided. This perspective accords with Norem (2008), who writes that "negative reflections help defensive pessimists to focus on imagined negative events (often perceived as 'disasters' through the negative lens of anxiety) in ways that promote actions designed to prevent those disasters (pg.123). "By 'playing through' potential bad outcomes before they occur, the defensive pessimist gains some degree of control over his anxiety" (Norem and Cantor 1986a pg. 350).

To illustrate, one consumer contemplating cosmetic surgery might imagine that the procedure could leave her with visible scars, or that the doctor might botch the job, leaving

her permanently disfigured. A consumer who acts in a defensively pessimistic way would envision these possible goal-incongruent outcomes and consider how they could be minimised, or avoided altogether. For example, she might decide to engage in extensive research on potential physicians, their credentials (e.g., board certified), their experience (e.g., time in the profession), and what other customers have said about him/her. In short, by thinking through what might go wrong, she can consider how to avoid or minimise goal-incongruent outcomes.

Note that whereas anxiety can sometimes cause individuals to flee or avoid an outcome, defensive pessimism involves a different response to anxiety; however, rather than do this, defensive pessimists confront their anxieties head-on by thinking through what could go wrong and how these goal-incongruent outcomes can be avoided. He/she therefore "shifts from anxious feelings to thoughts about possible specific problems, and then to actions to prevent those problems from derailing progress" (Norem 2008). In this way, by using constructs of hope and defensive pessimism, these individuals add theoretical insights to better understand *when* anxiety will induce an approach, rather than by adopting an avoidance response.

Defensive Pessimism and Confidence in the Goal-Congruent Outcome. Ironically, the process of engaging in defensive pessimism might actually increase an individual's confidence enough to convince them that a goal-congruent outcome can indeed be attained. Specifically, DP enhances adoption intentions for a new product because, by considering actions that support the occurrence of the goal-congruent outcome alongside taking actions that thwart goal-incongruent ones, a consumer will feel more confident about the positive outcomes resulting from adoption. Consequently, I propose a serial mediation:

H2: Defensive pessimism and confidence in the goal-congruent outcomes serially

mediate the effects of strong hope and strong anxiety on adoption intentions.

Moderating Role of Processing Opportunity. The above discussions imply that DP can
be activated situationally when hope and anxiety are both strong. Engaging in defensively
pessimistic thoughts is likely to use elaborative processing that involves reflection and mental
simulation. Thus, DP requires that consumers have sufficient motivation, ability and
opportunity in order to engage in elaborative processing (Chang 2001; Napolitano and Freund
2017; Nenkov et al. 2007). Distractions during contemplation may be detrimental to
retrieving memory created by existing knowledge or accessing new information when
ruminating whether the outcomes from product adoption will be goal-incongruent or not
(Seery et al. 2008).

Because defensive pessimism involves considering possible outcomes and how they can
be managed, the process should be relatively effortful from a cognitive perspective. It
involves imagining things that might happen and developing plans that support (thwart)
hoped for (anxiety-inducing) outcomes. If DP does, indeed, underlie the effects of hope and
anxiety on adoption intentions, I am of the view that strong hope and strong anxiety influence
new product adoption intentions only when consumers have sufficient opportunity to engage
in DP. This theory leads me to predict the following:

H3: The effects of strong hope and strong anxiety on adoption intentions are observed

only when consumers have the opportunity to engage in defensive pessimism.

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2.6   Summary

Based on the logic above, I have developed three hypotheses that are tested in the studies that follow:

H1: New product adoption intentions are greatest when both hope *and* anxiety are strong.

H2: Defensive pessimism and confidence in the goal-congruent outcomes serially mediate the effects of strong hope and strong anxiety on adoption intentions.

H3: The effects of strong hope and strong anxiety on adoption intentions are observed only when consumers have the opportunity to engage in defensive pessimism.

Below, I report four studies designed to test my hypotheses. Study 1 tests H1 by using a large-scale field study involving a product for which goal-congruent outcomes are health-related; in this instance, protection against HIV/AIDS. Study 2 replicates H1 in a controlled lab experiment that manipulates hope and anxiety and uses a service rather than a product for which goal-congruent outcomes are appearance related; in this instance, acquisition of straight teeth. In order to test H2, I measure DP and outcome confidence. I also account for several alternative process explanations for the results, including consumers' beliefs that, in order to obtain gains, one must experience pains. Study 3 examines if H1 and H2 have been replicated when goal-congruent outcomes are experience related; in this case by seeing the Northern Lights. Study 3 also controls for additional alternative explanations not examined in Study 2. Studies 1 to 3 also show that the outcomes I predict are specific to hope and anxiety; that is, they are not explained by other high arousal emotions. Study 4 tests H3 where I show that the observed effects replicate when individuals have sufficient opportunities to engage in defensive pessimism. I also show whether individuals construct defensively pessimistic

thoughts when the effects are strongest. See Table 3 for an overview of four studies

conducted in this research.

Table 3. An Overview of Four Studies in This Thesis

	Study 1: PrEP (N=1861)	**Study 2: Orthodonture (N=266)**	**Study 3: Aurora Travel (N=243)**	**Study 4: Online Dating (N=243)**
Focus	The effect	Mediation test	Mediation test	Moderation test
Type of Goals to be Achieved	Health	Aesthetic	Experiential	Social
Hope and Anxiety Stimuli	Measured	Manipulated	Manipulated	Fixed hope, manipulated anxiety
Defensive Pessimism (DP)	NA	Measured (state DP)	Measured (state DP)	Measured (trait DP)
Processing Opportunity	High (people in these countries paid attention to HIV/AIDS)	High	High	Manipulated

3   Study 1

3.1   Design and Procedure

Study 1 is a large-scale field study ($N = 2{,}084$) sponsored by the Bill & Melinda Gates Foundation which involves the adoption of a product called "pre-exposure prophylaxis (PrEP)", a medication designed to protect individuals from contracting HIV/AIDS. I thank my supervisor for allowing me to use the dataset he collected as part of his global project with World Health Organisation (WHO) and the Bill & Melinda Gates Foundation.

The study included participants from eight countries (i.e., Thailand, India, South Africa, Botswana, Uganda, Kenya, Peru, and Ukraine) who were deemed to be at high risk of contracting HIV/AIDS. Respondents included injecting drug users, men who have sex with men, female sex workers, individuals whose partner has HIV/AIDS, and young women in some countries because of vulnerabilities created by unequal cultural status. Two hundred twenty-three cases were deleted due to missing data or incomplete answers, resulting in an effective sample size of 1,861 individuals. Since respondents were vulnerable to contracting HIV/AIDS, hope that the medication would reduce their risk of contracting the disease should be high. Taking the medication should also generate anxiety about possible goal-incongruent outcomes as participants were informed that the medicine could cause side effects (headache, drowsiness, and gassiness) and that it might not be effective if not taken as directed.

Ipsos MORI, a large international market research company, gathered the data using surveys. The study protocol was approved by numerous agencies, including the Health Research and Development Division, Ministry of Health (Botswana); the Independent Ethics Committee (IEC), Bangalore (India); the Kenya Medical Research Institute (KEMRI); Comite Institucional de Etica (CIE), Universidad Peruana Cayetano Heredia (Peru); the

Human Research Ethics Committee (Medical), University of the Witwatersrand, Johannesburg (South Africa); the Director General Health Services Ministry of Health (Uganda); and the Committee of Professional Ethics of the Sociological Association of Ukraine (SAU, and the Institute for the Development of Human Research Protections, Ministry of Public Health in Thailand). Informed written consent were obtained from all participants.

The questionnaires were translated into 16 languages by the local market research teams and back-translated by professional translators to ensure content consistency. The final translation was approved by consensus. Participants received questionnaires in their native languages. All participants completed the anonymous questionnaire and were offered a monetary incentive of the equivalent of $5, except in South Africa, where the ethical committee prohibits such incentives.

After reading a brief introduction on PrEP, the respondents stated their feelings about the new medication and indicated their willingness/unwillingness to use it ("Would you take PrEP as soon as it becomes available, or not?" 1 = *no, definitely not*, 2 = *no, probably not*, 3 = *yes, probably,* 4 = *yes, definitely*). Hope and anxiety were measured, followed by this question. For hope, respondents were asked, "How much hope, if any, does PrEP give you for new possibilities for you in life?" (1 = *no hope at all*, 2 = *not much hope,* 3 = *some hope,* 4 = *a lot of hope*). Anxiety was measured by asking, "How anxious, if at all, does the thought of taking PrEP make you feel?" (1 = *not at all anxious*, 2 = *not very anxious*, 3 = *fairly anxious*, 4 = *very anxious*).

Several measures were included to differentiate anxiety from other negative high arousal emotions. Firstly, it is helpful to distinguish anxiety from fear, particularly from a specific referent point of view. A view can identify which target object, either a product or a disease,

is tied to emotion. Conceptually, anxiety is distinct from fear in terms of the certainty of the target referent. Thus, fear of contracting HIV was measured by asking "How afraid are you of contracting HIV/AIDS, if at all?" (1 = *not at all afraid*, 2 = *not very afraid*, 3 = *fairly afraid*, 4 = *very afraid*). Secondly, I measured embarrassment over taking PrEP. Embarrassment was measured by asking "How embarrassing, if at all, would you find taking PrEP to be?" 1 = *not at all embarrassing*, 2 = *not very embarrassing*, 3 = *fairly embarrassing*, 4 = *very embarrassing*).

Feeling anxious about the health consequences of taking PrEP was both modestly correlated with fear of contracting HIV/AIDS ($r = .12$, $p < .001$) and embarrassment over using PrEP ($r = .23$, $p < .001$). To test whether anxiety of taking PrEP, fear of contracting HIV/AIDS and embarrassment of taking PrEP are discriminable constructs, I conducted confirmatory factor analyses (CFAs). The model in which all items indicated their respective factors showed the best fit relative to a model in which items loaded on a single factor ($\Delta\chi^2(2) = 933.50$, $p < .001$). These results support the notion that anxiety of taking PrEP is empirically distinct from fear of contracting HIV/AIDS and embarrassment of taking PrEP.

Finally, respondents indicated their gender (1 = *male*, 2 = *female*, 3 = *transgender*), age (1 = *up to 15*, 2 = *16-18*, 3 = *19-24*, 4 = *25-30*, 5 = *31-35*, 6 = *36-40*, 7 = *41-45*, 8 = *46-50*, 9 = *51-55*, 10 = *56-60*, 11 = *61+*), and country.

3.2   Results

Test of Hypotheses. Since the independent and dependent variables were both measured and continuous, I ran a regression analysis using the full sample of respondents. All measured variables were mean-centred (Hayes 2017). Prior to regression analyses, I tested to see if the

data met the assumption of collinearity, suggesting that multicollinearity was not a concern (Hope, Tolerance = .99, VIF = 1.01; Anxiety, Tolerance = .99, VIF = 1.01). The regression analysis modelled the main effect of hope, the main effect of anxiety and their interaction, as well as several control variables (see Table 4).

Table 4. Study 1 Effect of Hope and Anxiety on Adoption Intentions

Dependent variable =Intention to adopt	Model 1 Base model (The effect of hope, anxiety and the interaction)		Model 2 Based model with controls for demographics		Model 3 Based model with controls for fear and embarrassment		Model 4 Base model with all controls	
	B (SE)	T	B (SE)	T	B (SE)	T	B (SE)	T
Constant	3.45 (.02)	215.81***	3.00 (.07)	40.87***	3.58 (.10)	35.45***	3.16 (.12)	25.87***
Hope	.40 (.03)	13.76***	.39 (.03)	13.44***	.38 (.03)	12.92***	.37 (.03)	12.69***
Anxiety	.01 (.01)	.64	.00 (.02)	.04	.03 (.02)	1.81	.02 (.02)	1.04
Hope × Anxiety	.07 (.03)	2.54*	.07 (.03)	2.66**	.06 (.03)	2.13*	.06 (.03)	2.28*
Gender			.10 (.03)	3.47***			.10 (.03)	3.40***
Age groups			.06 (.01)	5.97***			.06 (.01)	5.58***
Country			.01 (.01)	1.61			.01 (.01)	2.04*
Fear					.00 (.02)	.21	- .00 (.02)	- .15
Embarrassment					- .10 (.02)	- 4.62***	- .10 (.02)	- 4.40***
	$R^2 = .12$		$R^2 = .14$		$R^2 = .13$		$R^2 = .15$	
	$F(3, 1857) = 70.72^{***}$		$F(6, 1854) = 47.56^{***}$		$F(5, 1855) = 50.11^{***}$		$F(8, 1852) = 40.01^{***}$	

NOTE.−Variables are mean centred; Heteroskedasticity-consistent SEs. ***$p < .001$; **$p < .01$; *$p < .05$.

As expected, the main effect of hope was significant and positive. The more respondents hoped that PrEP would offer goal-congruent life outcomes, the more positive were their intentions to adopt it ($\beta = .40$, SE $= .03$, $t = 13.76$, $p < .001$). There was no main effect of anxiety on adoption intentions ($\beta = .01$, SE $= .01$, $t = .64$, $p > .51$). However, the predicted interaction between hope and anxiety was significant ($\beta = .07$, SE $= .03$, $t = 2.54$, $p < .05$). Figure 3 visualises the interactions between hope and anxiety. As shown in the figure, the two error bars in the conditions of strong hope did not overlap indicating the difference between two means of strong anxiety and weak anxiety coupled with strong hope was statistically significant. The form of the interaction supports H1 demonstrating that as hope increased, increases in anxiety had a greater impact on adoption intentions. These effects remained unchanged even when controlling for high arousal emotions including fear and embarrassment (see Model 3 in Table 4), as well as demographics including gender, age, and country (see Model 2 and Model 4 in Table 4).

Figure 3. Study 1 Interaction between Hope and Anxiety
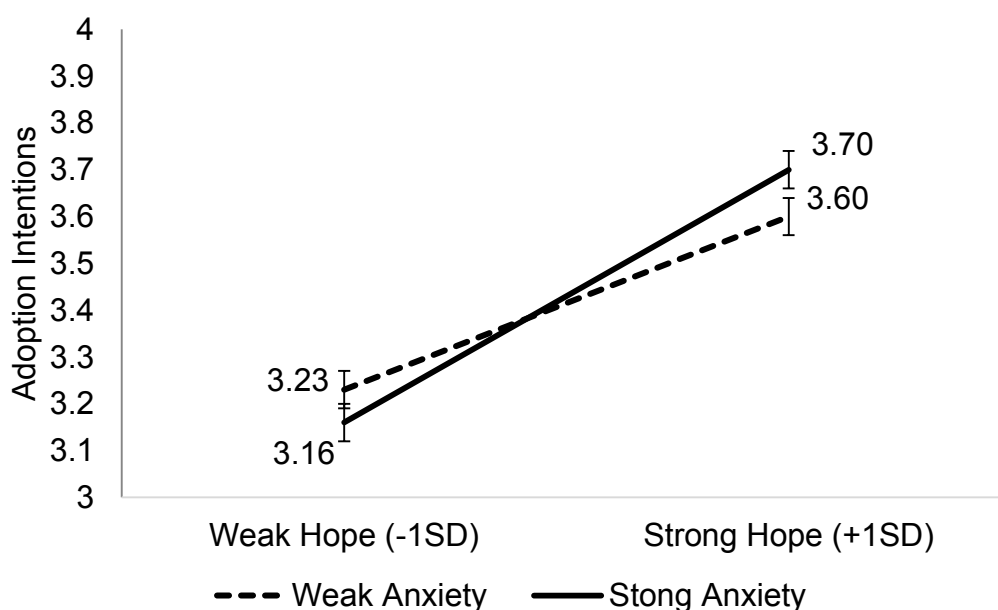
NOTE.-All errors bars represent standard errors.

To better understand the interaction, I conducted a regression-based spotlight analysis following Krishna (2016) so as to see the effect of hope at strong vs. weak levels of anxiety. The results showed that when anxiety was weak (i.e., one standard deviation below the mean), the effect of hope was significant and modest, such that participants with strong hope were 28% more likely to adopt PrEP ($\beta = .28$, SE = .03, $t = 9.63$, $p < .001$). In contrast, a spotlight analysis at one standard deviation above the mean of anxiety showed a greater effect, such that hope significantly increased willingness to adopt PrEP (by 42%) at strong levels of anxiety ($\beta = .42$, SE = .04, $t = 12.05$, $p < .001$). Moreover, these results held when controlling for the high arousal emotions of fear and embarrassment. Specifically, hope had greater effect on adoption intentions at strong levels of anxiety ($\beta = .39$, SE = .04, $t = 11.09$, $p < .001$) compared to weak levels of anxiety ($\beta = .27$, SE = .03, $t = 9.40$, $p < .001$).

3.3   Discussion

The results of Study 1 support H1. Anxiety over possible goal-incongruent outcomes of taking the medication strengthened the positive effect of hope on willingness to take PrEP, indicating that the combination of strong hope and strong anxiety led to more positive adoption intentions. Of note, an interesting observation about the effects of fear appeal on adoption intentions was insignificant in both Model 3 and Model 4 as shown in Table 4. This finding was not in support of existing knowledge (Johnston and Warkentin 2010; Moulard et al. 2012) in the sense that individuals did not choose to comply with recommended solutions to mitigate threats of contracting HIV/AIDS. I surmise this finding resulted from the difficult environments where the vulnerable respondents were located. It seems that when the

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likelihood of contracting HIV/AIDS is high, respondents are able to endure the conditions one way or the other, and are no longer fearful of the disease. To them, HIV/AIDS could have become tolerable, bearable or even acceptable to some extent. Hence, fear appeal did not effectively influence adoption intentions in this study.

Whereas Study 1 supports H1 in a large-scale field study, one wonders whether similar findings would be observed in more controlled environments. Study 1 also involved a product involving functional (i.e., health) benefits, raising questions about whether the predicted effects would be observed in contexts where different consumption goals are activated. Furthermore, given the nature of the field study and where the data were collected, only single-item measures for hope, anxiety, and willingness to adopt could be used. A study that replicates these effects using multi-item measures would reduce concerns about potential measurement error from the use of single items. Study 1 also sampled respondents from areas of the world characterized by high levels of poverty, limited education, and limited access to medical resources. Moreover, data were gathered in non-traditional research contexts, such as in nightclubs, saunas, streets, red-light districts, bars, or health centres. One wonders if the results are replicated for respondents from more developed countries and when examined in more traditional research contexts. Study 1 was also correlational in nature as hope and anxiety were measured (vs. manipulated) independent variables. Confidence in the results will be increased if H1 is replicated when hope and anxiety are manipulated, when a different sample and research context are used, when a different product is being considered, and when multi-item measures are used. Hence, Study 2 was designed with these objectives in mind.

4   Study 2

While the context for study 1 focuses on preventing HIV/AIDS and the functional (health) benefits from receiving PrEP, study 2 focuses on approaching aesthetic benefits (enhanced personal beauty) from orthodontic treatment. Study 2 also involves college students, as compared with study 1, which involves uneducated individuals living under conditions of poverty. Study 2 also explicitly tests the proposed serial mediation of defensive pessimism and confidence (H2). Additional factors that might explain variation in adoption intentions, or reflect alternative process mechanisms, were also controlled.

4.1   Design and Procedure

Participants. Study 2 used orthodontic treatment as the product context. Participants who reported that their teeth were not perfectly straight and felt they could benefit from orthodontic treatment proceeded with the study. Whereas participants who felt that their teeth were already perfectly straight and/or those who lacked a perfect smile due to reasons other than misaligned teeth (e.g., tooth colour, cavities, lip shape) were screened out, since the service should be irrelevant to those who have been satisfied with their smiles and/or dissatisfied with their smiles because of reasons that were unrelated to teeth alignment. Two hundred and sixty-six college students from a large research university participated in this study as part of a regular course. Respondents were offered the chance to win one of five $50 Amazon.com gift vouchers.

Manipulation of Hope and Anxiety. This study used a 2 (Hope: strong vs. weak) × 2 (Anxiety: strong vs. weak) between-subjects design. Participants were asked to read a brochure about a new orthodontic treatment called SMILE. The content of the SMILE

brochure was used to manipulate hope and anxiety. Figure 4 shows manipulations for the four conditions; i.e., the strong hope/strong anxiety, the weak hope/weak anxiety, the strong hope/weak anxiety and the weak hope/strong anxiety conditions. Participants were randomly assigned to one of the four conditions and were asked to read the SMILE brochure.

Hope was measured by emphasising the degree of goal congruence associated with having straight teeth. Consistent with MacInnis and Chun (2006), goal congruence was conceptualised as a function of the desirability and importance of the goal-congruent outcome. Thus, in the strong hope condition, participants read information about the desirability of straight teeth (i.e., a transformed smile) and the importance of this outcome (i.e., an enhanced appearance and improved self-confidence). In contrast, the weak hope condition, participants were presented with information that suggested somewhat less desirable outcomes (i.e., a nice smile) and outcomes of more limited importance (i.e., confidence with friends). Both images and words were used to manipulate strong vs. weak hope. I attempted to keep the images as comparable as possible in terms of non-hope related elements including sequence of images and entity in the images, see Figure 4. For example, the *first* image in the 'strong and weak hope' conditions both depicted a picture of a woman with her hand holding her head. The *second* image in the 'strong and weak' hope conditions focused on the lower half of a woman's face. I also attempted to make the text copies relatively similar in length. In both conditions, the format of the pages, font, and text size were identical.

Anxiety was manipulated by emphasising the undesirability and importance of possible goal-incongruent outcomes resulting from the procedure. For example, the 'strong anxiety' condition participants were presented with information about the possibility of inflammation and swollen gums as well as the chances of a relapse following treatment. For the weak

anxiety participants, these outcomes were depicted as being both less important and undesirable. As with the hope manipulation, I used both images and texts to manipulate anxiety, and aimed to equate the images and texts in order to control non-anxiety related elements.

The brochure depicted the hope and anxiety-inducing materials in the order shown in Figure 4. Thus, the first page of the brochure depicted text and images designed to manipulate strong vs. weak hope. The second two pages depicted text and images designed to manipulate strong vs. weak anxiety. The final page depicted text and images designed to manipulate strong vs. weak hope. Therefore, the brochure contained an equivalent number of hope and anxiety-inducing stimuli, and the presentation order of these stimuli was constant across the conditions.

A pretest (N = 125) involving participants from the same population as the main study revealed that the manipulations for hope (M_{strong} = 5.29, SD = .22 vs M_{weak} = 2.72, SD = .23) and anxiety (M_{strong} = 4.86, SD = .20 vs M_{weak} = 2.60, SD = .21) worked as expected. After they had read the brochure, participants were asked a set of questions using seven-point scales (see measurement items of hope and anxiety in Table 5). Unless otherwise indicated, all scales were constructed by averaging the summated items representing the scale.

Figure 4. Study 2 Manipulation Stimuli

Condition 1: Strong Hope + Strong Anxiety	Condition 2: Weak Hope + Weak Anxiety

NOTE.– Strong (vs. weak) hope was manipulated by making goal congruence more (vs. less) desirable and important. Strong (vs. weak) anxiety was manipulated by making the treatment more (vs. less) undesirable and important.
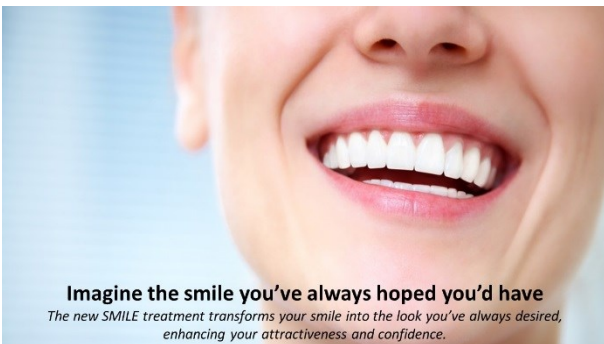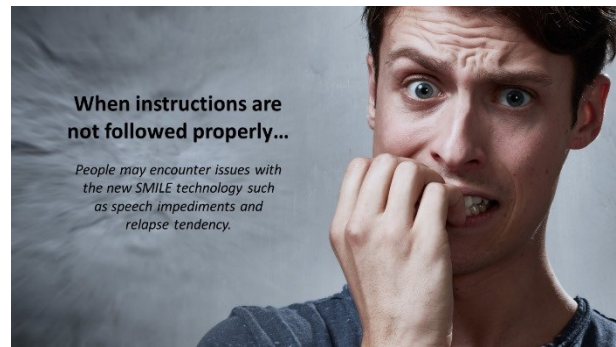
Source: texts were from this thesis and images were used under standard licensed users at Dreamstime.com

Figure 4 Study 2 Manipulation Stimuli (continued)

Condition 3: Strong Hope + Weak Anxiety	Condition 4: Weak Hope + Strong Anxiety

Picture yourself with the smile you always wanted
Our new technology uses a number of cutting-edge methods to perfectly align teeth with your facial structure, enhancing your look and overall attractiveness.

Teeth arrangement can be of interest to many people
For people affected by a misaligned facial structure, our new technology uses several contemporary methods to align teeth, improving your attractiveness.

Regular dental treatment is common
When undertaking SMILE, you may have to go through typical ways of recovery.

Think about how unsettling the process can be
When undertaking SMILE, you may have to experience inflammation and swollen gums.

With standard instructions to follow...
People may have to handle normal issues related to the SMILE treatment such as temporary mouth and teeth sensitivity.

When instructions are not followed properly...
People may encounter issues with the new SMILE technology such as speech impediments and relapse tendency.

Imagine the smile you've always hoped you'd have
The new SMILE treatment transforms your smile into the look you've always desired, enhancing your attractiveness and confidence.

A nice smile is a nice thing to have
The SMILE treatment gives you a nice smile and can increase your confidence when dealing with others such as friends or colleagues.
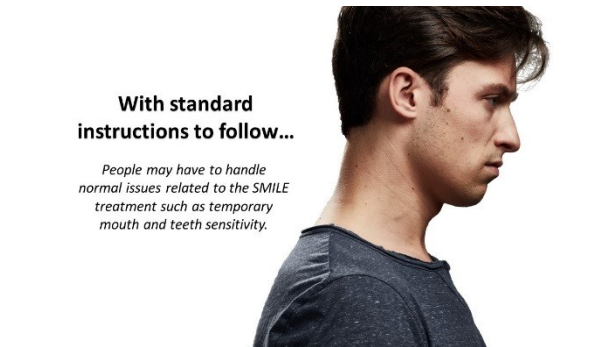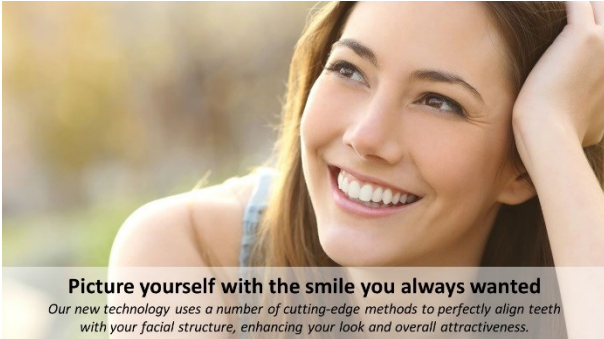
NOTE.– Strong (vs. weak) hope was manipulated by making goal congruence more (vs. less) desirable and important. Strong (vs. weak) anxiety was manipulated by making the treatment more (vs. less) undesirable and important.

Source: texts were from this thesis and images were used under standard licensed users at Dreamstime.com

Dependent Variable. In addition to the identical item used in Study 1 – i.e., "If the SMILE treatment does become available, do you think you will adopt it?", three more items were adapted from White et al. (2011) to indicate adoption intentions: "How likely are you to adopt the SMILE treatment in the near future?", "How inclined are you to undertake the SMILE treatment?", "How willing are you to receive the SMILE treatment?" ($\alpha = .97$).

Process Variables. Defensive pessimism, adapted from Norem and Cantor (1986), was assessed by respondents being asked to indicate their agreement with the following statements: "I am thinking about how I will feel if the SMILE treatment works poorly for me", "I am thinking about how I will feel if the SMILE treatment works well for me", "Considering what can go wrong with the SMILE technology helps me prepare for the possibility that it might not work for me", "Considering what might go wrong with the SMILE treatment makes me want to figure out how I can make sure that it will work for me" ($\alpha = .96$). Confidence in the hoped-for outcome (adapted from De Mello et al. 2007) was measured by asking, "I am confident that I will get the beautiful smile that I want by using the SMILE treatment" and "I am confident that the SMILE treatment will help me avoid negative outcomes typically associated with orthodontic treatment" ($r = .87$).

Alternative Processes. The participants were then asked questions regarding potential alternative explanations for the defensive pessimism processing mechanism. Firstly, since the brochure noted possible goal-(in)congruent outcomes, goal-congruent outcomes might have been interpreted as gains, while goal-incongruent ones might have been interpreted as pains. Consumers sometimes use a decision-making heuristic that states, "in order to achieve gains, they must endure pains" (Kramer et al. 2012). Thus, participants were asked about the extent to which they believed that in order to obtain gains they must experience pains. Secondly, ideals that relate to people's hope might be related to depth-of-processing in persuasion

(Pham and Avnet 2004). Global elaboration was also assessed by asking respondents the extent to which the brochure made them think a lot about the SMILE treatment and the extent to which it made them consider many other things. I assessed global elaboration to rule out the possibility that my results might be due to merely elaborating on the product generally, not activating defensively pessimistic thoughts. Thirdly, motivated reasoning was assessed based on De Mello et al. (2007) research, which postulated that when hope is strong, consumers want to believe that they can get what they want. Such belief can result in bias when information is processed because consumers can come to believe that what they hope for can indeed happen. Therefore, the participants were asked to what extent they believed the product's downsides to be not that bad, and that bad outcomes were unlikely to occur to them personally. All items were measured on 7-point scales.

Control Variables. As noted in Table 5, I also assessed a set of control variables. Firstly, I assessed whether there were differences across the conditions in product category relevance, need for emotion (Raman et al. 1995), category involvement (Mittal 1995) and demographics including age and gender. One might expect that any differences across conditions concerning these factors would be minimised via random assignment of participants to conditions. As expected, the conditions did not differ. Several other emotions beyond hope and anxiety were also measured to ensure that the manipulations had not inadvertently manipulated other 'high arousal' emotions. Specifically, participants were asked to indicate the extent to which they felt hopeful, proud, angry or afraid, after reading the brochure. There were no differences across conditions in the activation of these other emotions. Participants' perceptions of the trustworthiness of the information presented in the brochure, together with their interest in the brochure, were assessed; however, no differences across these conditions were detected on any of these variables. Moreover, the results reported below did not change when these

control variables were included in the analyses. Hence, I shall not refer to these control variables in this thesis further.

Table 5. Study 2 Measures and Reliabilities

Items *(1= not at all, 7= very much)*	Reliabilities	Mean	SD
Product relevance	$\alpha = .92$	4.35	1.71
How interested are you in orthodontic treatment?		4.41	1.92
How relevant is orthodontic treatment to you?		4.35	1.84
How much do you need orthodontic treatment?		4.28	1.79
Intention to adopt	$\alpha = .97$	3.66	1.94
If the SMILE treatment does become available, do you think you will adopt it?		3.64	1.99
How likely are you to adopt the SMILE treatment in the near future?		3.63	2.06
How inclined are you to undertake the SMILE treatment?		3.71	2.00
How willing are you to receive the SMILE treatment?		3.65	2.09
Defensive pessimism	$\alpha = .96$	3.42	1.80
I am thinking about how I will feel if the SMILE treatment works poorly for me.		3.45	1.91
I am thinking about how I will feel if the SMILE treatment works well for me.		3.41	1.89
Considering what can go wrong with the SMILE technology helps me prepare for the possibility that it might not work for me.		3.54	1.89
Considering what might go wrong with the SMILE treatment makes me want to figure out how I can make sure that it will work for me.		3.29	1.95
Confidence in hope-for outcome	$r = .87$	3.33	1.71

Items (1= not at all, 7= very much)	Reliabilities	Mean	SD
I am confident that I will get the beautiful smile that I want by using the SMILE treatment.		3.37	1.76
I am confident that the SMILE treatment will help me avoid negative outcomes typically associated with orthodontic treatment.		3.30	1.79
Pain-gain	$r = .76$	3.32	1.64
Experiencing the SMILE treatment could be painful but is worth it.		3.38	1.75
Experiencing the SMILE treatment could involve some suffering, but I am willing to endure it to obtain the result I want.		3.26	1.74
Global elaboration about the SMILE treatment	$r = .75$	3.44	1.59
The SMILE treatment makes me think a lot.		3.50	1.72
The SMILE treatment makes me consider a lot of things.		3.38	1.67
Motivated reasoning	$r = .78$	3.23	1.66
The potential downsides of the SMILE treatment are not that bad.		3.31	1.81
True, there could be some negative outcomes from the SMILE treatment, but they're unlikely to happen to me.		3.15	1.71
Hope	$\alpha = .95$	3.72	1.85
The SMILE treatment gives me hope for a better smile.		3.69	1.97
I really hope that the SMILE treatment can improve the way I look.		3.71	1.95
I yearn to get the amazing smile that the SMILE technology can bring me.		3.77	1.89
Anxiety	$\alpha = .74$	3.81	1.97
I am worried that the SMILE treatment won't improve my smile.		3.82	1.94
I am anxious that the SMILE treatment could have undesirable experiences like inflammation and swollen gums.		3.70	1.92
I am nervous about whether the SMILE treatment will work for me.		3.91	3.19

Items *(1= not at all, 7= very much)*	Reliabilities	Mean	SD
Category Involvement	$\alpha = .93$	4.34	1.69
If you were trying to select one particular type of orthodontic treatment available on the market, would you say that: *(1= I would not care at al which one I choose, 7= I would care a great deal as to which one I choose)*		4.47	1.72
How important is to you to make the right choice when it comes to orthodontic treatment? *(1= not at all important, 7= extremely important)*		4.32	1.82
In making your selection of this treatment, how concerned would you be about your choice? *(1= not at all concerned, 7= very much concerned)*		4.25	4.89
Other Emotions			
Proud		2.87	1.49
Afraid		2.93	1.46
Angry		2.53	1.46
Hopeful		4.36	1.86
Hopeless		2.98	1.71
Need for emotion	$\alpha = .95$	3.01	1.45
I try to anticipate and avoid situations where there is a likely chance of my getting emotionally involved.		3.07	1.54
I would rather be in a situation in which I experience little emotion than one which is sure to get me emotionally involved.		2.94	1.55
I do not look forward to being in situations that others have found to be emotional.		3.09	1.56
I do not like to have the responsibility of handling a situation that is emotional in nature.		2.95	1.57

Items *(1= not at all, 7= very much)*	Reliabilities	Mean	SD
Brochure trustworthiness	$r = .78$	4.70	1.57
The information in the excerpt about SMILE is credible.		4.70	1.68
The information provided in the SMILE excerpt is very trustworthy.		4.69	1.66
Brochure interest	$r = .82$	4.17	1.69
The information in the excerpt was interesting for me		4.17	1.80
The information in the excerpt was irrelevant to me (recoded).		4.16	1.75
Gender (0 = male, 1 = female)		.55	.50
Age		22.01	1.53

4.2   Results

Manipulation checks. A set of 2 (Hope: strong vs. weak) × 2 (Anxiety: strong vs. weak) ANOVAs on the manipulation checks revealed that the manipulations worked as expected (see Table 6). Specifically, the manipulation check for hope showed only a main effect of hope. As expected participants in the strong hope condition felt strong hope about achieving a perfect smile ($M_{strong} = 4.78$) than those in the weak hope condition did ($M_{weak} = 2.63$; $F(1, 262) = 134.22$, $p < .001$, partial $\eta^2 = .34$). The manipulation check for hope showed neither a main effect for anxiety ($F(1, 262) = .12$, $p > .73$) nor a significant interaction between hope and anxiety ($F(1, 262) = .68$, $p > .41$).

Table 6. Study 2 Cell Means

Means[1]	Strong Hope		Weak Hope	
	Strong Anxiety (N=68)	Weak Anxiety (N=67)	Strong Anxiety (N=68)	Weak Anxiety (N=63)
Manipulation Checks				
Hope	4.89[a]	4.67[a]	2.59[b]	2.68[b]
Anxiety	4.98[a]	2.74[b]	4.87[a]	2.54[b]
Dependent Variable	5.42[a]	4.17[b]	2.18[c]	2.81[d]
Intention to adopt				
Proposed Process Mechanisms				
Defensive pessimism	4.84[a]	3.58[b]	2.64[c]	2.58[c]
Confidence in hope-for outcome	4.52[a]	3.72[b]	2.32[c]	2.71[c]
Additional Process Mechanisms				
Pain-gain	4.32[a]	3.26[b]	2.86[bc]	2.80[c]
Motivated reasoning	4.44[a]	3.45[b]	2.57[c]	2.40[c]

NOTE.–Means with different superscripts are significantly different, $p < .05$.

[1]Table 6 only reports those variables for which I observed significant differences across conditions.

Likewise, the manipulation of anxiety worked as expected, revealing only a main effect of anxiety. Participants in the strong anxiety condition reported feeling stronger anxiety than those in the weak anxiety condition did ($M_{strong} = 4.92$ vs. $M_{weak} = 2.64$; $F(1, 262) = 134.19$, $p < .001$, partial $\eta^2 = .34$). For the anxiety manipulation check measure, neither the main effect

of hope ($F(1, 262) = .60$, $p > .44$), nor the interaction between hope and anxiety were significant ($F(1, 262) = .06$, $p > .80$).

Test of Hypotheses: ANOVA Results. A 2 × 2 ANOVA with adoption intentions as the dependent variable revealed a main effect of hope ($M_{strong\ hope} = 4.79$ vs. $M_{weak\ hope} = 2.50$; $F(1, 262) = 159.84$, $p < .001$, partial $\eta^2 = .38$), no main effect of anxiety ($F(1, 262) = 2.93$, $p > .09$) and the predicted hope × anxiety interaction ($F(1, 262) = 26.62$, $p < .001$, partial $\eta^2 = .09$). Supporting H1, those in strong hope/strong anxiety condition had the highest adoption intentions ($M_{strong\ hope/strong\ anxiety} = 5.42$) relative to those in the other three conditions: ($M_{strong\ hope/weak\ anxiety} = 4.17$, $t(127) = 4.55$, $p < .001$; $M_{weak\ hope/weak\ anxiety} = 2.81$, $t(129) = 10.33$, $p < .001$; $M_{weak\ hope/strong\ anxiety} = 2.18$, $t(134) = 14.03$, $p < .001$). These results, which replicate H1, suggest that the facilitative effect of anxiety on adoption intentions is limited to conditions where hope is strong.

In addition, an ANOVA using defensive pessimism as the dependent variable yielded both main effects of hope ($M_{strong\ hope} = 4.21$ vs. $M_{weak\ hope} = 2.61$; $F(1, 262) = 69.59$, $p < .001$, partial $\eta^2 = .21$) and anxiety ($M_{strong\ anxiety} = 3.74$ vs. $M_{weak\ anxiety} = 3.08$; $F(1, 262) = 12.02$, $p < .01$, partial $\eta^2 = .04$) as well as a significant hope × anxiety interaction ($F(1, 262) = 9.80$, $p < .01$, partial $\eta^2 = .04$). As predicted, defensive pessimism was greatest in the strong hope/strong anxiety condition ($M_{strong\ hope/strong\ anxiety} = 4.84$) relative to the other three conditions ($M_{strong\ hope/weak\ anxiety} = 3.58$, $t(133) = 4.10$, $p < .001$; $M_{weak\ hope/weak\ anxiety} = 2.58$, $t(129) = 8.21$, $p < .001$; $M_{weak\ hope/strong\ anxiety} = 2.64$, $t(134) = 7.63$, $p < .001$; see Table 5).

An ANOVA with confidence in goal-congruent outcome as dependent variable showed a main effect of hope ($M_{strong\ hope} = 4.12$ vs. $M_{weak\ hope} = 2.52$; $F(1, 262) = 77.40$, $p < .001$, partial $\eta^2 = .23$), no main effect of anxiety ($F(1, 262) = 1.25$, $p > .27$) and a significant hope × anxiety interaction ($F(1, 262) = 10.63$, $p < .01$, partial $\eta^2 = .04$). Here too, confidence was

greatest in the strong hope/strong anxiety condition ($M_{\text{strong hope/strong anxiety}}$ = 4.52) relative to the other three conditions ($M_{\text{strong hope/weak anxiety}}$ = 3.72, $t(133)$ = 2.78, p < .001; $M_{\text{weak hope/weak anxiety}}$ = 2.71, $t(129)$ = 6.31, p < .001; $M_{\text{weak hope/strong anxiety}}$ = 2.32, $t(134)$ = 8.52, p < .001).

For exploratory purposes, I ran several ANOVAs with pain-gain, motivated reasoning and general elaboration as dependent variables, respectively (see Table 6). The ANOVA on pain-gain showed main effects of hope ($M_{\text{strong hope}}$ = 3.79 vs. $M_{\text{weak hope}}$ = 2.83; $F(1, 262)$ = 26.03, p < .001, partial η^2 = .09) and anxiety ($M_{\text{strong anxiety}}$ = 3.59 vs. $M_{\text{weak anxiety}}$ = 3.03; $F(1, 262)$ = 8.80, p < .01, partial η^2 = .003) as well as hope × anxiety interaction ($F(1, 262)$ = 7.04, p < .01, partial η^2 = .008). Specially, participants were more likely to infer that in order to achieve gains one must endure pains when hope and anxiety were both strong ($M_{\text{strong hope/strong anxiety}}$ = 4.32) relative to the other three conditions ($M_{\text{strong hope/weak anxiety}}$ = 3.26, $t(133)$ = 3.86, p < .001; $M_{\text{weak hope/weak anxiety}}$ = 2.80, $t(129)$ = 5.89, p < .001; $M_{\text{weak hope/strong anxiety}}$ = 2.86, $t(134)$ = 5.48, p < .001).

An ANOVA on motivated reasoning revealed a main effect of both hope ($M_{\text{strong hope}}$ = 3.94 vs. $M_{\text{weak hope}}$ = 2.49; $F(1, 262)$ = 66.55, p < .001, partial η^2 = .20) and anxiety ($M_{\text{strong anxiety}}$ = 3.50 vs. $M_{\text{weak anxiety}}$ = 2.93; $F(1, 262)$ = 10.42, p < .01, partial η^2 = .04) as well as a significant hope × anxiety interaction ($F(1, 262)$ = 5.41, p < .05, partial η^2 = .02). Specially, motivated reasoning was greatest in the strong hope/strong anxiety condition ($M_{\text{strong hope/strong anxiety}}$ = 4.44) relative to the other three conditions ($M_{\text{strong hope/weak anxiety}}$ = 3.45, $t(133)$ = 3.70, p < .001; $M_{\text{weak hope/weak anxiety}}$ = 2.40, $t(129)$ = 8.57, p < .001; $M_{\text{weak hope/strong anxiety}}$ = 2.57, $t(134)$ = 7.13, p < .001). Finally, an ANOVA on global elaboration showed no effect of hope ($F(1, 262)$ = .004, p > .95) or anxiety ($F(1, 262)$ = .39, p > .53). Nor was the hope × anxiety interaction significant ($F(1, 262)$ = 1.08, p > .29). I discuss the effect of hope and anxiety on

pain/gain inferences and motivated reasoning in greater detail in the General Discussion section.

Test of Hypotheses: Mediation. To examine whether defensive pessimism and confidence mediate the effect of hope and anxiety on adoption intentions (H2), I used bootstrapping with repeated extraction of 5,000 samples (Hayes 2017, model 85). The mediation analysis included a serial sequence of defensive pessimism and confidence in mediating the relationship between hope × anxiety and adoption intentions. I report these results in two models as shown in Table 7. Model 1 tests the proposed processing mechanism when considering only defensive pessimism and confidence as key mediators. Model 2 includes defensive pessimism and confidence but also controls for other potential processing mechanisms.

Table 7. Study 2 Results

	Model 1 is the base model without controls			Model 2 accounts for alternative explanations		
	Defensive Pessimism	Confidence in Goal-Congruent Outcome	Intention to Adopt	Defensive Pessimism	Confidence in Goal-Congruent Outcome	Intention to Adopt
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Independent Variables						
Constant	3.43 (.10)***	2.03 (.20)***	2.16 (.20)***	2.82 (.35)***	.99 (.33)**	1.36 (.27)***
Hope	1.61 (.19)***	1.00 (.19)***	1.57 (.16)***	1.38 (.22)***	.63 (.20)**	1.33 (.16)***
Anxiety	.67 (.19)***	- .04 (.17)	.34 (.14)*	.57 (.20)**	- .23 (.17)	.17 (.14)
Hope × anxiety	**1.20 (.38)****	.73 (.34)*	1.33 (.28)***	**1.05 (.39)****	.44 (.34)	1.10 (.27)***
Mediators						
Defensive pessimism		**.38 (.05)*****	- .26 (.05)***		**.35 (.05)*****	- .25 (.05)***
Confidence			**.71 (.05)*****			**.64 (.05)*****
Covariates						
Pain-Gain				.05 (.06)	.19 (.05)***	.25 (.04)***
Motivated reasoning				.12 (.07)	.16 (.06)**	.07 (.05)
General elaboration				.01 (.06)	.00 (.05)	-.01 (.04)
	$R^2 = .26$	$R^2 = .38$	$R^2 = .67$	$R^2 = .27$	$R^2 = .43$	$R^2 = .71$
	$F(3, 262) = 30.70$	$F(4, 261) = 39.22$	$F(5, 260) = 107.07$	$F(6, 259) = 16.21$	$F(7, 258) = 27.29$	$F(8, 257) = 79.93$

Indirect Effect: Hope -> Defensive Pessimism -> Confidence in Goal-Congruent Outcome -> Intentions

	Effect	Boot SE	CI	Effect	Boot SE	CI
Weak anxiety	.27	.09	[.12, .45]	.19	.07	[.07, .35]
Strong anxiety	**.60**	**.13**	**[.36, .89]**	**.42**	**.11**	**[.23, .67]**

Note.–Bold-faced show support for my hypotheses. Variables are mean centred; ***$p < .001$. **$p < .01$. *$p < .05$.

The results for Model 1 support H2. The interaction between hope and anxiety predicted defensive pessimism (β = 1.20, SE = .38, t = 3.13, p < .01, 95% bootstrap confidence interval (CI) .44 to 1.95). Defensive pessimism, in turn, influenced confidence in attaining the goal-congruent outcome (β = .38, SE = .05, t = 7.05, p < .001, CI: .28, .49). Confidence in the hoped-for outcome significantly predicted intentions to adopt the SMILE treatment (β = .71, SE = .05, t = 14.10, p < .001, CI: .61, .91). Conditional indirect effects revealed a significantly serial mediation for strong anxiety (indirect effect = .60, Boot SE= .13, CI: .36, .89).

Model 2 adds the additional potential mediators of pain/gain inferences, motivated reasoning and global elaboration as control variables whilst testing the proposed model. The results from model 1 were replicated, even when these alternative mediators were included as controls. Specifically, the results showed that hope × anxiety enhances defensive pessimism (β = 1.05, SE = .39, t = 2.68, p < .01, CI: .28, 1.82), which in turn strengthened outcome confidence (β = .35, SE = .05, t = 6.68, p < .001, CI: .25, .46). Confidence, in turn, positively affected adoption intentions (β = .64, SE = .05, t = 12.80, p < .001, CI: .54, .74). Conditional indirect effects revealed a significantly serial mediation for strong anxiety (indirect effect = .42, Boot SE= .11, CI: .23, .67). Model 2 also shows that hope and anxiety influence adoption intentions directly, even after accounting for defensive pessimism, confidence and when controlling for other drivers of adoption intentions. These results remain unchanged when I include other high arousal emotions as controls. Thus, H2 is supported even when controlling for other factors.

4.3   Discussion

Study 2 replicates Study 1 in a controlled lab study that manipulates hope and anxiety, uses multi-item indicators, uses a different product that involves a different consumption goal, samples a different population, and identifies other potential process mechanisms. The results support the general idea that strong anxiety can *enhance* adoption intentions when hope is strong (H1). They also suggest that the process by which these emotions have these effects are at least partly due to their influence on defensive pessimism and outcome confidence (H2). This is true even when other potential process explanations are accounted for – i.e., pain/gain inferences, motivated reasoning, and global elaboration.

5   Study 3

Study 3 is designed to replicate and advance Study 2 in several ways. Firstly, to enhance generalisability, I use a new offering that emphasises experiential consumption goals rather than the functional and aesthetic consumption goals examined in Studies 1 and 2. Secondly, to determine the impact of strong hope and strong anxiety on adoption intentions, potential confounds associated with the hope and anxiety manipulations, which were not examined in Study 2, are examined. These include trustworthiness, relevance and vividness of costs/benefits associated with the new product. The study again examines and controls for other high arousal emotions; these include those measured in Study 2, together with excitement, optimism and pessimism, the need for emotion and category involvement. Also, the alternative processing mechanisms, identified in Study 2 – i.e., inferences about the need to endure pain in order to obtain gain, motivated reasoning, and global elaboration, are assessed and controlled.

5.1   Design and Procedure

Two hundred and forty-three college students from a large research university participated in Study 3. Instead of offering monetary incentives, as with Study 2, the participants were thanked by being invited to select several hand-made chocolates at the study's conclusion. I randomly assigned participants to one of four conditions created by manipulating hope (strong vs. weak) and anxiety (strong vs. weak) in a 2 × 2 between-subjects experiment. I asked participants to read a brochure about a new tour company (Aurora travel) that was promoting the opportunity to see the Northern Lights.

As with Study 2, hope was manipulated by making possible goal-congruent outcomes from the tour more (vs. less) desirable and important; anxiety was manipulated by making

possible goal-incongruent outcomes from the tour more (vs. less) undesirable and important. See Figure 5 for the exact manipulations. In addition to the manipulation check measures used in Study 2, two additional items were added ("I have strong desire to see the Northern Lights", "If I were to go on the tour, I would really hope to see the Northern Lights"), see Table 8.

A pretest involving 203 respondents revealed that the hope (M_{strong} = 4.88 vs M_{weak} = 3.25; $F(1, 203)$ = 50.69, $p < .001$) and anxiety (M_{strong} = 4.38 vs M_{weak} = 3.05; $F(1, 203)$ = 32.59, $p < .001$) manipulations were successful. Appendix A shows the pretest results. The pretest revealed no differences across the conditions regarding the trustworthiness, relevance or vividness of the brochure.

All constructs used in Study 3 are listed together with their associated items and scale reliabilities in Table 8. As with Study 2, each scale was constructed by averaging the summated items representing the scale. Participants also indicated their gender (Female = 54.3%) and age (M = 22.54, SD = 2.24). As with Study 2, the manipulations had no effect on high arousal emotions other than hope and anxiety (Table 8). Moreover, the conditions did not differ in participant age, gender, category involvement, interest in seeing the Northern Lights, need for emotion, or the vividness, relevance and credibility of the brochure. These variables are not discussed further.

Figure 5. Study 3 Manipulation Stimuli

Condition 1: Strong Hope + Strong Anxiety	Condition 2: Weak Hope + Weak Anxiety

NOTE.– Strong (vs. weak) hope was manipulated by making goal congruence more (vs. less) desirable and important. Strong (vs. weak) anxiety was manipulated by making the travel more (vs. less) undesirable and important.

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Figure 5 Study 3 Manipulation Stimuli (continued)

Condition 3: Strong Hope + Weak Anxiety	Condition 4: Weak Hope + Strong Anxiety

NOTE.– Strong (vs. weak) hope was manipulated by making goal congruence more (vs. less) desirable and important. Strong (vs. weak) anxiety was manipulated by making the travel more (vs. less) undesirable and important.

Source: texts were from this thesis and images were used under standard licensed users at Dreamstime.com

Table 8. Study 3 Measures and Reliabilities

Items *(1= not at all, 7= very much)*	Reliabilities	Mean	SD
Product relevance	$\alpha = .84$	3.54	1.49
How interested are you in seeing the Northern Lights?		3.53	1.74
How much would you like to experience the Northern Lights?		3.54	1.73
How attracted are you to the idea of visiting the Northern Lights?		3.55	1.67
Intention to adopt	$\alpha = .90$	3.23	1.69
If the Aurora travel tour were available to me, I think I would take their tour.		3.24	1.94
I would be willing to be part of Aurora's travel tour.		3.18	1.91
I am inclined to take part in the Aurora travel tour.		3.20	1.82
If I had the money, I would take the Aurora tour in the near future.		3.30	2.01
Defensive pessimism	$\alpha = .90$	3.44	1.63
I am thinking about how I will feel if the Aurora travel tour works out poorly for me.		3.35	1.90
I am thinking about how I will feel if the Aurora travel tour works well for me.		3.37	1.83
Considering what can go wrong with the Aurora travel tour helps me prepare for the possibility that the tour might not work for me.		3.53	1.80
Considering what might go wrong with the Aurora travel tour makes me want to figure out how I can make sure that it will work for me.		3.52	1.89
Confidence in hope-for outcome	$r = .74$	3.74	1.78
I am confident that I will experience the magical night that I want by joining the Aurora travel tour		3.93	1.95
I am confident that the Aurora travel tour will help me avoid negative outcomes typically associated with trips to see the Northern Lights.		3.54	1.85

Items (1= not at all, 7= very much)	Reliabilities	Mean	SD
Pain-gain	$r = .76$	3.03	1.64
Experiencing the Aurora travel tour could be painful but is worth it.		3.04	1.81
Experiencing the Aurora travel tour could involve some suffering, but I am willing to endure it to obtain the result I want.		3.02	1.70
Global elaboration about the tour	$r = .65$	2.80	1.39
The Aurora travel tour makes me think a lot.		2.93	1.59
The Aurora travel tour makes me consider a lot of things.		2.68	1.48
Motivated reasoning	$r = .66$	2.92	1.41
The potential downsides of the Aurora travel tour are not that bad.		2.90	1.59
True, there could be some negative outcomes from the Aurora travel tour, but they're unlikely to happen to me.		2.93	1.49
Hope	$\alpha = .95$	3.84	1.77
The Aurora travel tour gives me hope for experiencing the magical Northern Lights.		3.85	1.97
I really hope that the Aurora travel tour can help me capture the magical Northern Lights.		3.75	1.83
I yearn to get the sensation of mother nature that the Aurora travel tour can bring me.		3.92	1.97
I have a strong desire to see the Northern Lights		3.84	1.84
If I were to go on the tour, I would really hope to see the Northern Lights		3.86	2.05
Anxiety	$\alpha = .86$	3.70	1.65
I am worried that the Aurora travel tour won't give me a magical Northern Lights experience.		3.72	1.83
I am anxious that the Aurora travel tour could give me		3.67	1.90

Items *(1= not at all, 7= very much)*	Reliabilities	Mean	SD
uncomfortable experiences due to noisy crowds.			
I am nervous about whether the Aurora travel tour will give me the magical experience of Northern Lights.		3.72	1.84
Category involvement	$\alpha = .92$	3.07	1.60
If you were trying to select one particular type of travel tour available on the market, would you say that: *(1= I would not care at al which one I choose, 7= I would care a great deal as to which one I choose)*		3.19	1.77
How important is to you to make the right choice when it comes to travel tours? *(1= not at all important, 7= extremely important)*		2.97	1.73
In making your selection of a travel tour, how concerned would you be about your choice? *(1= not at all concerned, 7= very much concerned)*		3.05	1.65
Other Emotions			
Proud		4.04	1.63
Afraid		3.28	1.72
Angry		3.60	1.69
Hopeful		3.42	1.75
Hopeless		3.08	1.67
Excited		3.37	1.84
Optimistic		3.47	1.80
Pessimistic		2.96	1.67
Need for emotion	$\alpha = .88$	3.60	1.43
I try to anticipate and avoid situations where there is a likely chance of my getting emotionally involved.		3.75	1.80
I would rather be in a situation in which I experience little emotion than one which is sure to get me emotionally involved.		3.49	1.57

Items (1= not at all, 7= very much)	Reliabilities	Mean	SD
I do not look forward to being in situations that others have found to be emotional.		3.63	1.67
I do not like to have the responsibility of handling a situation that is emotional in nature.		3.55	1.62
Brochure trustworthiness	$r = .70$	4.53	1.52
The material about the Aurora travel tour is credible.		4.52	1.74
The material provided about the Aurora travel tour is very trustworthy.		4.54	1.54
Brochure self-relevance	$r = .90$	4.23	1.64
The material was interesting for me.		4.28	2.05
The material was irrelevant to me (reverse coded).		4.14	1.80
The material about the Aurora travel tour was highly self-relevant.		4.19	1.72
I felt the material about the Aurora travel tour spoke to me directly.		4.33	1.90
Brochure vividness	$r = .77$	4.55	1.65
I could imagine myself being on such a tour.		4.36	1.95
I had a relatively vivid sense of what the tour could be like.		4.73	1.70
Gender (0 = male, 1 = female)		.54	.50
Age		22.54	2.24

5.2 Results

Manipulation checks. A set of 2 (Hope: strong vs. weak) × 2 (Anxiety: strong vs. weak) ANOVAs on the manipulation checks revealed that the manipulations of hope and anxiety were successful (see Table 9). Specifically, the manipulation check for hope showed only a main effect of hope (M_{strong} = 4.58 vs. M_{weak} = 3.12; $F(1, 239)$ = 49.12, $p < .001$, partial η^2 = .17). Neither the main effect for anxiety ($F(1, 239)$ =.09, $p > .76$) nor the interaction between hope and anxiety were significant ($F(1, 239)$ = .004, $p > .94$). Likewise, the manipulation check for anxiety revealed only a main effect of anxiety (M_{strong} = 4.28 vs. M_{weak} = 3.12; $F(1, 239)$ = 33.64, $p < .001$, partial η^2 = .12). Neither the main effect for hope ($F(1, 239)$ = .22, $p > .64$) nor the interaction between hope and anxiety were significant ($F(1, 239)$ = .58, $p > .44$).

<p align="center">*Table 9. Study 3 Cell Means*</p>

Means[1]	Strong Hope		Weak Hope	
	Strong Anxiety (N=60)	Weak Anxiety (N=61)	Strong Anxiety (N=62)	Weak Anxiety (N=60)
Manipulation Checks				
Hope	4.61^a	4.54^a	3.14^b	3.09^b
Anxiety	4.31^a	3.00^b	4.25^a	3.24^b
Dependent Variable				
Intention to adopt	4.22^a	3.32^b	2.65^c	2.75^c
Mediators				
Defensive pessimism	4.35^a	3.25^b	3.07^b	3.10^b
Confidence in hope-for outcome	4.08^a	3.70^a	3.73^a	3.45^a
Additional Process Mechanisms				
Pain-gain	3.57^a	3.18^{ab}	3.03^b	2.34^c

NOTE.–Means with different superscripts are significantly different, *p* < .05.

[1] Table 9 only reports those variables for which I observed significant differences across conditions.

Test of Hypotheses: ANOVA Results. For adoption intentions, my results revealed a main effect of hope ($M_{\text{strong hope}}$ = 3.77 vs. $M_{\text{weak hope}}$ = 2.70; $F(1, 239)$ = 27.86, *p* < .001, partial η^2 = .10), a main effect of anxiety ($M_{\text{strong anxiety}}$ = 3.44 vs. $M_{\text{weak anxiety}}$ = 3.03; $F(1, 239)$ = 3.92, *p* = .049, partial η^2 = .02), and the predicted hope × anxiety interaction ($F(1, 239)$ = 6.03, *p* < .05). Specifically, those in strong hope/strong anxiety condition had the highest adoption

intentions ($M_{\text{strong hope/strong anxiety}}$ = 4.22) relative to those in the other three conditions: ($M_{\text{strong hope/weak anxiety}}$ = 3.32, $t(119)$ = 2.92, $p < .01$; $M_{\text{weak hope/weak anxiety}}$ = 2.75, $t(118)$ = 4.75, $p < .001$; $M_{\text{weak hope/strong anxiety}}$ = 2.65, $t(120)$ = 5.48, $p < .001$). These results replicate H1, suggesting that the facilitative effect of anxiety on adoption intentions is limited to conditions where hope is strong. See Table 9 for those variables for which I observed significant differences across conditions.

I also conducted an ANOVA on defensive pessimism. The results yielded both positive main effects of hope ($F(1, 239)$ = 12.95, $p < .001$, partial η^2 = .05) and anxiety ($F(1, 239)$ = 7.10, $p < .01$, partial η^2 = .03) as well as the pairwise interaction ($F(1, 239)$ = 8.09, $p < .01$, partial η^2 = .03). These results replicate H2.

As with Study 2, and for exploratory purposes, I examined whether hope and anxiety influence adoption intentions by inducing inferences about the need to endure pains in order to obtain gains. I observed both a main effect of hope ($F(1, 239)$ = 11.32, $p < .01$, partial η^2 = .05) and a main effect of anxiety ($F(1, 239)$ = 6.96, $p < .01$, partial η^2 = .03). Although the means reported in Table 9 for pain/gain are consistent with those in study 2, the pairwise interaction was not significant ($F(1, 239)$ = .56, $p > .45$). I did not replicate the effect in Study 2 such that strong hope and anxiety influence motivated reasoning. Neither of the main effects (Hope: $F(1, 239)$ = .79, $p > .37$; Anxiety: $F(1, 239)$ = .02, $p > .89$) nor the interaction were significant ($F(1, 239)$ = .20, $p > .66$) for the motivated reasoning variable. As with Study 2, I observed no effect of strong hope and strong anxiety on global elaboration about the tour ($M_{\text{strong hope/strong anxiety}}$ = 2.91, $M_{\text{strong hope/weak anxiety}}$ = 2.65, $M_{\text{weak hope/weak anxiety}}$ = 2.79, $M_{\text{weak hope/strong anxiety}}$ = 2.87; $F(1,239)$ = .26, $p > .61$).

Test of Hypotheses: Mediation. To further explore defensive pessimism as a process mechanism, I followed Hayes (2017) recommended bootstrapping technique with 5,000

resamples (model 85) and examined the effects of defensive pessimism and confidence in mediating the relationship between hope × anxiety and adoption intentions. The results in Model 1 (see Table 10) support my proposed process mechanism, and replicate H2. The interaction between hope and anxiety predicted defensive pessimism ($\beta = 1.13$, SE = .40, $t = 2.84$, $p < .01$, CI: .35, 1.92). Defensive pessimism, in turn, influenced confidence in attaining the goal-congruent outcome ($\beta = .69$, SE = .06, $t = 11.65$, $p < .001$, CI: .57, .81). Confidence in attaining the goal-congruent outcome significantly predicted intentions to use the Arora travel tour ($\beta = .62$, SE = .05, $t = 11.27$, $p < .001$, CI: .51, .73). Conditional indirect effects revealed a significantly serial mediation for strong anxiety (indirect effect = .55, Boot SE= .15, CI: .28, .85) but not for weak anxiety (CI: -.17, .30).

These results remained unchanged after controlling for inferences about enduring pains to achieve gains, motivated reasoning and global elaboration. Specifically, I see that the interaction between hope and anxiety enhances defensive pessimism ($\beta = 1.08$, SE = .40, $t = 2.74$, $p < .01$, CI: .30, 1.86), which in turn strengthens confidence in achieving hoped-for outcomes ($\beta = .69$, SE = .05, $t = 12.61$, $p < .001$, CI: .58, .80). Confidence, in turn, has a positive effect on adoption intentions ($\beta = .50$, SE = .06, $t = 8.57$, $p < .001$, CI: .38, .61). Conditional indirect effects revealed a significantly serial mediation for strong anxiety (indirect effect = .44, Boot SE= .13, CI: .22, .73) but not for weak anxiety (CI: -.12, .26). These results replicate H2. Further analysis showed that the results in Table 10 were unchanged when I also included other high arousal emotions as controls.

Table 10. Study 3 Results

	Model 1 is the base model without controls			Model 2 accounts for alternative explanations		
	Defensive Pessimism	Confidence in Goal-Congruent Outcome	Intention to Adopt	Defensive Pessimism	Confidence in Goal-Congruent Outcome	Intention to Adopt
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Independent Variables						
Constant	3.44 (.10)***	1.36 (.22)***	1.13 (.20)***	3.64 (.34)***	.15 (.34)	.47 (.31)
Hope	.72 (.20)***	- .20 (.19)	.93 (.16)***	.74 (.20)***	- .46 (.17)*	.75 (.16)***
Anxiety	.53 (.20)**	- .04 (.18)	.23 (.16)	.50 (.20)*	- .24 (.17)	.08 (.15)
Hope × anxiety	**1.13 (.40)****	- .68 (.37)	1.00 (.31)**	**1.08 (.40)****	- .55 (.34)	.99 (.30)**
Mediators						
Defensive pessimism		**.69 (.06)*****	- .06 (.06)		**.69 (.05)*****	.01 (.06)
Confidence			**.62 (.05)*****			**.50 (.06)*****
Covariates						
Pain-Gain				.02 (.06)	.38 (.05)***	.26 (.05)***
Motivated reasoning				- .20 (.08)*	.04 (.07)	- .05 (.06)
Global elaboration				.12 (.08)	-.02 (.07)	.08 (.06)
	$R^2 = .10$	$R^2 = .37$	$R^2 = .51$	$R^2 = .13$	$R^2 = .49$	$R^2 = .56$
	$F(3, 239) = 9.31$	$F(4, 238) = 35.39$	$F(5, 237) = 49.25$	$F(6, 236) = 5.99$	$F(7, 235) = 32.19$	$F(8, 234) = 37.16$

Indirect Effect: Hope -> Defensive Pessimism -> Confidence in Goal-Congruent Outcome -> Intentions

	Effect	Boot SE	CI	Effect	Boot SE	CI
Weak anxiety	.06	.12	[-.17, .30]	.07	.09	[-.12, .26]
Strong anxiety	**.55**	**.15**	**[.28, .85]**	**.44**	**.13**	**[.22, .73]**

Note.–Bold-faced show support for my hypotheses. Variables are mean centred; ***$p < .001$. **$p < .01$. *$p < .05$.

5.3   Discussion

Study 3 tests and replicates both the interaction between hope and anxiety on adoption intentions (H1) and the serial mediational roles of defensive pessimism and confidence in the goal-congruent outcome regarding the relationship between hope and anxiety on adoption intentions (H2). As in Study 2, effects were observed even after controlling for a set of potential mediators. In the following Study 4, I assess if H1 and H2 are replicated when using a service that promises social (vs. functional, aesthetic, and experiential) benefits. H3 is also tested – the moderating role of processing opportunity in the effect of strong hope and strong anxiety on new product adoption intentions.

6   Study 4

Studies 1 to 3 consistently show that strong anxiety can increase adoption intentions when hope is strong (H1). Studies 2 and 3 also provide evidence that this effect is driven – at least in part – by the mediating roles of defensive pessimism and confidence in attaining the goal-congruent outcome (H2). In Study 4, by testing H3, I provide additional evidence for the mediating role of defensive pessimism on adoption intentions.

If defensive pessimism is indeed a viable mechanism that explains why strong anxiety can facilitate adoption intentions when hope is strong (H2), I should find evidence for the predicted effects only under conditions that foster defensively pessimistic thinking (H3). I test this idea in Study 4 by creating conditions that promote (vs. reduce) opportunities to engage in defensive pessimism.

Study 4 also examines the hypothesised effects in a new context, here involving social benefits. I recruit a sample of participants from Asia (e.g., Taiwan) to control for potential cultural differences in beliefs about how luck influences levels of hope and anxiety (Darke and Freedman 1997). I also enhance the comparability of the strong and weak anxiety conditions by keeping the images portrayed in the brochures unchanged across the experimental treatments. Anxiety is manipulated only through the text. Strong and weak anxiety messages are comparable in length.

6.1   Design and Procedure

Two hundred and forty-three college students from a large research university in Taiwan participated in Study 4 in exchange for $3 USD as compensation. To simplify the study's

design, I manipulated anxiety (strong vs. weak) and opportunity for defensively pessimistic thinking (high vs. low) under conditions in which hope was strong; hence only anxiety and processing opportunity were manipulated, while hope remained strong in all conditions. These manipulations resulted in a 2 (Anxiety: strong vs. weak) × 2 (Processing Opportunity: high vs. low) between-subjects experiment. Participants were asked to read a coloured brochure about a new online dating service, which purportedly would help them find the love of their dreams. I restricted my sample to individuals who were not in a serious, long-term relationship, since the service should be irrelevant to those whose are already committed.

I manipulated anxiety by making possible negative aspects of the service more (vs. less) undesirable and important. As with Studies 2 and 3, the participants read a 4-page brochure that included a page designed to induce strong hope, two pages designed to manipulate strong vs. weak anxiety, and a final page designed to further induce strong hope. The images used for high vs. low anxiety conditions were identical. Anxiety was manipulated only within the text. See below Figure 6 for the exact manipulations.

Figure 6. Study 4 Manipulation Stimuli

Strong Hope + Strong Anxiety	Strong Hope + Weak Anxiety

NOTE.–Two conditions are presented here: (i) strong hope/strong anxiety, and (ii) strong hope/weak anxiety. The other two conditions are composed of corresponding distraction tasks in which participants were asked to memorise two (vs. seven) digits in high (vs. low) processing opportunities Strong (vs. weak) anxiety was manipulated by making the dating service more (vs. less) undesirable and important.

Source: texts were from this thesis and images were used under standard licensed users at Dreamstime.com

To test H3, the processing opportunity was manipulated using a well-known distraction task (Shiv and Fedorikhin 1999). In particular, in the low processing opportunity group, participants were asked to memorise seven digits before reading the brochure. Participants in the high processing opportunity condition were asked to memorise two digits before reading the brochure. The participants were then asked to describe, as completely as possible, what went through their minds while they were deciding whether to use the new Quantify Love service. The instructions for reporting thought protocols were similar to those used by Shiv and Fedorikhin (1999). The protocols were coded for the total number of thoughts by two independent judges. A higher number of thoughts in the high (vs. low) processing opportunity conditions were expected. See Table 11 for all constructs used in Study 4, including their items and scale reliabilities. Table 12 presents the ANOVA results.

Table 11. Study 4 Measures and Reliabilities

Items (1= not at all, 7= very much)	Reliabilities	Mean	SD
Product relevance	$\alpha = .84$	4.44	1.06
How interested are you in online dating?		4.71	1.22
How much are you in favour of online dating?		4.32	1.19
How attracted are you to the idea of finding love through online dating?		4.29	1.27
Intention to adopt	$\alpha = .90$	4.78	1.13
If Quantify Love were available to me, I think I would use it.		4.93	1.29
I would be willing to be willing to use Quantify Love.		4.88	1.20
I am inclined to use Quantify Love.		4.42	1.33
If I had time, I would use Quantify Love in the near future.		4.92	1.32
Anxiety	$\alpha = .83$	4.49	1.28
I am worried that Quantify Love won't find me the love of my dreams.		4.64	1.50
I am anxious that Quantify Love might make me subject to undesired outcomes.		4.49	1.50
I am nervous about whether Quantify Love will help me find my perfect match.		4.35	1.45
Hope	$\alpha = .90$	4.49	1.28
Quantify Love gives me hope for finding the love of my dreams.		4.37	1.39
I really hope that Quantify Love can help me find the love of my dreams.		4.39	1.46
I yearn to find the perfect match that Quantify Love can bring me.		4.53	1.43
If I were to use Quantify Love, I would really hope to find my		4.68	1.54

Items *(1= not at all, 7= very much)*	Reliabilities	Mean	SD
love.			
Brochure trustworthiness	*r* = .66	4.35	1.01
The information about Quantify Love was believable.		4.35	1.10
The material provided about Quantify Love was trustworthy.		4.35	1.11
Brochure self-relevance	*α* = .65	4.57	.86
The material was interesting for me.		4.80	1.24
The material was irrelevant to me. (reverse coded)		4.80	1.18
The material about Quantify Love was highly self-relevant.		4.42	1.17
I felt the material that described Quantify Love spoke to me directly.		4.27	1.33
Brochure vividness	*r* = .63	4.42	1.17
I could imagine myself using such a service.		4.49	1.29
I had a relatively vivid sense of what the service could be like.		4.36	1.31
Trait defensive pessimism	*α* = .90	4.63	1.35
When I really hope that something good happens, I try not to get my hope up too high so as to avoid being disappointed later.		4.92	1.74
I often go into situations with the expectation that things might not go well.		4.41	1.74
I often go into situations expecting the worst, even though I know it will probably end up OK.		4.22	1.81
When I'm thinking about something good that might happen to me in the future, I tend to think through all the things that might go wrong.		4.09	1.84
When I'm thinking about something bad that might happen to		4.58	1.61

Items *(1= not at all, 7= very much)*	Reliabilities	Mean	SD
me in the future, I tend to make sure they don't happen.			
Planning for the future helps me manage my anxiety.		5.03	1.66
When I can imagine what might happen in the future and take steps to avoid negative outcomes, I feel more in control of what might occur.		5.15	1.52
Gender (0 = male, 1 = female)		.55	.50
Age		21.50	2.76

Table 12. Study 4 Cell Means

Means[1]	Strong anxiety		Weak anxiety	
	High processing opportunity (N=62)	Low processing opportunity (N=60)	High processing opportunity (N=59)	Low processing opportunity (N=62)
Manipulation checks				
Hope	4.57[a]	4.48[a]	4.61[a]	4.31[a]
Anxiety	4.78[a]	4.77[a]	4.22[b]	4.19[b]
Total no. of thoughts	3.34[a]	2.18[b]	3.25[a]	2.15[b]
Dependent variable				
Intention to adopt	5.31[a]	4.54[b]	4.61[b]	4.67[b]

Note.–Means with different superscripts are significantly different, $p < .05$.

[1]Table 12 only reports those variables for which I observed significant differences across conditions.

6.2 Results

Manipulation checks. Unsurprisingly, the manipulation check of hope showed no effects since hope was not manipulated and kept at a high level (see Table 12). The manipulation check for anxiety showed the predicted main effect of anxiety, with participants in the strong anxiety condition feeling stronger anxiety ($M_{strong} = 4.78$) than those in the weak anxiety condition ($M_{weak} = 4.20$; $F(1, 239) = 12.52$, $p < .001$, partial $\eta^2 = .05$). The manipulation check for anxiety showed no effects for processing opportunity ($F(1, 239) = .02$, $p > .90$).

Nor was the interaction between anxiety and process opportunity significant ($F(1, 239) = .01$, $p > .94$).

Also, as expected, participants reported greater opportunity to think about the online dating service in the high (vs. the low) processing opportunity condition. Specifically, I measured the success of the processing opportunity manipulation by the total number of thoughts respondents reported when thinking about the dating service. Two judges, blind to the condition of respondents, coded the number of thoughts respondents reported while reading the brochure. Intercoder agreement was .90. The results (see Table 12) showed a significant main effect of processing opportunity ($M_{high} = 3.30$ vs. $M_{low} = 2.16$; $F(1, 239) = 28.46$, $p < .001$, partial $\eta^2 = .11$). Neither the main effect of anxiety ($F(1, 239) = .08$, $p > .77$), nor the interaction between anxiety and processing opportunity were significant ($F(1, 239) = .01$, $p > .91$).

Effect of Anxiety on Adoption Intentions. Since the brochures aimed to induce strong hope, I anticipated that adoption intentions would be greatest when anxiety was strong vs. weak. A one-way between subjects ANOVA revealed the predicted main effect of anxiety on adoption intentions ($M_{strong\ anxiety} = 4.93$ vs. $M_{weak\ anxiety} = 4.64$; $F(1, 241) = 4.12$, $p = .043$, partial $\eta^2 = .02$). These results replicated H1, here using a product with social benefits.

Effect of Anxiety x Processing Opportunity on Adoption intentions. As per my theory, I anticipated that the effect of strong hope and strong (vs. weak) anxiety on adoption intentions would be greater when respondents had the opportunity to engage in defensively pessimistic thinking (i.e., when opportunity was high). A 2 (Anxiety: strong vs. weak) × 2 (Processing Opportunity: high vs. low) analysis of variance on adoption intentions showed main effects for anxiety ($M_{strong\ anxiety} = 4.92$ vs. $M_{weak\ anxiety} = 4.64$; $F(1, 239) = 4.18$, $p = .042$, partial η^2

= .02), for processing opportunity ($M_{\text{high opportunity}}$= 4.96 vs. $M_{\text{low opportunity}}$ = 4.60; $F(1, 239)$ =

6.42, p = .012, partial η^2 = .03) and for the anxiety × processing opportunity interaction ($F(1,$

239) = 8.92, p < .01, partial η^2 = .04). Supporting H3, when hope was strong, adoption

intentions were greatest when participants' anxiety was strong and their processing

opportunity was high ($M_{\text{strong anxiety/high opportunity}}$ = 5.31) relative to the other three conditions:

($M_{\text{strong anxiety/low opportunity}}$ = 4.54, $t(120)$ = 3.71, p < .001; $M_{\text{weak anxiety/high opportunity}}$ = 4.61, $t(119)$

= 3.64, p < .001; $M_{\text{weak anxiety/low opportunity}}$ = 4.67, $t(122)$ = 2.93, p < .001). As expected by H3

then, strong hope and strong anxiety enhanced adoption intentions only when respondents

had the opportunity to engage in defensively pessimistic thinking.

6.3   Discussion

Study 4 supports H3, in this case in regard to using a service that provides social benefits. The results further highlight the role of defensive pessimism as a mechanism that explains (at least in part) why strong hope and strong anxiety influences adoption intentions. These effects were observed despite attempts to keep the brochures identical in terms of visuals and by manipulating anxiety only through the brochure's text. In particular, when participants were in a high state of processing opportunities, they were more likely to have greater intentions in the context of both strong hope and strong anxiety.

Furthermore, a robustness check was conducted to check the effect of anxiety on defensively pessimistic thoughts. In Studies 2 and 3, defensively pessimistic thinking was measured by a scale specifically designed to assess it (see Tables 5 and 8). In Study 4, participants were asked to record their specific thoughts when reading about the new product. Their responses were coded for the extent to which they revealed defensively pessimistic thoughts.

Although the primary goal for Study 4 was to test H3, I also attempted to find evidence of defensive pessimism by coding participants' thoughts when they read the brochure. Two judges, blind to the condition of the respondents, coded the thought protocols for evidence of defensively pessimistic thinking. The thought protocols were discussed and listed based on the seminal work by Chang (2001). The overall intercoder agreement was .86, and the differences were resolved by discussion. In Table 13, examples are shown regarding responses that indicate defensively pessimistic thinking.

Table 13. Study 4 Example of Defensively Pessimistic Thoughts

Defensive Pessimism	Responses
Thinking through what might happen if the congruent outcome is less positive than hoped for (emotional preparedness)	• An opportunity to find the love of my life, and even if I don't find the love of my life I could possibly find someone interesting as a friend. • As long as the safety issue is secured, having a correct and healthy attitude, etc., everyone gains benefits regardless of success or failure of the outcomes. • Even if I could not find my true love, I could meet new friends.
Planning so as to ensure that outcomes are goal-congruent	• I would like to find out whether the chat room function records the time and frequency of our talks as a reference for relationship development. • I want to understand more so that I can be sure to find my dream love through this service. • I want to know how many profiles Quantify Love has. • I might need to figure out whether the system can automatically offer potential dating sites or activities to take my relationship to the next level when certain criteria are met (e.g., chat duration exceeds certain hours, high response rates).

Defensive Pessimism	Responses
Thinking through possible goal-congruent outcomes	• The benefits of online dating are to meet any kinds of friends without geographical limitation. After all, there are many people who are not in my social circle but they have common interests or similar lifestyles to me. It helps me to approach those friends. • I might be nervous, but I am open to meet new friends and hope to meet more people who have the same values as mine.
Thinking through possible goal-incongruent outcomes	• If I had good online time with my partner so that we decided to date offline, what can I do to protect myself from him cheating on me? • What if he uploads fake pictures and personal information? • Should I tell my parents that I accepted the online dating service? Will they misunderstand this service?
Thinking through how possible goal-incongruent outcomes could be avoided	• Quantify Love could help me to understand my match. Although the match might give fake information, it could be spotted through several rounds of conversations. • I will spend more time talking with and knowing my match to prevent fraud. • With the advancement of technology, this is going to be a trend. Whether it's fast or slow, I don't know. I think we shall not be scared. On the contrary, the government could take charge of online dating and manage to avoid any crisis.

I computed an index of defensively pessimistic thinking by counting the number of statements indicating defensive pessimism. A 2 x 2 ANOVA on the summation revealed the main effect of anxiety, which as predicated indicated that individuals with strong anxiety had more defensively pessimistic thoughts than individuals with weak anxiety ($M_{strong\ anxiety}$ = .67 vs. $M_{weak\ anxiety}$ = .34; $F(1, 239) = 6.96$, $p < .01$, partial η^2 = .03) in the presence of strong hope. Unsurprisingly, a main effect of processing opportunity was observed, with participants in the high processing opportunity condition had more defensively pessimistic thoughts than those in the low processing opportunity condition (M_{high} = .70 vs. M_{low} = .30; $F(1, 239) = 10.51$, $p < .01$, partial η^2 = .04). In accordance with my prediction, respondents in the condition of anxiety and processing opportunity were both high had the greatest number of defensively pessimistic thoughts ($M = .93$) relative to respondents in the other three conditions ($M_{strong\ anxiety/low\ processing}$ = .40, $t(120) = 2.61$, $p = .010$; $M_{weak\ anxiety/high\ opportunity}$ = .47, $t(119) = 2.05$, $p = .043$; $M_{weak\ anxiety/low\ opportunity}$ = .21, $t(122) = 3.72$, $p < .001$).

I did not measure confidence in Study 4 since the primary objective was to test H3. However, I ran a PROCESS model looking at the mediational effect of defensively pessimistic thoughts on the relationship between anxiety (coupled with strong hope) and intention to use the online dating service. The results showed that anxiety (with strong hope) significantly increased defensively pessimistic thoughts (β = .33, SE = .13, $t = 2.65$, $p < .01$, CI: .09, .58), while defensively pessimistic thoughts marginally enhanced intention (β = .13, SE = .07, $t = 1.77$, $p = .079$, CI: -.01, .27). The marginal effect might be attributed to, (i) confidence was not measured in the study since it had already been examined in studies 2 and 3, and (ii) thought protocols are sometimes regarded as relatively imprecise measures of

thinking, particularly when there is limited variation in the number of participant responses (Cacioppo, Harkins and Petty 1981).

In the next chapter, I conclude reporting by pointing out the consistency and difference between the four studies' results. Based on those findings, I discuss the theoretical contribution, managerial implications, limitations of the studies and future research.

7 General Discussion

7.1 Contributions to Theory

This thesis theorises and demonstrates that anxiety regarding possible goal-incongruent outcomes from product use can actually enhance intentions to adopt a new product, particularly when hope is also strong. This effect was observed among participants, given sufficient processing opportunities, and that it is driven at least in part by a psychological process called 'defensive pessimism'. My studies showed the positive effects of strong anxiety, combined with strong hope, in motivating intensions to adopt different products or services. These effects were also observed for participants from diverse geographical locations and socio-economic backgrounds, when they were presented with different manipulations of hope and anxiety and after their state defensive pessimism was measured, and when conditions that foster defensive pessimism were manipulated (i.e., processing opportunity). The current research contributes theoretically to the consumer behaviour literature in several ways, which are listed below.

Firstly, to my knowledge, this thesis, which is the first to show the facilitative effects of anxiety on adoption intentions when hope is strong, will contribute to information processing theory by exploring the synergistic effect of strong hope when coupled with strong anxiety. These emotions share the appraisal dimension of uncertainty, yet they are opposite in their goal congruence. While Richins (2007) noted the importance of hope and anxiety raised in regard to 'consumption emotions' in the sense that they are pre-purchase emotions significantly influencing subsequent actions, work on how they jointly influence consumer information processing is exceedingly limited.

Consequently, this research will contribute to the literature on the information processing effects of anxiety. Past research has found that anxiety can have a diverse effect on information processing and motivation by way of a positive, negative, or inverted U (see Cheng and McCarthy 2018 for a comprehensive summary in the context of workplace anxiety). In particular, the link between anxiety and motivation orientation is empirically mixed. For instance, on the one hand, anxiety can create an avoidance motivation that makes consumers want to distance themselves from anxiety-inducing stimuli (Castaño et al. 2008; Lee et al. 2011; Thomas and Tsai 2012), which might reduce new product adoption intentions. On the other hand, though, an 'approach' motivation towards alternative routes that are seemingly related to the source of the anxiety can activate compensatory consumption (Arndt et al. 2004; Liu and Smeesters 2010; Raghunathan et al. 2006). My findings suggest that strong hope provides the motivational energy to spur individuals to take control over their anxieties and use them for adaptive purposes. That is, when hope for a goal-congruent outcome is strong, anxiety may enhance adoption intentions by allowing individuals to *directly* approach the source of anxiety and consider how anxiety evoking outcomes can be addressed, resulting in hoped-for outcomes being maximised. Therefore, the notion that hope, when it is strong, may play a significant role in understanding *when* individuals confront their anxieties vs. withdraw from the source of their anxiety, is novel and important.

Secondly, this research adds to a limited marketing literature on defensive pessimism. Devasagayam (2014) has studied the purchasing patterns of individuals who have an enduring personality characteristic of defensive pessimism and its impact on consumer expectations. Nenkov et al. (2017) addressed defensive pessimism as a similar construct to

elaboration on potential outcomes (EPO), which focused on the antecedents and consequences of EPO. My studies, I believe, complement their work by showing that, (i) defensive pessimism can be activated from a situational perspective, (ii) it mediates the effect of hope and anxiety on adoption intentions, and (iii) it influences adoption intentions when processing opportunity is high. My studies' findings suggest this is so because high processing opportunity consumers have adequate resources to engage in thoughts and actions that facilitate the occurrence of goal-congruent outcomes, and minimises the occurrence of goal-incongruent ones. Studies of defensive pessimism could advance the coping literature, which reveals that people can respond to stress using either problem-focused coping, such as by aiming to manage the source of the threat, or emotion-focused coping, which aims to regulate emotional responses to the threat (Lazarus 1991). Although I did not examine the relationship between coping and defensive pessimism, this strategy might not only activate problem-focused coping (as in the case of trying hard to influence outcome) but also emotion-focused coping (by enhancing emotional preparedness).

7.2   Managerial Implications

Bringing a new product to market is relatively costly, calling attention to the need to design communications that facilitate adoption intentions. From a managerial perspective, my findings suggest that, counter to common intuition, there are situations in which marketers may benefit from enhancing consumers' anxiety. Practitioners could shape their communications by disclosing product-related anxieties (e.g., pointing out side effect or issuing disclaimers) alongside with 'hope' slogans in order to increase adoption intentions. This approach might prepare consumers for undesirable outcomes and allow them to actively

address such outcomes. This approach might prepare consumers for undesirable outcomes and allow them to actively address such outcomes. Furthermore, there are also several extended practical thoughts that marketers can most credibly and effectively do so. These are listed below.

Firstly, businesses could have much to gain from composing hope and anxiety appeals to encourage consumers to participate in new product development. Previous researchers have shown an interesting notion that motivating consumers to participate voluntarily in product development is more likely to increase purchase intentions and amounts of spending (Merlo et al. 2014). Hope may inject a yearning in customers by encouraging them to sample new products, while undesirable outcomes from product design or flawed usage may paradoxically spur discussion and get consumers involved in identifying potential problems. Inviting consumers to address flaws in offerings not only stimulates consumers' attention, but also firms may receive useful comments from defensively pessimistic consumers regarding what preventive actions might ensure favourable outcomes. I hope that the studies in this thesis contribute to the growing literature about customer participation.

Secondly, consumers often do not know much about a certain product or service. By sharing critical information with them, businesses can enhance customer trust and loyalty. Customer education has proven-records to constructively influence consumers' perception of the offerings when firms are educating consumers for firm-related expertise (Bell et al. 2017; Bell and Eisingerich 2007). By means of a message framing strategy that applies both hope and anxiety when educating customers on firm-related expertise, such as technical or functional skills, businesses can effectively and influentially help consumers equip and grasp such knowledge. It is so because consumers may systematically process and review the

information as they feel more attentive to anxiety-provoking situations.

Thirdly, hope and anxiety could even act as predictors of future behaviour by providing the basis for interesting measures of consumer-brand relationships. The acknowledgement of a consumer's anxiety can put a relationship to the test since relationships are sometimes better studied in the context of negative incidents. Owning up to information that potentially induces undesirable outcomes could offer a great opportunity to develop a useful customer-brand relationship metric.

Fourthly, because it is better to know what there is to be anxious about than not to know, giving customers something to be anxious about could paradoxically reduce their worries, since they may stop looking for negative information. Thus, if used strategically, inducing anxiety could help reduce perceived uncertainty. However, there are a number of ethical caveats regarding the manipulation of consumers' anxiety, since it could have potentially negative physiological or psychological consequences. It must be done right by introducing it alongside hope and defensive pessimism.

Finally, a practical way to create persuasive communications that combine both strong hope and strong anxiety is to adopt transparent policies in order to potentially increase consumers' processing opportunities. Lin and Eisingerich (2018) state that, "consumer cynicism runs high these days" and Eisingerich and Kretschmer (2008) remarked that consumers are motivated to want to know more information about what they are buying – a notion of 'more is more' in e-commerce. Providing objective and accessible information shows a gesture of goodwill and that firms have nothing to hide (Foscht et al. 2018; Merlo et al. 2018). Such a policy might equip consumers with sufficient facts and knowledge to allow them to process information defensively. It is also worth noting in which location or channel

emotional advertisements are placed. Environments that are more conducive to consumers' systemic processing might yield beneficial effects.

7.3   Limitation and Future Research

Future research might examine the role of hope and anxiety in the context of social media. For example, it is possible that unfavourable goal-incongruent consequences related to the use of new products in social media could create anxiety in its recipients. However, negative reviews might create less impact on adoption intentions if consumers have strong levels of hope about the new product, induced either by marketers or by the product's relevance to important and desirable goal-congruent outcomes. This could be because consumers might engage in defensive pessimism to ensure that negative outcomes that have happened to other reviewers will not happen to them. Relatedly, research could examine the effects of hope on consumers' response to tepid reviews or word-of-month on online social platforms (offering sWOM in particular), since it has become the mainly informational source and differs from traditional word-of-mouth (Eisingerich et al. 2015). Reviews or sWOM that report product outcomes were not as great as hoped, might have less impact on consumers with strong hope, if they think in a defensively pessimistic way about how they, personally, can ensure that the outcomes they receive from product adoption are not similarly tepid, but instead are highly positive.

Since the digital era has transformed the way how we live, when and how if at all the effects of hope and anxiety on purchase intentions can be observed in different categories of digital services. An impressive study has just examined the variance intrinsic needs for hedonic and utilitarian mobile apps (Fritze et al. 2018). Similarly, distinct interface design

rules offered by mobile apps could possibly interfere and/or interact with appraisals of hope and anxiety (Lin et al. 2018). The context of online dating in Study 4 has demonstrated one type of digital services. Future research is needed into consumer responses to emotional appeals across various types of mobile apps and among distinct characteristics of digital services in order to offer actionable guidance and implications in digital marketing.

Moreover, for the purpose of extending insights on useful customer-brand relationship metric, it would also be worthwhile to examine to what extent hope and anxiety arise from desirability and importance of brands, and whether they have either a facilitative, or deliberative, impact on customers intentions to purchase particular brands. Studying these topics could be invaluable, since brands might benefit greatly from relationship building, which has evidently been coined to refer to 'brand attachment' (Park et al. 2013; Park et al. 2016; Park et al. 2010).

Overall consumers' decision journey consists of three stages: brand awareness, purchase intention and consumer satisfaction. However, the effects I observed in my studies are related to purchase intention. It is unclear whether such effects occur in the early stages of brand awareness, or in the later stages of consumer satisfaction; hence, further study of different outcome measures would be richly deserving.

Prior research examining the effects of emotional appeals on consumers' attitudes (Hong and Lee 2010) suggests that, when people experience emotions of opposite valence at the same time, they enter into a conflicting psychological state and feel torn and uncomfortable, akin to what people experience in situations of cognitive dissonance (Festinger 1957) or attitudinal ambivalence (Thompson, Zanna, and Griffin 1995). This feeling of discomfort evoked by advertisements using mixed emotions appeals (e.g., happiness and sadness) in turn

leads to less favourable attitudes toward the ads, as compared to those that employ a pure positive emotional appeal (e.g., happiness; Williams and Aaker 2002). Similar to the research on cognitive dissonance, uncomfortable tensions are indeed derived from the two conflicting emotions of hope and anxiety. Anxiety conflicts with an existent cognition and defensive pessimism is the mechanism through which consumers minimise that cognitive dissonance by reappraisal. However, defensive pessimism, in contrast to cognitive dissonance, which involves taking subsequent steps in order to reduce emotional dissonance, may differ in two aspects; firstly, instead of altering cognition, or changing connation to alleviate a negative state, it confronts the provoked inconsistency by actually embracing it. Secondly, although the consequences of defensively pessimistic actions may be the same as resolving the cognitive dissonance, such as when smokers on realising the risks it involves, quit smoking. However, by being defensively pessimistic, they are showing that they are prepared to face up to the side-effects of quitting, which may include fatigue, nausea, insomnia, constipation, etc. Therefore, I would advocate further research to address the differences between emotional dissonance and cognitive dissonance as alluded by researchers Williams and Aaker (2002). The results could potentially contribute to cognitive dissonance theory with a great impact.

The current research also has limitations which might stimulate future research. Firstly, I identify an important boundary conditions for the observed effects, namely processing opportunity. I examined this boundary conditions because it is directly pertinent to the mediation explanation of defensive pessimism. Future research could examine if additional moderators explain when strong hope and anxiety positively influence adoption intentions. It could also examine other moderators; for instance, I collected data on the need for emotion.

Exploratory analyses (not reported in the studies) showed that this individual difference factor did not moderate the results in either Study 2 or Study 3. However, future research could examine other moderators, and test when hope might even have a negative effect on intentions as prior work shows inspiration was negatively associated with health behaviour changes (Lin et al. 2018). For instance, (i) do consumers who are more (vs. less) future oriented react to hope and anxiety differently, (ii) whether mindfulness about being in a state of strong hope and strong anxiety buttress the effects I have observed, (iii) whether the effect of hope and anxiety on intentions to adopt new products is limited to conditions where consumers can exert control over actions designed to enhance the attainment of goal-congruent outcomes and to avoid goal-incongruent ones, (iv) whether having product knowledge moderates the relationship between hope and anxiety to drive adoption intentions because being knowledgeable of resolving potential adversity while pursuing the desire may be more likely to increase willingness to try out new products.

To empirically test a potential moderator, I collected data on self-efficacy since such a sense makes consumers feel capable of enacting and controlling actions to both produce desired outcomes and reduce undesired outcomes; in turn, intentions to purchase the product that induces mixed emotions can be enhanced. Nonetheless, there is scepticism over why consumers with high self-efficacy would be more likely to utilise defensive pessimism and lower their performance expectations because they already have high confidence in their own abilities. This additional study is not included in the main body of the thesis. Instead, I report the entire study design and results in the Appendix in order to contribute a new method of manipulating general self-efficacy by programming a mastermind game.

Secondly, the effects of strong hope and strong anxiety are interesting, because their

interaction not only influences defensive pessimism and confidence, but also seems to independently stimulate heuristic beliefs. In the context of this thesis, beliefs refer to the saying that in order to get gains one must experience pains. Specifically, the ANOVA results in Tables 6 and 9 in Studies 2 and 3 respectively, both show that hope and anxiety influenced thoughts about enduring pains in order to achieve gains. The result is interesting as it suggests that, while on the one hand, strong hope and anxiety might stimulate thoughtful and systematic processing regarding possible outcomes and their valence by activating defensive pessimism; on the other hand, these two emotions might also induce heuristic processing by activating inferences about what is necessary to attain the goal-congruent outcome.

Consistent with above idea, I conducted an exploratory PROCESS model for Study 2 (see Figure 7 at the end of this section), which showed that both defensive pessimism and inferences about pains/gains mediated the effect of hope and anxiety on confidence and adoption intentions. A similar model for Study 3 (see Figure 8 at the end of this section) showed the same mediational effects of both defensive pessimism and inferences about pains/gains. However, the latter effect was only observed when I used the dichotomous hope and anxiety conditions themselves (not the manipulation check measures for hope and anxiety). Future research should further investigate if and when "dual routes" for the effect of hope and anxiety on adoption intentions are observed (e.g., Chaiken and Trope 1999; Petty and Cacioppo 1986), which might add to an understanding of the role of, and processes by which, emotions influence persuasion and behavioural intentions.

Thirdly, in Study 2 the ANOVA results showed that hope and anxiety influenced motivated reasoning (this was not replicated in Study 3 though). The PROCESS model shown in Figure 7 demonstrated significant effects for all three mediators – defensive

pessimism, pain/gain inferences and motivated reasoning – on adoption intentions through the mediational effect of confidence. These results suggest that when strong hope is coupled with strong anxiety, multiple processes (i.e., systematic, heuristic, and motivated reasoning) may be activated, and their activation might influence adoption intentions via their mediating effects on confidence. However, again, a similar model in Study 3 (see Figure 8 at the end of this section) did not replicate the mediational role of motivated reasoning. Therefore, future research might examine whether, and if so, when strong hope coupled with strong anxiety, encourages motivated reasoning as well as defensive pessimism, and perhaps heuristic processing also.

Fourthly, the effects of hope and anxiety might operate through additional mechanisms, not identified in this thesis. Specifically, I find a direct effect of hope × anxiety on adoption intentions even when I consider defensive pessimism, pain/gain inferences, motivated reasoning and confidence in Studies 2 and 3 (see Tables 7 and 10). Consequently, future research should perhaps explore additional process mechanisms that can explain why strong hope enhances adoption intentions when anxiety is also strong. For example, perhaps when hope is strong, strong anxiety creates a state of defiance against negative outcomes, which blinds consumers to their potential occurrence.

Finally, I observed global elaboration of a product/service did not influence the results in question. I suspect global elaboration reflects the general process of thinking. Defensive pessimism is a specific type of thinking that seems to be evoked by strong hope and strong anxiety. Since my theorising emphasises a specific type of thinking (i.e., defensively pessimistic thoughts) as opposed to just thinking in general, the lack of effects for global evaluation may be unsurprising.

On the whole, the synergic effect of hope and anxiety in driving consumers' intentions to adopt new products represents a rich domain for future research. The notion that consumers might embrace their anxiety when hope is strong is particularly interesting. Moreover, the adage "hope for the best, prepare for the worst" may, in some cases, be a prudent way of attaining the important and desirable outcomes that one hopes for.

Figure 7. Additional Test for the Multiple Processes Model in Study 2

Process Model (Hayes Model 80) Testing the Mediational Role of Defensive Pessimism, Pain Gain Inferences, and Motivated Reasoning as Mediating the Relationship between Hope and Anxiety (IVs) and Confidence and Adoption Intentions (DVs)[1]

β = .07, SE = .01, *t* = 7.36, *p* < .001
(β = 1.90, SE = .22, *t* = 8.43, *p* < .001)

β = .39, SE = .05, *t* = 7.44, *p* < .001
(β = .38, SE = .05, *t* = 7.31, *p* < .001)

Defensive Pessimism

β = .03, SE = .01, *t* = 2.92, *p* < .01
(β = 1.34, SE = .22, *t* = 6.21, *p* < .001)

β = .21, SE = .05, *t* = 4.03, *p* < .001
(β = .20, SE = .05, *t* = 3.67, *p* < .001)

β = .72, SE = .05, *t* = 13.19, *p* < .001
(β = .70, SE = .05, *t* = 13.60, *p* < .001)

Hope x Anxiety

Pain Gain Inferences

Confidence

Adoption Intentions

β = .04, SE = .01, *t* = 4.96, *p* < .001
(β = 1.63, SE = .21, *t* = 7.69, *p* < .001)

β = .21, SE = .05, *t* = 3.86, *p* < .001
(β = .20, SE = .06, *t* = 3.53, *p* < .001)

Motivated Reasoning
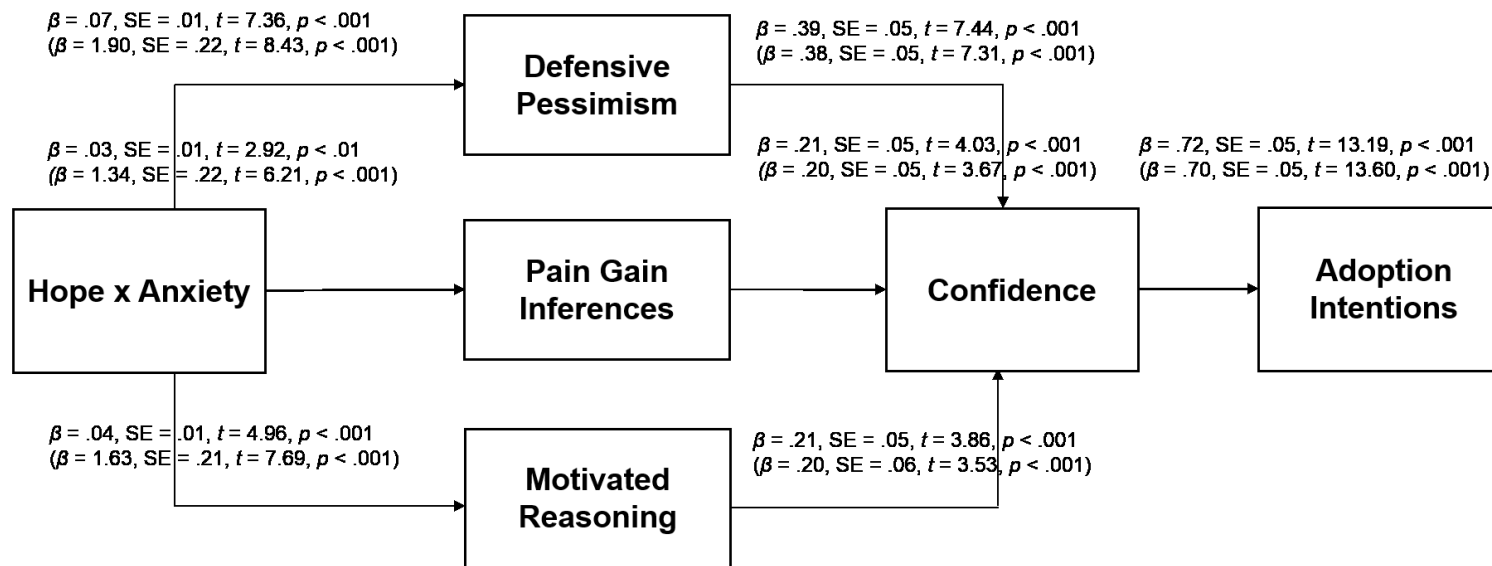
HxA -> DP -> Confidence -> Intentions: Effect = .018, Boot SE = .004, CI: .01, .03 (Effect = .511, Boot SE = .110, CI: .31, .74)
HxA -> PG -> Confidence -> Intentions: Effect = .004, Boot SE = .002, CI: .00, .01 (Effect = .187, Boot SE = .064, CI: .08, .32)
HxA -> MR -> Confidence -> Intentions: Effect = .007, Boot SE = .002, CI: .00, .01 (Effect = .226, Boot SE = .083, CI: .08, .41)

[1]Results when using the manipulation check measures of hope and anxiety are shown first. Results using the interaction between hope and anxiety as computed by the dichotomous hope and anxiety manipulations are shown in parentheses.

Figure 8. Additional Test for the Multiple Processes Model in Study 3

Process Model (Hayes Model 80) Testing the Mediational Role of Defensive Pessimism, Pain Gain Inferences, and Motivated Reasoning as Mediating the Relationship between Hope and Anxiety (IVs) and Confidence and Adoption Intentions (DVs)[1]
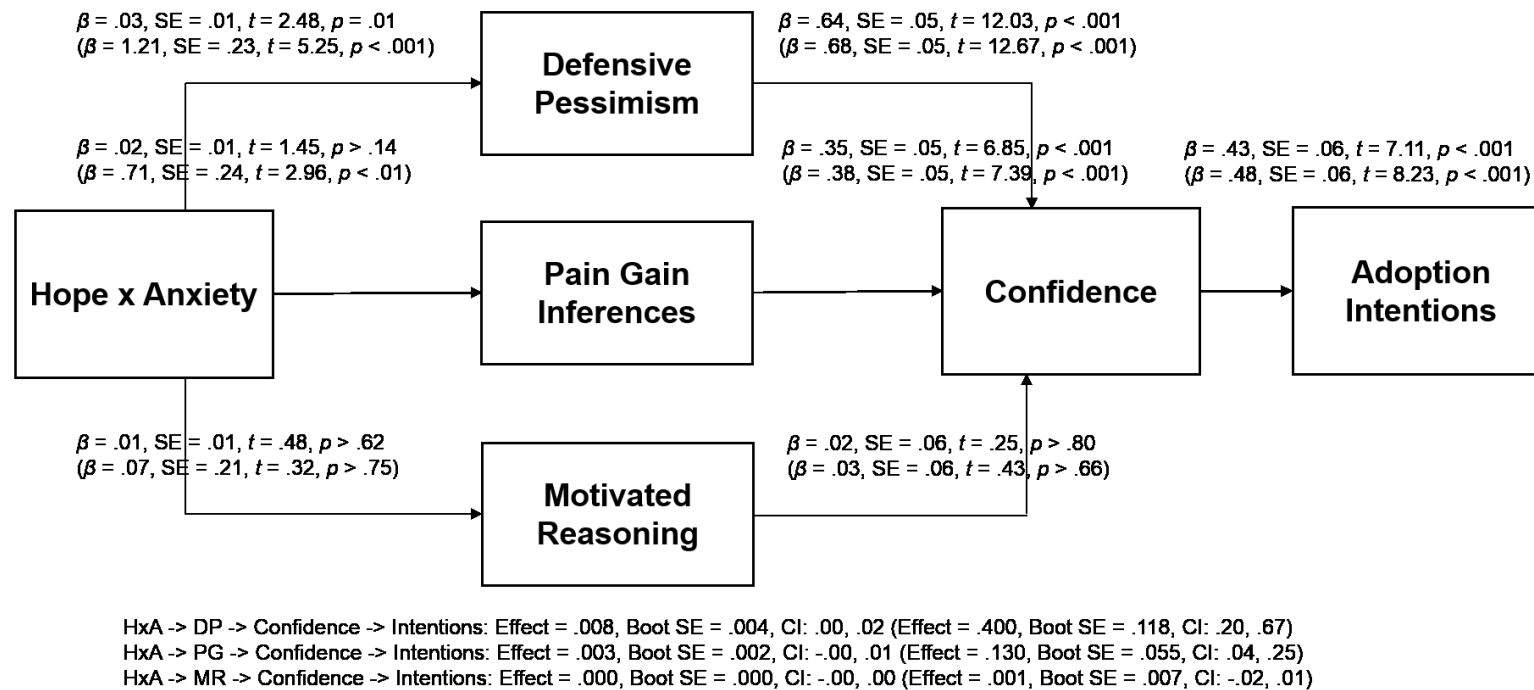
[1]Results when using the manipulation check measures of hope and anxiety are shown first. Results using the interaction between hope and anxiety as computed by the dichotomous hope and anxiety manipulations are shown in parentheses.

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APPENDIX A: PRETEST INFORMATION FOR STUDY 2-4

Study 2 Pretest Results

I manipulated hope and anxiety by emphasising the fundamental factors (i.e., desirability and importance) that MacInnis and Chun (2006) mentioned to enhance strong hope and strong anxiety. In particular, the degree of hope was manipulated by the extent to which straight teeth was important and desirable to obtain a better smile. While strong hope condition provided information about yearning for straight teeth and amazing smiles, weak hope condition presented information about moderate teeth arrangement and nice smiles.

Regarding the manipulation of anxiety, the information focused on lack of goal congruence (i.e., unsettling experiences due to inflammation and swollen gums vs. typical ways of recovery) and goal incongruence (i.e., relapse tendency vs. teeth sensitivity) were included in strong vs. weak anxiety conditions. See Figure 3 for the exact manipulations. A pretest (N = 125) involving respondents from the same population as the main study revealed that the manipulations for hope (M_{strong} = 5.29, SD = .22 vs M_{weak} = 2.72, SD = .23) and anxiety (M_{strong} = 4.86, SD = .20 vs M_{weak} = 2.60, SD = .21) worked as expected.

Study 3 Pretest Results

I manipulated hope by making the tour more (vs. less) desirable and important. I manipulated anxiety by making possible negative aspects of the tour more (vs. less) undesirable and important. In addition to the measures of manipulation check that were the same as in Study 2, two items of hope were added ("I have strong desire to see the Northern

Lights", "If I were to go on the tour, I would really hope to see the Northern Lights") and validated in a pretest involving 203 respondents. Potential confounds related to material including trustworthiness, self-relevance and vividness were also examined. The pre-test revealed both hope ($M_{strong} = 4.88$ vs $M_{weak} = 3.25$; $F(1, 203) = 50.69$, $p < .001$) and anxiety ($M_{strong} = 4.38$ vs $M_{weak} = 3.05$; $F(1, 203) = 32.59$, $p < .001$) were manipulated as expected. There were no difference across conditions for material confounds. Figure 4 showed the exact manipulations.

Study 4 Pretest Results

I manipulated anxiety by making the possible negative aspects of the online dating more (vs. less undesirable and important). The stimuli were composed of hope and strong (vs. weak) anxiety. I used the same manipulation checks for anxiety and hope as in the previous studies, see Appendix 5 for the exact manipulations. I used a well-known task to manipulate processing opportunity (Shiv and Fedorikhin 1999). In low processing opportunity conditions, participants were asked to perform a distraction task such that they memorised seven digits. Such distraction task was performed by memorising two digits in high processing opportunity condition. A pretest ($N = 76$) revealed both anxiety ($M_{strong} = 5.05$ vs $M_{weak} = 4.26$; $F(1, 72) = 9.45$, $p < .01$) and processing opportunity ($M_{high} = 3.28$ vs $M_{low} = 2.11$; $F(1, 72) = 11.08$, $p < .01$) were manipulated as expected.

APPENDIX A.1 HOPE AND ANXIETY PRETESTS RESULTS

	Study 2			
	Strong Hope		Weak Hope	
	Strong Anxiety (N=32)	Weak Anxiety (N=32)	Strong Anxiety (N=31)	Weak Anxiety (N=30)
Manipulation checks				
Hope	5.40[a]	5.19[a]	2.72[b]	2.72[b]
Anxiety	4.38[a]	2.66[b]	4.84[a]	2.53[b]

	Study 3			
	Strong Hope		Weak Hope	
	Strong Anxiety (N=50)	Weak Anxiety (N=52)	Strong Anxiety (N=50)	Weak Anxiety (N=51)
Manipulation checks				
Hope	4.82[a]	4.93[a]	3.32[b]	3.18[b]
Anxiety	4.39[a]	3.09[b]	4.37[a]	3.01[b]
Material confounds				
Material trustworthiness	4.50[a]	4.72[a]	4.74[a]	4.40[a]
Material self-relevance	4.42[a]	4.40[a]	4.66[a]	4.52[a]
Material vividness	4.61[a]	4.45[a]	4.80[a]	4.37[a]

	Study 4			
	Strong Anxiety		Weak Anxiety	
	High processing opportunity (N=18)	Low processing opportunity (N=18)	High processing opportunity (N=19)	Low processing opportunity (N=21)
Manipulation checks				
Anxiety	5.06[a]	5.04[a]	4.23[b]	4.29[b]
Total no. of thoughts	3.72[a]	1.89[b]	2.84[a]	2.33[b]

NOTE.–Means with different superscripts are significantly different, $p < .05$.

APPENDIX B: ALTERNATIVE MODERATOR SELF-EFFICACY STUDY

The facilitative effects of defensive pessimism on purchase intentions, however, may depend on self-efficacy, defined as a belief in one's ability to enact actions to influence an outcome (Bandura 1977). When self-efficacy is high, people approach threatening situations with assurance that they can exercise control over such situations, thereby maximising the likelihood of positive outcomes. In contrast, when people doubt their capabilities to exert control over a threatening situation (i.e., when self-efficacy is low), they avoid difficult tasks. Whereas perceived self-efficacy can vary as a function of the match between the context and individual capabilities, some individuals exhibit chronic tendencies toward high vs. low self-efficacy (Bandura 1977).

Prior work on self-efficacy in marketing and consumer behaviour is limited, although such research has shown positive effects of self-efficacy on behavioural intentions in an advertising context. For example, White et al. (2011) found that loss (vs. gain) framed messages activate a more concrete (vs. abstract) mind-set, thereby enhancing self-efficacy and recycling intentions. Block and Keller (1995) observed that vivid messages regarding negative health outcomes had positive effects on the persuasiveness of marketing communications when self-efficacy was high (vs. low; see also Keller 2006). Other research has observed that fear appeals regarding lack of compliance with recommended computer security measures affect compliance as long as consumers feel they are high (vs. low) in self-efficacy (Johnston and Warkentin 2010). Outside a persuasive communications context, Park and John (2014) observed that consumers felt more efficacious and performed better when

they used a brand, such as an MIT branded pen, where that image matches the task to be performed – for instance writing in a graduate exam.

I suggest that when hope and anxiety are both high (and defensive pessimism is activated), a generalised sense of self-efficacy increases consumers' confidence that they can achieve goal-congruent outcomes and avoid goal-incongruent ones. Thus, the effects of defensive pessimism, which is activated by high hope and high anxiety, on purchase intentions should be maximised when self-efficacy is high. It is considered, therefore, that self-efficacy encourages high hope/high anxiety consumers to believe that their hoped for goal-congruent outcome will actually occur because they are capable of addressing the issues evoked by defensive pessimism. Consequently, purchase intentions should be greatest when hope, anxiety and self-efficacy are all high.

This study used orthodontic treatment as the context in which to test this, since it improves physical appearance relative to the status quo of having no treatment; thus it results in a gain in physical appearance. People for whom teeth are misaligned will hope that treatment will improve their appearance, producing an outcome gain, while they know that the treatment is not without its negatives, in that it will include feelings of anxiety and its outcomes could include inflammation of the gums and possible relapse.

I predict that H1 is generalisable, such that it can be replicated in a gain domain. I also predict that the interactive effect of hope and anxiety on purchase intentions will be observed only in conditions where respondents' generalised feelings of self-efficacy are high (vs. low). Thus, I predict a 3-way interaction between hope, anxiety, and self-efficacy on purchase intentions, and specifically that the facilitative effects of anxiety on strong hope consumers'

purchase intentions are likely to be greatest among those consumer for whom a general sense of self-efficacy is high.

Design and Procedure

Participants and Design. I used a 2 (Hope: Strong vs. Weak) × 2 (Anxiety: Strong vs. Weak) x 2 (Self-efficacy: High vs. Low) between-subject design for this study. Participants, who were randomly assigned to one of eight experimental conditions, were required to complete two tasks in the survey, followed by a questionnaire with seven-point scales. The experiment was conducted on computers with pre-programmed instructions.

Two hundred and fifty-six students from Taiwan voluntarily participated in the lab experiment in exchange for a nominal compensation. I chose Taiwan as the study location since orthodontic treatment is less prevalent than in the US, costs of orthodontic treatment are relatively expensive (Tanne 2016), and income is 25% lower than in the US (http://www.ifitweremyhome.com/compare/US/TW). These factors enhanced the likelihood that individuals would regard the orthodontic treatment I presented as a new product offering, and it increased the likelihood of sampling individuals who had not received orthodontic treatment in the past. The questionnaire was in Taiwanese. Items were translated into Taiwanese by myself, who is a Taiwanese citizen.

Manipulation of Self-efficacy. I manipulated respondents' sense of generalised self-efficacy using a procedure adapted from Vancouver et al. (2002). Specifically, respondents played an analytical game called Mastermind. I manipulated self-efficacy by altering their game performances. In the game, participants had to arrange four coloured circles – out of six possible ones – in the correct order. In the high self-efficacy condition, I reconfigured the correct answers to match their attempts, thereby enhancing their perceived skilfulness and

evoking in them a sense of self-efficacy. This procedure was not implemented in the low efficacy condition. After the final trial, the participants completed four items designed to assess self-efficacy. These items served as manipulation check measures (Chen et al. 2001). Although the game was unrelated to the product context – orthodontic treatment – prior research suggests that self-efficacy from one task can be generalised to another one (Vancouver et al. 2002). Moreover, by making the self-efficacy manipulation independent of the purchase context, it reduces the likelihood of demand effects.

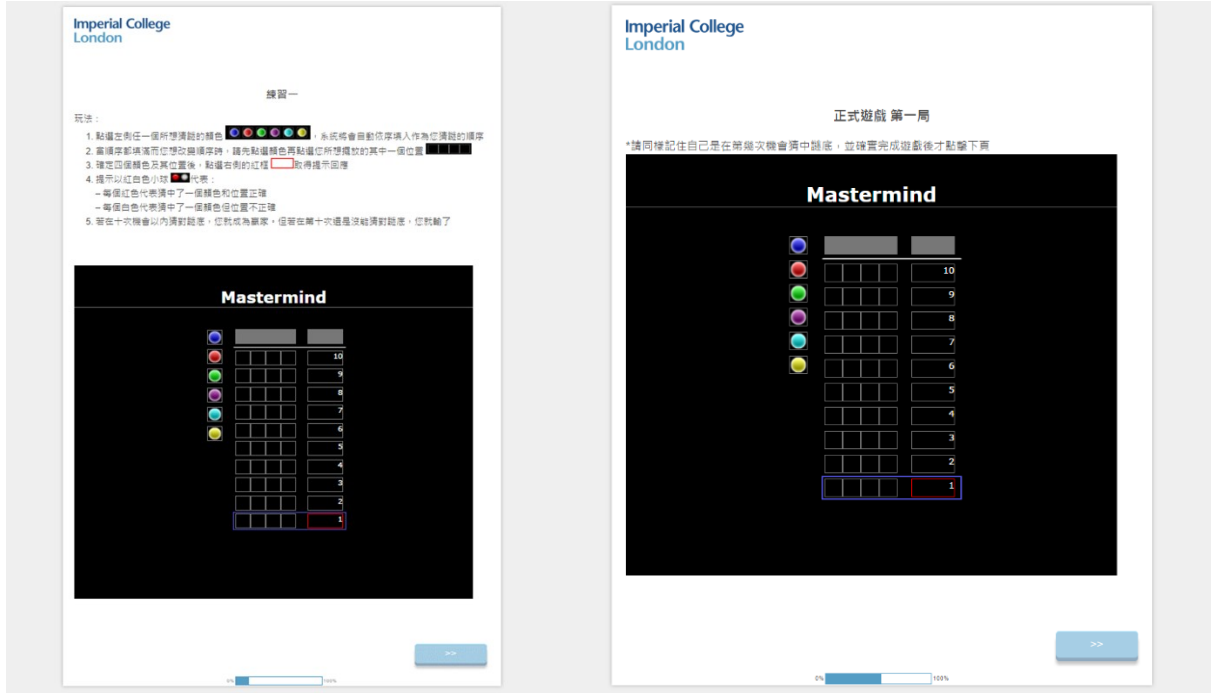APPENDIX B.1

EXPERIMENT ENVIRONMENT
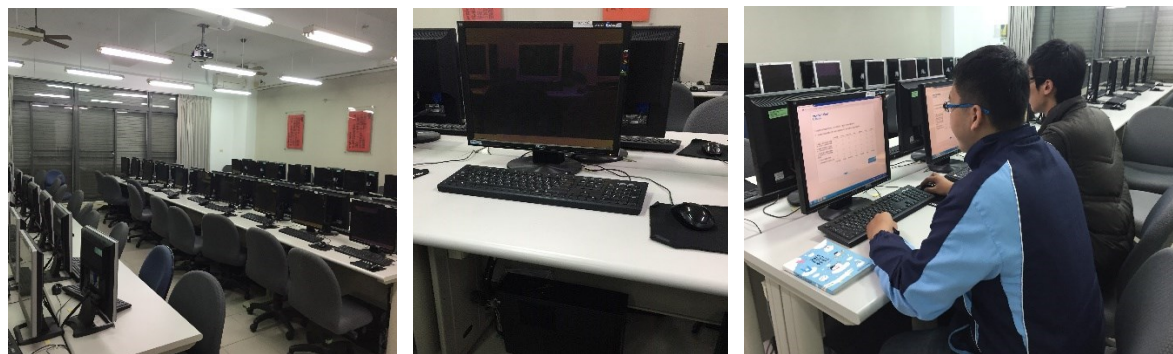
Source: the author

System specification
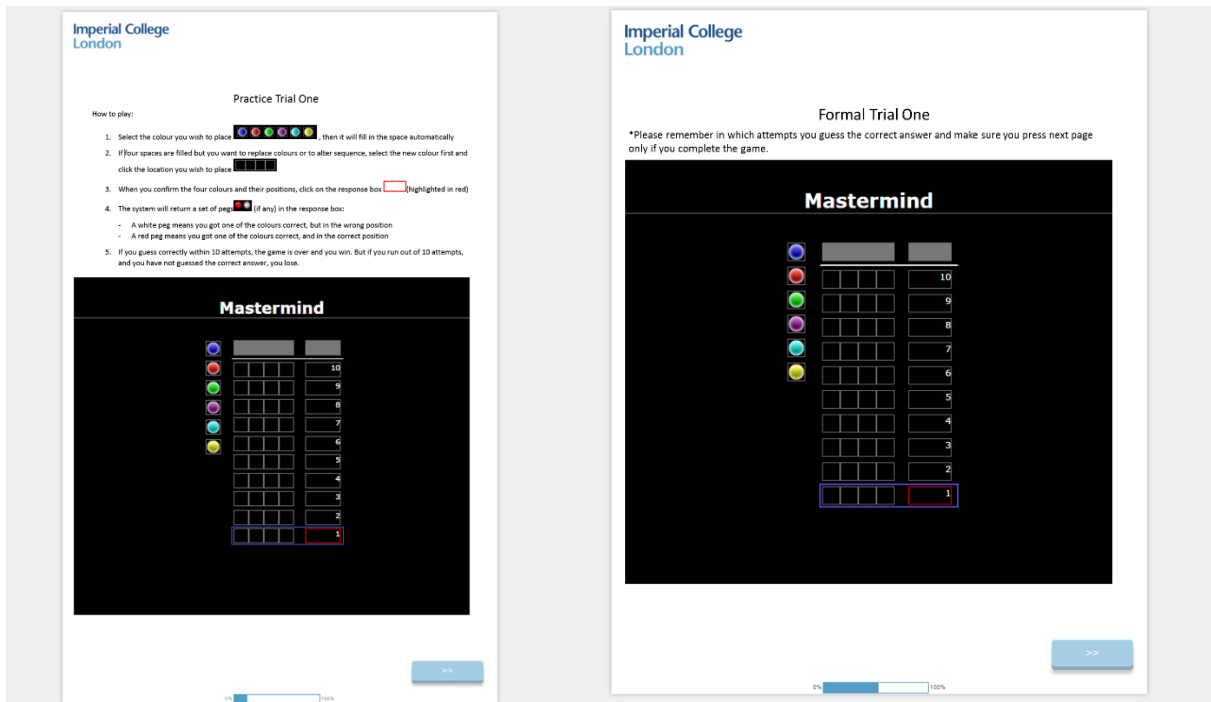
- CPU: Intel(R)Core(TM) i5-4590 CPU @ 3.30Ghz

- RAM: 8G DDR3 1600MHz

- Hard disk: 1TB WDC WD10EZEX-22BN5A0 ATA Device

- Display card: Intel(R) HD Graphics 4600

- Power: TFX PSU 300W

- Screen: ASUS VB191S-G 19 inch 1280x1024

APPENDIX B.2

SELF-PROGRAMMED INTERFACE OF MASTERMIND GAME

*Below illustrations are translated from Traditional Chinese to English

Source: the author

Product Context. After playing the Mastermind game, participants completed a purportedly separate study on their possible interest in a new type of orthodontic treatment and they were asked to indicate whether they had received prior orthodontic treatment. I collected this data to ensure that my sample included only those who had not had prior orthodontic treatment. Seventy two percent of the participants had not previously received orthodontic treatment, resulting in a final sample size of one hundred and eighty-five. Notably, the results reported here are replicated, even when all participants are included in the analyses.

Manipulation of Hope and Anxiety. All respondents watched a 60-second clip regarding an orthodontic treatment called SMILE. After watching the clip, they were asked about their intentions to adopt the treatment. In the 'strong hope' condition, the clip included information on how SMILE would enhance their professional images. In the 'strong anxiety' condition, the clip included information about potential pain from treatment and the possibility of irreversible harm from not following the orthodontist's orders. In the 'weak hope and weak anxiety' conditions, they were shown generic product information (see illustrations below). Each clip consisted of six video frames to ensure consistency of length across four conditions.

APPENDIX B.3

HOPE AND ANXIETY MANIPULATION STIMULI

- Product-related hope about orthodontic treatment SMILE

SMILE transforms your smile into confidence
Not only keeping teeth healthy and adding fresh breath in the mouth, but also increasing your attractiveness with a nice facial shape

SMILE prepares for your future now
Straight teeth can create and maintain a professional image, which is certainly one of the main criteria for academic and career development!

- Product-related anxiety about orthodontic treatment SMILE

SMILE may improve bad bite and appearance, but you need to co-operate with your dentist in case of irreversible harm

If you don't keep scheduled appointments or wear retainers, as instructed, your teeth will have a tendency to relapse. Then the entire treatment may be in vain.

In addition, during the process you may feel discomfort, inflammation, swollen gums...
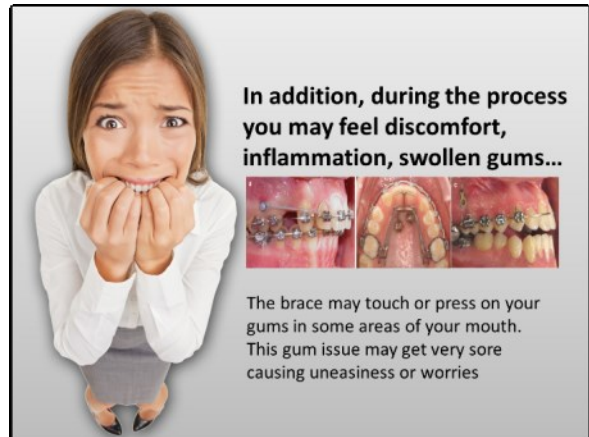
The brace may touch or press on your gums in some areas of your mouth. This gum issue may get very sore causing uneasiness or worries
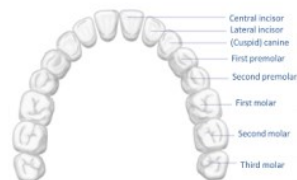
- Generic description about orthodontic treatment SMILE (for low hope and low anxiety condition)

Techniques such as SMILE were invented at the end of the 19th century. Many orthodontic theories and appliances were then introduced.

Selection of Angle components

Among them, Edward Angle (1855-1930) played the most important role, owing to his passion for, and devotion to, orthodontics. He was regarded as "the father of modern orthodontics".

In summary, SMILE is concerned with the treatment of improper bites and crooked teeth.

Central incisor
Lateral incisor
(Cuspid) canine
First premolar
Second premolar
First molar
Second molar
Third molar

It uses braces and clear aligners together with scheduled appointments to set the patient's teeth.

Source: texts were from this thesis and images were used under standard licensed users at Dreamstime.com

Measures. The dependent variable measured participants' intention to adopt the SMILE treatment. We adapted the purchase intention items from (White et al. 2011), averaging them to create a purchase intentions index ($\alpha = .97$). Participants also completed manipulation checks for self-efficacy ($\alpha = .91$), hope ($\alpha = .94$), and anxiety ($\alpha = .95$). In addition, both performance risks (e.g., "What is the likelihood that there will be something wrong with the performance of SMILE or that it will not work properly?") and social risks (e.g., "What are the chances that adopting SMILE treatment will negatively affect the way others think of you?") were measured from 1 = *strongly disagree* to 7 = *strongly agree*. Finally, purchase decision involvement (Mittal 1995) was also measured ($\alpha = .95$) as a control variable. Appendix B.4 shows all items and scale reliabilities. All scales were constructed by averaging the summated items representing the scale.

APPENDIX B.4

SELF-EFFICACY AS MODERATOR STUDY: MEASURES AND RELIABILITIES

Constructs	Items	α
Self-efficacy	*(1= strongly disagree, 7= strongly agree)*	.91
	I will be able to achieve most of the goals I have set for myself.	
	I believe I can succeed at almost any endeavour to which I set my mind.	
	I am confident I can perform many different tasks effectively.	
	Even when things are tough, I can perform quite well.	
Intention to Adopt	*(1= not at all, 7= very much so)*	.97
	From what you have watched, if SMILE treatment did become available, do you think you would adopt it?	
	How likely would you be to adopt SMILE treatment?	
	How inclined are you to undertake SMILE treatment?	
	How willing are you to receive SMILE treatment?	
Hope	*(1= not at all, 7= very much so)*	.94
	How much hope, if any, does SMILE treatment offer you for having a confident smile?	
	To what extent does SMILE treatment give you hope for building a professional image?	
	How much hope, if any, does SMILE treatment give you for new possibilities in life?	
Anxiety	*(1= not at all, 7= very much so)*	.95
	How anxious, if at all, does the thought of receiving SMILE	

Constructs	Items	α
	treatment make you feel?	
	How worried, if at all, are you when thinking of adopting SMILE treatment?	
	To what extent does the thought of undertaking SMILE treatment make you feel tense and nervous?	
Purchase decision involvement	In selecting from many types and brands of orthodontic treatment available in the market, would you say that: *(1= I would not care at all, 7= I would care a great deal as to which one I would choose)*	.95
	How important would it be to you to make a right choice of this treatment? *(1= not at all important, 7= extremely important)*	
	In selecting this treatment, how concerned would you be about the outcome of your choice? *(1= not at all concerned, 7= very much concerned)*	

APPENDIX B.5

STUDY 3: RESULTS

Means	Low self-efficacy				High self-efficacy			
	High hope/ High anxiety (N=22)	High hope/ Low anxiety (N=26)	Low hope/ High anxiety (N=26)	Low hope/ Low anxiety (N=25)	High hope/ High anxiety (N=20)	High hope/ Low anxiety (N=22)	Low hope/ High anxiety (N=24)	Low hope/ Low anxiety (N=20)
Manipulation checks								
Self-efficacy	4.61[b]	4.38[b]	4.38[b]	4.14[b]	5.63[a]	5.16[a]	5.20[a]	5.36[a]
Hope	5.26[a]	5.17[a]	4.36[b]	4.33[b]	5.75[a]	5.39[a]	4.50[b]	4.37[b]
Anxiety	4.77[a]	3.82[b]	4.68[a]	3.31[b]	4.98[a]	3.65[b]	5.07[a]	3.43[b]
Dependent variable								
Intention to adopt	4.13[b]	4.31[b]	3.29[c]	3.52[c]	5.56[a]	4.32[b]	3.38[c]	4.05[b]
Covariates								
Involvement	5.36[a]	5.85[a]	5.54[a]	5.52[a]	6.12[a]	5.72[a]	5.75[a]	5.32[a]
Gender (female)	.41	.35	.39	.36	.55	.36	.83	.35
Age	21.45	21.69	22.58	21.72	22.95	21.91	21.63	21.40
Had regular check-ups	.55	.62	.62	.68	.75	.64	.67	.40

NOTE.–Means with different superscripts are significantly different, $p < .05$.

On average, an involvement level of M = 5.65 (SD = 1.61) was observed, indicating moderate to high levels of product involvement. There were no differences across conditions in the level of product involvement, and product involvement had no effect on the impact of hope and anxiety in the results reported below. Participants also completed demographic measures on gender (Female = 44.9%), age (M = 21.91, SD = 3.22), education, the degree they were currently pursuing (undergraduate 70.3%, graduate 20.5%, others 9.2%), and the extent to which they had regular dental check-ups (61.6%). Such variables neither predicted nor interacted with other independent variables in predicting purchase intentions. Appendix B.5 presents the results. Covariates are included in this table. However, the results replicate when the covariates are excluded, and hence I do not discuss these control variables further.

Results

Manipulation Check. A set of 2 (self-efficacy: high vs. low) × 2 (hope: strong vs. weak) × 2 (anxiety: strong vs. weak) ANOVAs on the manipulation checks revealed that the manipulations worked as expected (see Appendix B.5). Specifically, participants in the high (vs. low) self-efficacy condition noted higher levels of self-efficacy (M_{high} = 5.34 vs. M_{low} = 4.38; $F(1, 177)$ = 41.98, $p < .001$, η^2 = .19). Participants in the strong (vs. weak) hope condition felt more hope (M_{high} = 5.39 vs. M_{low} = 4.39; $F(1, 177)$ = 33.93, $p < .001$, η^2 = .16). Participants in the strong (vs. weak) anxiety condition also felt more anxiety from treatment adoption (M_{high} = 4.88 vs. M_{low} = 3.55; $F(1, 177)$ = 43.34, $p < .001$, η^2 = .19). No other effects were observed for these manipulation check measures. Thus, the independent variables were cleanly manipulated.

An additional set of ANOVAs indicated that the anxiety conditions did not differ in social risk (M_{high} = 2.90 vs. M_{low} = 2.82; $F(1, 177)$ = .22, p > .63). However, as expected, participants in the strong anxiety condition reported a higher level of perceived performance risk than those in the weak anxiety condition did (M_{high} = 5.46 vs. M_{low} = 4.48; $F(1, 177)$ = 31.47, p < .001, η^2 = .15). This confirmed that anxiety was product related and involved perceived functional performance risk.

Test of Hypotheses. A set of 2 (self-efficacy: high vs. low) × 2 (hope: strong vs. weak) × 2 (anxiety: strong vs. weak) between-subjects ANOVAs on intentions to adopt SMILE was performed to test the moderating of self-efficacy. As expected, respondents in the strong hope condition had more positive adoption intentions than those in the weak hope condition did (M_{high} = 4.53 vs. M_{low} = 3.61; $F(1, 176)$ = 37.04, p < .001). Also as expected, adoption intentions were greatest when self-efficacy was high vs. low (M_{high}= 4.29 vs. M_{low} = 3.84; $F(1, 176)$ = 8.82, p < .01). The results also revealed a two-way interaction between hope and anxiety ($F(1, 176)$ = 12.95, p < .001). The interaction showed that, in support of H1, purchase intentions were greatest when hope and anxiety were both strong ($M_{high\ hope/high\ anxiety}$ = 4.81) compared to any other condition ($M_{high\ hope/low\ anxiety}$ = 4.31, $t(88)$ = 1.87, p = .06; $M_{low\ hope/high\ anxiety}$ = 3.33, $t(90)$ = 5.45, p < .001; $M_{low\ hope/low\ anxiety}$ = 3.76, $t(85)$ = 3.79, p < .001).

Importantly, I also observed the predicted three-way interaction between hope, anxiety, and self-efficacy ($F(1, 176)$ = 7.70, p < .01) on purchase intentions. I decomposed the interaction so as to examine the effect of hope and anxiety by self-efficacy condition (see Figure in Appendix B.6). Specifically, for high self-efficacy respondents, purchase intentions were greatest when hope and anxiety were both strong ($M_{high\ hope/high\ anxiety}$ = 5.56). This mean score differed significantly from the remaining three means ($M_{high\ hope/low\ anxiety}$ = 4.32, $t(40)$ =

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3.41, $p < .01$; $M_{\text{low hope/high anxiety}} = 3.38$, $t(42) = 6.71$, $p < .001$; $M_{\text{low hope/low anxiety}} = 4.05$, $t(38) = 3.75$, $p < .01$). When self-efficacy was low, I observed only a main effect of hope on purchase intentions ($F = 16.62$, $p < .001$). Anxiety had no effect on purchase intentions ($F = .24$, $p > .62$).

SELF-EFFICACY STUDY: THREE-WAY INTERACTION ON INTENTION TO ADOPT
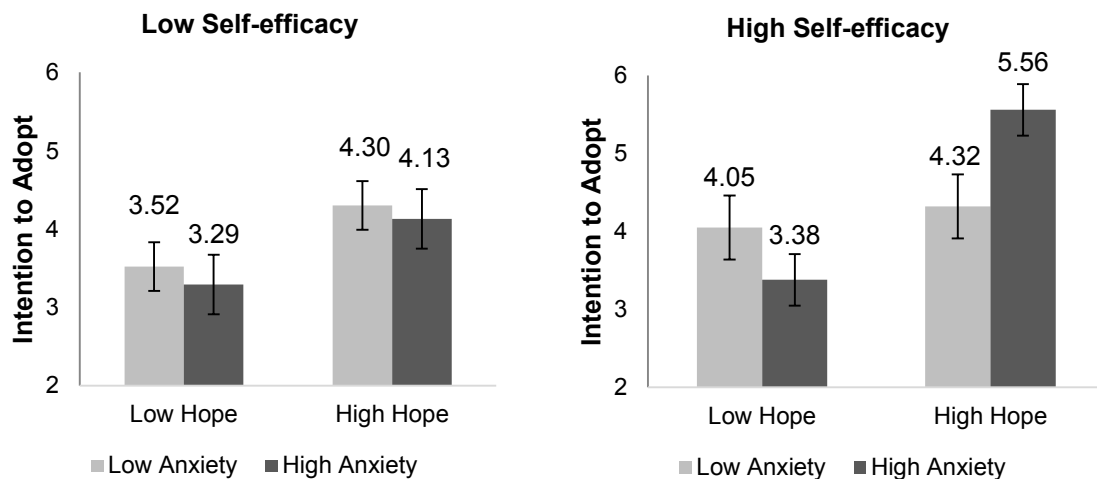
NOTE.- All errors bars represent standard errors.

Discussion

This study replicates H1 and supports the argument that self-efficacy as a moderator using a different product and a product in a gain (vs. loss) domain. The results shed additional light on situations in which participants expressed strong hope of possessing greater beauty, by undertaking orthodontic treatment, but who felt anxious about the potential of this treatment to result in negative outcomes. The findings suggest that the effects of strong hope

and strong anxiety on respondents' intentions to adopt a new dental treatment were greatest among those who had expressed feelings that showed they had a high sense of self-efficacy.

Conversely, when self-efficacy was shown to be low, the results of the hope × anxiety effect on purchase intention (see Figure in Appendix B.6) gave further support to our proposed mechanism. With low self-efficacy, I observed only a main effect of hope on adoption intentions, while anxiety did not boost the effect of hope on purchase intentions. These results suggest that the proposed effect of strong anxiety, coupled with strong hope, needs to be backed by high self-efficacy in order for it to positively affect adoption intentions. Hence, anxiety over the outcome does not lead to higher adoption intentions when consumers do not believe that they have the capacity to enact transactions that are likely to enhance hoped for goal-congruent outcomes, and/or minimise anxiety-evoking, goal-incongruent outcomes.

I chose not to include this study in the main section of the thesis since it was difficult to disentangle the significant result of adoption intentions which were driven either by a strong sense of confidence and control over gloom-ridden processes, or by the combined effects of hope and anxiety. However, the consistent findings of this study show that strong anxiety boosts the positive effects of 'hope' on adoption intentions, strongly supporting the extent to which my proposed facilitative effect of anxiety on purchase intentions can be generalised.