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Strengthening the Customer Experience via Interactive Digital Tactics: Evaluating the Quantification of Self and Gamification

George Pettinico

STRENGTHENING THE CUSTOMER EXPERIENCE VIA INTERACTIVE DIGITAL TACTICS:

EVALUATING THE QUANTIFICATION OF SELF AND GAMIFICATION

A Dissertation Presented

by

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ABSTRACT

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INTERACTIVE DIGITAL TACTICS:

EVALUATING THE QUANTIFICATION OF SELF AND

GAMIFICATION

MAY 2018

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Managing customer interactions has evolved, with firms shifting their focus from simply "selling" to customers to instead building more meaningful personal relationships with them. A key part of this new thinking is the *customer experience*, involving interactions between a customer and brand that provoke a meaningful personal reaction, and often include the consumer playing an active role in tailoring the experience. I examine two interactive innovations, the quantification of self (QOS) and gamification, that are being utilized by marketers to enrich the customer experience. QOS involves the production of highly-detailed individualized performance metrics for personal activity monitoring. Gamification is the use of game design elements to enhance products and

services. There is a significant overlap between the two, when gamification is based on QOS metrics.

Both QOS and gamification are meant to deepen the consumer experience with a product/brand, in terms of more engagement and more personal benefits derived. In addition, both involve co-creation. My dissertation explores these marketing tactics and their impact on the customer experience.

The purpose of essay one is to establish if QOS data, provided via a consumer product, positively impacts motivation toward a goal pursuit. I propose and show support for a mediation model that captures the psychological process underlying QOS's positive motivational impact. My model suggests three factors mediate the impact of QOS on motivation: 1) feedback loop enhancement, 2) self-empowerment amplification, and 3) goal focus strengthening. This research suggests QOS-based consumer products used as part of a goal pursuit will provide the user with a more personally meaningful experience than a similar non-QOS product.

The purpose of essay two is to understand the impact of QOS in wellness programs that are directed by a third party. Since an increase in perceived self-empowerment is found in essay one to be a critical mediating factor in the impact of QOS, this essay explores the hypothesis that QOS loses much of its appeal when run by a third party that is seen as having a power advantage. The theoretical framework for this essay draws from self-determination theory and the consumer empowerment literature. This research identifies an important boundary condition for the impact of QOS.

Essay three examines the use of gamification in marketing contexts, including gamification's impact on the gamified marketing activity itself (enjoyment, emotional

attachment) as well as the potential spillover benefits for the brand associated with the activity. I also gauge potential moderators of gamification's appeal, such as individual's innate competitiveness and innate propensity for risk. My results suggest gamification has some ability to bolster anticipated enjoyment and interest in joining a marketing activity, though this can vary substantially due to innate personal characteristics and situational factors. No support was found for gamification's ability to strengthen emotional engagement with the activity or the brand.

Drawing from established theoretical foundations such as goal setting theory, self-determination theory and the consumer empowerment literature, these three essays extend marketing theory regarding how interactive, digital-based environments can help marketers strengthen the consumer experience. My research provides models to understand the meaningful benefits consumers derive from these marketing approaches. It also identifies important boundary conditions and modifiers, including innate personal characteristics and situational contexts. In my discussion of results, I provide applicable managerial insights for strengthening relationships between consumers and products/brands.

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CHAPTER 1

INTRODUCTION AND CONTRIBUTION

1.1 Background and Research Gaps

Managing customer interactions has evolved significantly over the last few decades, transitioning from a focus on single-point customer transactions in the 1980s to the more recent emphasis on establishing deeper and more meaningful relationships between brands and customers (Pansari and Kumar, 2017). Firms have shifted their focus from simply "selling" products and services to customers to instead building connections with them that are meant to resonate with each individual in a personally significant way. The concept of *customer experience* is a critical part of this new thinking. As described by Gentile, Spiller and Noci (2007), "The customer experience originates from a set of interactions between a customer and a product, a company, or part of its organization, which provoke a reaction. This experience is strictly personal and implies the customer's involvement at different levels (rational, emotional, sensorial, physical and spiritual)" (p. 397). Customer experiences are seen as particularly impactful if they involve co-creation, where consumers are playing an active role in shaping and personalizing the experience (Gentile, Spiller and Noci, 2007; Caru and Cova, 2003).

Recent technological advancements, such as rapid digital data processing and mobile technologies, have given marketers powerful new tools to make non-face-to-face interactions between brands and customers far more personal, co-creative and meaningful than was previously possible (Lord and Velez, 2013). Two interactive digital

innovations, the quantification of self and gamification, are increasingly incorporated into consumer offerings as a means to enrich the experience for consumers. The quantification of self (QOS) involves the production of highly-detailed individualized performance feedback metrics for personal activity monitoring (e.g. Fitbits, Sleep Number Beds, Worry Watch app and Nest Thermostats). Gamification refers to the use of game design elements to enhance non-game products and services. Gamification is not entirely new in marketing. For instance, McDonald's Monopoly Game has been used on and off by the company for decades. However, there appears to be a new impetus behind the use of gamification in marketing, partly driven by technology, with more and more marketing programs incorporating gamification (e.g. America's Army online game, United Airlines Team Challenge, Heineken's Star Player game, Bertucci's Eat For Free scratch off game) (Burke 2014).

Importantly, there is an overlap between the two. With advancements in digital and mobile technology, quantified self-data is increasingly being used as a foundation for gamification. Consider, for example, Vail's EpicMix, which is a smart phone app offered to skiers and snowboarders at their resorts. It records their personal statistics of speed, vertical feet covered and other on-resort statistics. Resort visitors can then use these statistics to enter games and competitions with other resort patrons. Turning to another example, the ZombieRun fitness app allows users to turn their daily exercise run into a virtual "zombie apocalypse," where users need to outrun zombies, collect vital "supplies" and other gamified activities based upon their running speed and distance. These and other product/service-based games are grounded squarely in quantified personal data (for more examples see Burke 2014).

Both the quantification of self and gamification are currently being utilized as interactive, technology-based tactics for enriching the customer experience. They are both meant to deepen the relationship between the consumer and the product/brand, in terms of more time spent, more attention paid and more personal benefits derived from the experience. They are also both meant to provoke a reaction that the consumer him/herself will appreciate, and hence add value for the consumer. Quantification of self, for the consumer products I will explore, is meant to increase individual motivation toward a personal goal. Gamification is meant to increase the enjoyment and engagement experienced in a marketing program (such as a loyalty program or online branded community) or product. Both QOS and gamification often involve co-creation, with a significant active role played by the consumer in the development of the experience over time. In quantification of self, the consumer sets her goals, tracks her progress and interacts with the device to evolve her goal-pursuit plan. In gamification, the consumer is an active participant in a game.

Although these two tactics are growing in use, there has been scant research conducted to date to understand their impact on the consumer experience and consumer decision-making, and no research at all regarding their impact on brand relationship. Regarding, gamification, conceptual articles and books have been written on the topic, however almost no empirical research has been conducted. Regarding QOS, a growing body of empirical research has been conducted, but it has been restricted in scope and hypotheses tested. For example, no research has been conducted to explore the causal mechanism behind QOS, or to test relevant boundary conditions involving context and

consumer characteristics. Given the growing use of these two tools by marketers to strengthen the customer experience, more research is clearly warranted.

1.2 Contribution

The three essays of my dissertation explore these two interactive, digital marketing tactics and their impact on the customer experience. Essay one tests the motivational impact of quantification of self in two personal goal pursuit areas, and explores the underlying psychological process driving QOS's hypothesized positive motivational impact. Essay two identifies and explains a significant boundary condition for QOS involving 3rd party implementation and its impact on perceptions of user self-empowerment. Essay three gauges the impact of gamification on a consumer's involvement in and reaction to a marketing activity and its spillover effect on the consumer's attachment to a brand. These essays represent a significant research program, including over one thousand consumers involved in one qualitative and several quantitative studies. They each help advance consumer behavior theory in a meaningful way. I provide more detail on each essay below.

1.3 Essay 1: Living By The Numbers: Understanding The "Quantification Effect"

The goal of this research is to establish if quantified self-data, provided via a consumer product, positively impacts motivation toward a goal pursuit across multiple contexts; as well as understand the underlying causal mechanism that drives the expected boost in personal motivation. Exploratory qualitative research helped direct my

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hypotheses development. Based on findings from this exploratory research, as well as insights derived from goal setting theory (Latham and Yukl, 1975; Locke and Latham, 1990), I developed a mediation model that identifies the psychological process underlying QOS's positive motivational impact. My model, supported by the research results, suggests three factors mediate the impact of QOS on motivation. These three factors are: 1) feedback loop enhancement (consumers believe the granular and numeric nature of quantified tracking metrics provide more meaningful feedback), 2) self-empowerment amplification (the self- and situational-awareness gained from quantification imparts a greater sense of individual control to a goal pursuit journey), and 3) goal focus strengthening (greater ability to focus on one's goals).

Specifically, the purpose of this essay is four-fold: 1) use goal setting theory to explain the motivational impact of quantification, 2) empirically test if quantification positively impacts consumer motivation in pursuit of behavior change – across a cross-section of consumers and in different life areas, 3) show the causal process by which it works, and 4) identify boundary conditions that may limit its impact. Two separate quantitative experiments were conducted via a national online consumer panel, involving 300+ respondents in total, to test the hypotheses and proposed mediation model in two different personal goal areas: health/fitness and carbon footprint reduction. Since past research has found older consumers to be less receptive to technology-based solutions (Agerwal, Animesh and Prasad, 2009; Czaja et al., 2006; Niehaves and Plattfaut, 2014), the present research tested for and identified age as a boundary condition for the positive effects of QOS. It also examined distance from goal as a possible boundary condition,

since previous research suggests greater distance to goal leads to increased concerns regarding goal attainability (Zhang and Huang, 2010). However, this was not supported.

Although the quantification of self is a technique being incorporated into a greater number of consumer products and services, there has been only limited research to understand the role it plays in consumer motivation. This research offers significant contributions to the literature on this topic. This is the first study to test the "quantification effect" on motivation in multiple life areas and the first to define a causal model to explain how it works. It is also the first to test for boundary conditions. Since I draw heavily from goal setting theory, this research contributes to that school of thought by showing its application to this new consumer tactic.

This research also has wide-reaching implications for marketing practitioners. Americans spend $60 billion annually to get in better physical shape (Williams, 2013). If quantified self-data can motivate consumers to better attain their behavior modification goals in fitness as well as other life areas, marketers would benefit from understanding how this phenomenon works, on whom does it work, and how broadly it can be applied.

1.4 Essay 2: QOS in Third-Party-Administered Wellness Programs: The Impact of Perceived Self-Empowerment

Previous research examined the impact of QOS on individuals in self-directed contexts, where the participant him/herself is setting quantified goals and managing his/her own QOS activities. The impact of QOS has not yet been studied in programs that are directed by a third party with whom the participant has an ongoing and significant relationship. The issue of third-party management of QOS-based programs is

especially relevant today, as employers and insurers begin incorporating QOS into their health and wellness programs for employees and members. Since an increase in perceived self-empowerment was found in essay one to be a critical factor in the causal process behind the positive impact of QOS, a program with a significant QOS component may lose much of its appeal if run by a third party, particularly if that third party is seen as having a power advantage. In addition, QOS involves the generation of significant amounts of personal data, and sharing this with a third party may also limit consumer interest, particularly if there is a degree of distrust between the individual and the third party. While these issues may lead to a reduction in the enjoyment and satisfaction (i.e. lower intrinsic motivation) a user derives from a third-party directed program, it does not necessarily mean all motivation is diminished. Rather, I hypothesize the power and authority of a significant third party will replace intrinsic motivation with external regulation, which occurs when individuals take action due to the demand or expected reward from an empowered third party.

The purpose of essay two is to: 1) confirm that a *self-directed* QOS approach to a goal pursuit program increases a user's interest in joining (versus a similar non-QOS program), 2) test if administration of a QOS program by *third parties* (who have an ongoing and significant relationship with the individual) reduces the positive effect of QOS on interest in joining, 3) test if third party administration of a QOS program transforms the type of motivation experienced, reducing intrinsic motivation and increasing external regulation, and 4) understand if perceptions of power imbalance and/or distrust between the user and the program administrator are mediators of the impact of third party management of QOS. A 2 x 4 between-subjects experiment

manipulating quantification (quantified versus non-quantified wellness program) and program administration type (directed by self, doctor, employer or insurer) was conducted to test my hypotheses.

Growing numbers of programs run by third-parties are incorporating QOS features, particularly employee and insurance wellness programs. Yet, research on this phenomenon is nonexistent. This essay adds to our knowledge of QOS by identifying an important boundary condition, namely administration by a third party with a significant role in an individual's life. Further, this research explores potential underlying factors behind the boundary effect, namely the roles of perceived self-empowerment and trust. This research contributes to the literature on power and the impact of perceived power differentials on decision-making. This research also contributes to the literature on internal marketing (Ahmed and Rafiq, 2003), providing a relevant case with significant challenges involved for employers marketing a program within a firm to employees. In addition, the managerial implications of this research are numerous, given the growing use of QOS in health and wellness programs administered by employers, insurers and health care professionals. This work helps managers better understand a key barrier they may face in incorporating QOS in wellness programs.

1.5 Essay 3: Gamification as a Marketing Technique: Opportunities and Limitations for Building Customer Engagement

Gamification, defined as the use of game-design elements to enhance non-game goods and services, is growing in use as a marketing strategy. While there is no

universally agreed upon list of game design elements, a review of the literature suggests

six common components of game design: 1) rules (structure), 2) narrative/story, 3)

personal challenge (testing one's ability), 4) scoring/ranks (sense of achievement and

competition), 5) chance/unexpected element and 6) social interaction (Blohm and

Leimeister, 2013; Seaborn and Fels, 2015; Schell 2008; Hofacker *et al*., 2016;

Zichermann and Linder 2010, p. 199; Deterding *et al*., 2011). Existing research on

gamification is limited. In fact, there have been recent calls in the literature for empirical

research on the topic (Searborn and Fels, 2015; Hildebrand *et al*., 2014). Drawing

heavily from self-determination theory (Deci and Ryan 1985), conceptual articles suggest

that gamification should increase the inherent enjoyment (intrinsic motivation) derived

from an activity and also increase the emotional attachment to an activity (Searborn and

Fels, 2015; Hildebrand *et al*., 2014).

This paper explores the use of gamification in marketing contexts, with three

areas of inquiry. First, this research gauges gamification's impact on the gamified

consumer activity itself. Does gamification increase interest in participating and

anticipated enjoyment derived from the activity? Does it increase emotional attachment

to the activity? Second, the research explores potential spillover benefits to the brand.

Does it strengthen the anticipated emotional attachment to the brand? Third, the research

tests for potential moderators of gamification's appeal. Since gamification often involves

competitions versus other individuals or versus program- or self-set goals, does an

individual's innate competitiveness modify the impact of gamification? Also, since

gamification often involves chance-based activities, does innate propensity for risk

modify the impact of gamification? Finally, how does situational context, utilitarian or hedonic, moderate the impact of gamification?

In a series of three experiments, I test the impact of gamification on expected enjoyment (intrinsic motivation), emotional engagement and interest in joining two types of marketing programs, an online brand community and a customer loyalty program. I also see if the heightened emotional engagement with the gamified program can transfer to increased emotional attachment to the brand or company sponsoring the program, via the mechanism of affect transfer. I also test if the personal traits of innate competitiveness and innate propensity for risk have a moderating role on the impact of competition-based and chance-based gamification, respectively. Finally, I test the moderating role of utilitarian versus hedonic situational contexts on the impact of gamification. Results of this research were mixed. Gamification appears to have some potential to increase anticipated enjoyment and interest in joining a marketing activity, though this can vary substantially due to personal characteristics such as innate competitiveness (for skill-based games) or age, and also due to situational factors. Only minimal support was found for gamification's ability to strengthen emotional engagement with the activity, and none for emotional engagement with the brand.

Given the limited empirical research on the effects of gamification in marketing contexts, this paper is meant to provide a foundation of empirical knowledge to help build theory regarding the opportunities and limitations of gamification in strengthening customer engagement with marketing activities and, further, with the brands behind the marketing activities. Emotional engagement is a key construct in marketing today, particularly regarding building deep and sustained consumer relationships with brands

(Thomson, MacInnis and Park, 2005). This research adds to the literature on building emotional engagement between customers and brands, by exploring gamification's ability, or lack thereof, in this regard. It also uncovers significant limitations for gamification by identifying innate individual traits which modify the appeal of gamification.

There are numerous managerial implications to be drawn from this research. Brand managers are constantly searching for ways to strengthen customers' involvement with marketing activities and emotional engagement with brands. This research shows that, for certain consumers, gamification may help do some of this, but not quite all of it. The research helps managers understand the types of customers for whom gamification is most, and least, effective in this regard.

Taken together, these three essays help advance marketing theory regarding enriching customer experiences and, as a result, strengthening relationships between consumers and brand offerings. Drawing from established theoretical foundations such as goal setting theory, self-determination theory and the consumer empowerment literature, my research helps build marketing insights regarding how interactive, digital-based environments can help marketers strengthen the interaction between their target consumers and market offerings aimed at them. These three essays focus on two techniques marketers are increasingly using to enrich the customer experience, namely quantification of self and gamification. Both of these techniques utilize recent advancements in digital and mobile technologies to create an interactive environment between the consumer and a brand offering. Though quantification of self and

gamification are distinct tools, they are both typically delivered as digitally-based

marketing tactics that involve a significant co-creative element, where the consumer

him/herself is an active participant in what is generally an ongoing activity. Further, they

are often used together to strengthen the consumer experience.

My research provides models to understand the meaningful benefits consumers

can derive from these marketing approaches, including enhanced motivation toward

personal goals and heightened enjoyment and increased interest in joining an activity. It

also identifies important boundary conditions and modifiers, including innate personal

characteristics, third-party involvement and situational context. It also provides

actionable insights to marketing managers regarding two techniques they are increasingly

using to enrich the customer experience.

CHAPTER 2

ESSAY ONE: LIVING BY THE NUMBERS: UNDERSTANDING THE QUANTIFICATION EFFECT

2.1 Introduction

Changing entrenched personal habits is not an easy thing to do. However, a recent phenomenon in the consumer marketplace, generally referred to as the "quantification of self" (QOS), appears to be having some success at motivating personal behavior change (Quart, 2013; Wolf, 2010). Marketers have taken notice of this development and are increasingly incorporating QOS elements into products and services aimed at behavior modification.

Quantification involves providing information in a granular, highly detailed and typically numeric format. Quantified results are generated via a systematic, often technology-based methodology meant to suggest precision. QOS is the application of quantification in personal activity monitoring, typically supplying quantified feedback in pursuit of a behavior modification goal. Today, QOS is most evident in fitness, where in only a few years wristband fitness trackers (e.g. Fitbit®) have grown into a $1.5 billion category (Smith, 2016). QOS has also been incorporated into products for sleep tracking (e.g. Sleep Number Beds®), home energy use (e.g. Nest Thermostats®), general goal tracking (e.g. GoalsOnTrack®) and increasingly other personal behavior areas.

Although quantified features are appearing in growing numbers of consumer products, there has been only limited research to understand the role they play in consumer motivation. The purpose of this paper is to: 1) use goal setting theory to

explain the motivational impact of quantification, 2) empirically test if quantification positively impacts consumer motivation in pursuit of behavior change – across a cross-section of consumers and in different life areas, 3) show the causal process by which it works, and 4) identify boundary conditions that may limit its impact.

Using goal setting theory as the broad theoretical basis, this research contributes to the literature that explains how consumers react to QOS environments. With goal setting theory, I will explain and show how quantification enhances the impact of feedback as an individual works toward his/her goals, which ultimately strengthens goal focus and motivation. Expanding upon the consumer empowerment literature, I will show how learning about oneself via self-quantification provides consumers with a greater sense of personal control, which also strengthens goal focus and motivation.

This research has wide-reaching implications for marketing practitioners. Americans spend $60 billion annually to get in better physical shape (Williams, 2013). If quantified self-data can motivate consumers to better attain their behavior modification goals in fitness as well as other life areas, marketers would benefit from understanding how this phenomenon works, on whom does it work, and how broadly it can be applied.

Given the relatively recent rise in widespread self-quantification, I conducted qualitative research, coupled with a literature review, to develop hypotheses. Qualitative research consisted of an in-depth content analysis of blog postings by current users of QOS technologies in fitness. To test the research hypotheses, two experiments were conducted with consumers not currently using QOS. In each, using a between-subject design I measured the difference in motivational impact between a quantified and non-quantified approach to personal goal achievement. Study 1 examined the impact of

quantification in a fitness context. Study 2 tested the quantification effect in the context of personal carbon footprint reduction. In both studies, multiple mediation modeling was employed to explore the process by which quantification impacts anticipated motivation, by examining the mediating impacts of feedback enhancement, self-empowerment and goal focus strengthening.

2.2 Theoretical Framework and Hypotheses Development

Quantification in the pursuit of behavior modification is not a completely new phenomenon. For decades, athletes were encouraged to keep detailed paper diaries and logs of their training activities and performance, and research suggests this practice had a positive impact on motivation (Hopkins, 1991). However, due to the effort involved, such activities were generally limited to serious athletes and fitness buffs. Recently, technology (e.g. Fitbits®) has made the quantified tracking of health and fitness much easier for the layperson. Over the past several years, health studies have supported the positive impact of tech-based fitness trackers on health outcomes (Cadmus-Bertram *et al*., 2015; Casey *et al*., 2014). Additionally, a handful of studies supporting QOS's positive impact on motivation and performance have been conducted in computer science (Fritz *et al*., 2014; Li, Dey and Forlizzi, 2010; Munson and Consolva, 2012). However, these studies have not addressed how quantified self-tracking impacts behavior or tie the findings into broader motivational theory. Recent work by Etkin (2016) suggests that quantified tracking, while increasing effort devoted to an activity, may reduce the enjoyment an individual experiences because the act of measurement makes the activity seem more like work. However, Etkin's experiments assigned people to tasks which

were not necessarily reflective of the respondent's personal life goals. In the marketplace, consumers are generally utilizing QOS to pursue personally relevant goals. Hence, my research will factor in goal relevance.

Due to the limited available research on QOS, I started my investigation with exploratory qualitative research to understand the appeal of QOS among current users who had engaged in public online conversations about fitness trackers. During a 12-month period from July 2014 to June 2015, I conducted a qualitative review of relevant online blogs posted on Tumblr.com and Reddit.com (two of the largest US blogging sites). Over 1,200 consumer blog postings about user's experience with fitness trackers were reviewed. Two coders (an independent coder and myself) recorded if the blog posts contained the following themes relating to fitness tracker usage: detailed feedback, goal focus, empowerment/educational impact, motivation, social interaction, gamification and equipment complaints. Overall, the inter-rating agreement was 86%. Areas of disagreement were discussed between coders until consensus was reached (see Appendix C for further details on the qualitative methodology).

The following combines insights from the qualitative research along with a literature review of relevant theory. From this, hypotheses are developed regarding the impact of quantification, and our mediation model is proposed.

Goals are defined as outcomes to aim for (Locke and Latham 2002). Individuals generally have numerous goals at any given point in their lives, some broad (e.g. adopting a healthier lifestyle) and some narrow (e.g. learning Spanish). There is a substantial stream of research on how personal goals are derived (for a comprehensive review see Bagozzi and Dholakia, 1999); how competing goals are managed (Dodge *et*

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al., 1989; Locke and Latham, 2002; Van Hook and Higgins, 1988); and the interaction of a superordinate goal with its various subgoals (Fishbach, Dhar and Zhang, 2006).

Motivation has been defined as the instigation and direction of behavior, representing the desire to undertake the actions needed to achieve an outcome (Elliot and Covington, 2001). In the present study, the dependent variable is anticipated motivation, which is an individual's self-described expected level of motivation when presented with a program to achieve a goal. It represents the critical first stage in engaging an individual in a plan of action. Anticipated motivation is a commonly used construct in health (Vassy *et al*., 2012), organization (Lount *et al*., 2008) and education research (Gorges and Kandler, 2012).

Goal setting theory emphasizes the importance of performance feedback in helping an individual improve her goal-directed effort, particularly feedback that assists the individual in better understanding her goals and the effort needed to achieve them (Latham and Yukl, 1975; Locke and Latham, 1990). I use the term feedback meaningfulness to capture this. QOS supplies feedback that is viewed by users as highly meaningful. Research suggests that the concrete and granular nature of quantitative self-data leads to more reflective thinking and thoughtful analysis among users (Li, Dey and Forlizzi, 2010). For example, without quantification, a person trying to lose weight may feel she had a physically active day, but this would be little more than a rough estimate. With current quantification techniques, she would know how many steps she took that day, the active minutes she had, the calories she burned and numerous other metrics. She could compare these metrics to her daily norms, to norms for people like her and to her

personal goals. In this way, the quantified feedback is more informative and hence more meaningful to users than non-quantified feedback.

Quantification, by helping users gain more meaningful insights about themselves and their behaviors in the course of a goal pursuit, provides a type of self-education (Choe *et al*., 2014). Informants in the qualitative research believe quantified data provides them with an extensive education about themselves, their bodies and proper fitness behavior – a level of insight seen as unavailable from previous, non-quantified efforts. One user wrote "*From clocking my number of steps, entering my daily meals and seeing other variables, Fitbit has educated me on how my body responds to fitness, and what I need to keep my machine in order.*" (Tumblr 2014). Another noted *"It is really helping me understand how to train and diet."* (Reddit 2015).

The granular, numeric nature of QOS's feedback also makes the user perceive it as more authoritative than non-quantified feedback, which enhances its perceived meaningfulness. Information presented in the form of specific, granular numbers, as opposed to more general representations, are perceived as more substantive and credible. Zhang and Schwarz (2012) found that consumers believe products are more likely to deliver on their promises when the promise is described in fine-grained rather than general terms and that the greater specificity increases confidence that the information is accurate and authoritative. Hence, I hypothesize:

> H1. A quantified (vs. non-quantified) approach to tracking progress in a goal pursuit increases the meaning a user perceives in feedback during that goal pursuit.

The concept of self-empowerment has been studied across various disciplines. The core elements of self-empowerment, as defined in the literature, is that individuals have control over their own choices, and have a sense of agency/autonomy regarding their life goals and activities (Labrecque *et al*. 2013; Rappaport, 1984; Wathieu *et al*. 2002). Research has shown that when individuals have access to greater amounts of useful information about themselves and their situations, they feel a heightened sense of personal empowerment (Nutbeam, 2008; Zimmerman and Rappaport, 1988). When an individual reduces the unknown in an aspect of life, he feels a greater sense of order and control.

The increased self-knowledge and situational understanding derived from quantification brings with it a heightened sense of personal empowerment. QOS users believe the education they receive from their quantified results helps them better understand their personal fitness process – which provides a sense of order and control in what otherwise could be a complex and puzzling process. As one of the informants in the qualitative research wrote, "*I feel like I'm in charge of my fitness now, because with my daily results I've learned what works best for me*." (Tumblr 2014). Hence, I hypothesize:

> H2. A quantified (vs. non-quantified) approach to tracking progress in a goal
>
> pursuit increases a user's perceived self-empowerment during that goal pursuit.

Goal setting theory posits that more specific goals, combined with more precise performance feedback, serve to strengthen goal focus (Latham and Yukl, 1975; Locke and Latham, 1990). Quantified metrics embedded in current QOS technology grant consumers access to a degree of specificity in goal setting that was previously

unavailable, such as the goal to walk 12,500 steps daily. This concreteness and specificity enhances the ability to visualize goals, strengthening goal focus.

Informants in the qualitative research reported that quantified self-data stimulates in them a stronger goal focus than they could otherwise attain. One informant noted, *"I have days where I get home from work and I'm a few thousand steps short of my daily goal, and I'll go walk on the treadmill until I get there. Otherwise I'd probably just flop on the couch for the night."* (Reddit 2014). Quantified results help focus users' attention both on their goals and on their daily activities in pursuit of those goals. One informant wrote, "*Fitbit has made me pay a lot more attention to what I eat, which has really helped me stay on track with my weight loss goals*." (Reddit 2014). The tangibility of quantified, numeric results is seen by users as demanding their attention. As one noted, "*You can't hide from the numbers. They're right there staring you in the face."* (Tumblr 2014). Another noted, "*It [Fitbit®] lets me know the days I'm slacking, in no uncertain terms.*" (Tumblr 2015). Hence, I hypothesize:

> H3. A quantified (vs. non-quantified) approach to tracking progress in a goal
>
> pursuit increases a user's goal focus during that goal pursuit.

I hypothesize that feedback meaningfulness has a positive impact on motivation in a goal pursuit. According to goal setting theory, effective performance feedback can cause an increase in goal-directed effort by: inducing goal setting where previously there were no goals, encouraging an individual to raise his goals after a goal is attained and focusing attention toward goal-relevant activities (Latham and Yukl, 1975; Locke, 1968; Locke and Latham, 1990). Reflecting the motivational impact of feedback

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meaningfulness, one informant in the qualitative research noted, *"I've found for me that having a raw source of data is definitely the best motivator. When I can see the impact that 30 minute walk just had, it makes me want to keep on walking to level up those numbers."* (Reddit 2015). Self-empowerment also has a positive impact on motivation. Prior research suggests that strategies which enhance feelings of empowerment and control have a positive influence on goal-directed behavior (Bandura, 1997; Patrick and Hagtredt, 2012; Schifter and Ajzen, 1985).

Heightened goal focus also has a positive impact in motivation. Goal setting theory asserts that goals, particularly *specific* goals, improve motivation in four ways: 1) focusing attention toward goal-relevant activities, 2) increasing effort toward the goal, 3) intensifying persistence, and 4) activating related cognitive knowledge (Locke, 1968; Locke and Latham, 1990). The theory posits that more specific and concrete goals have greater impact on motivation than general goals, because specificity helps to further focus an individual's attention. Scholars in marketing and sport performance have noted the motivational power of specificity in goal setting and tracking (Bagozzi and Dholakia, 1999; Tenenbaum *et. al.*, 1991). Two studies among fitness tracker users from the computing science literature lend support to the positive motivational impact of setting granular, quantitatively-based goals (Fritz *et al.*, 2014; Munson and Consolva, 2012).

Building on these findings, I propose that quantification ultimately strengthens anticipated motivation via a causal chain involving the three mediators of feedback meaningfulness, self-empowerment and goal focus (see figure 2.1). It is the heightened feedback meaningfulness derived from quantification that strengthens perceived self-empowerment, since meaningful feedback provides the user with greater self and

situational understanding, leading to an enhanced sense of control. The increased

feedback meaningfulness and self-empowerment serve to intensify the user's goal focus,

since the granularity of quantified feedback helps the user better visualize and

concentrate on her goals, and the increased self-empowerment grants the user a stronger

perception of agency in the goal attainment process. The strengthened feedback

meaningfulness, self-empowerment and goal focus all serve to increase the user's

anticipated motivation, since, as noted above, they each provide the user with a stronger

drive to invest the effort needed for goal attainment. I presume that the bulk of

quantification's impact on anticipated motivation flows through the causal chain

composed of the three mediators as opposed to via the direct path. Formally stated:

> H4a. A quantified (vs. non-quantified) approach to tracking progress in a goal
>
> pursuit increases a user's anticipated motivation regarding that goal pursuit.
>
> H4b. The effect of a quantified (vs. non-quantified) approach to tracking progress
>
> in a goal pursuit on anticipated motivation is serially mediated by perceived
>
> feedback meaningfulness, self-empowerment and goal focus.

Figure 1: How QOS impacts motivation - causal model
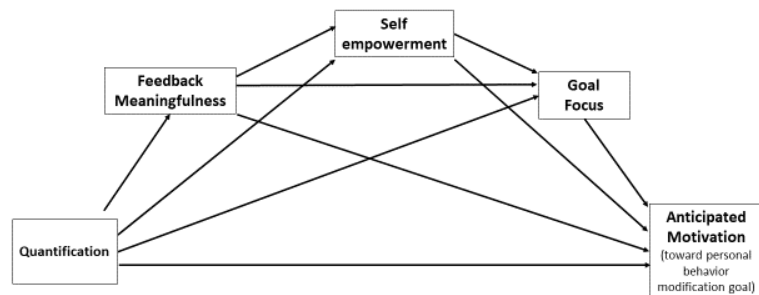
In addition to the hypothesized relationships, I will include in my analysis the constructs of attitude toward technology, age and distance to goal. Attitude toward technology is included as a control variable, since, reflecting reality, our QOS scenarios involve technology (e.g. wristband fitness trackers). Age is included for subgroup analysis, since past research has found that older individuals are often less receptive to new technologies (Agerwal, Animesh and Prasad, 2009; Czaja *et al*., 2006; Niehaves and Plattfaut, 2014). Finally, distance from goal is included for subgroup analysis, since previous research suggests greater distance to goal leads to increased concerns regarding goal attainability (Zhang and Huang, 2010). Goal setting theory, however, suggests its propositions are even more impactful in the pursuit of challenging goals, which distance to goal reflects (Locke and Latham, 1990).

We now turn to two experiments, both of which test all hypotheses. Study 1 does this in a fitness context, while study 2 does so in the context of personal carbon footprint reduction. Both studies include only respondents who are not yet using QOS tactics in the relevant area, which provides a more rigorous test for the "quantification effect."

2.3 Study 1: Impact of QOS in Fitness

A two-cell, between-subjects experiment manipulating quantification (quantified versus non-quantified fitness program) was used to test if quantification in a fitness context has a significant impact on perceived feedback meaningfulness, self-empowerment, goal focus and anticipated motivation in a goal pursuit. Included in this study is an analysis controlling for the possible impact of technology, an examination of differences by subgroup, and a test of the proposed mediation model.

2.3.1 Method

I collected responses from 235 American consumers using Amazon.com's

MTURK online panel, which has been successfully used for scenario-based research

(Liu, Lamberton and Haws, 2015; Paolucci, Chandler and Ipeirotis, 2010). Respondents

were aged 18 to 64, had the ability to walk half a mile without difficulty, expressed the

desire to improve their physical fitness/stay physically fit (this factors in goal relevance)

and were not users of biometric fitness trackers. To strengthen response validity,

respondents were restricted to individuals with a rating of 90% or higher (MTURK rates

panelists based on past response quality). Only respondents who met the inclusion

criteria and passed all attention checks were included. The resulting sample was 54.0%

male, with 34.9% age 18 to 29, 35.3% age 30 to 39, 15.7% age 40 to 49 and 14.1% age

50 to 64.

Respondents were randomly assigned to view either a QOS or non-QOS scenario.

Both scenarios described the same exercise and eating routines, the only difference was

how progress would be tracked. The QOS scenario reflected the tracking functionality

available with fitness trackers, and showed a wristband and results dashboard (all de-

branded) and emphasized detailed goals and granular tracking of personal fitness

activities. The non-quantified scenario emphasized general goals and high-level, less

quantitative tracking of personal fitness activities (see Appendix A for scenarios).

2.3.2 Measures

After viewing the scenario, respondents answered four multi-item scales (created by the author, based upon insights derived from the qualitative research and literature review) comprising feedback meaningfulness, self-empowerment, goal focus and anticipated motivation (α = .929, .894, .926 and .946, respectively). See Appendix B for scale details.

In addition, respondents answered a five-question scale (α = .868) measuring self-assessed physical fitness, adapted from Abadie (1988). Based on this composite measure, the sample was divided into equally sized low, medium and high self-assessed physical fitness groups (each one third of the sample), which captures distance from goal. Finally, respondents completed a 12-item attitude-toward-technology scale (α = .815) from Rosen *et al*. (2013). All scale items can be found in Appendix B.

2.3.3 Manipulation Check

A t-test measured differences in the degree of quantified self-data perceived in each scenario *("How would you describe the level of detail of the day-to-day fitness activity results supplied ... 1 = not detailed at all ... 7 = very detailed")*. The QOS scenario scored significantly higher than the non-QOS scenario on this measure (M_{QOS} = 5.9, $M_{Not-QOS}$ = 3.4, t = 14.52, p < .001).

2.3.4 Findings

Before testing the causal model, I measured the simple effects of quantification on the four outcome variables. The QOS scenario was rated significantly higher on anticipated motivation than the non-QOS scenario (M_{QOS} = 5.1, $M_{Non-QOS}$ = 4.1, t=5.46,

p<.001), supporting H4a. The same occurred for perceived feedback meaningfulness (M_{QOS} = 5.6, $M_{Non-QOS}$ 3.9, t=9.20, p<.001), self-empowerment (M_{QOS} = 5.4, $M_{Non-QOS}$ = 4.5, t=5.16, p<.001), and goal focus (M_{QOS} = 5.6, $M_{Non-QOS}$ = 4.2, t=7.53, p<.001), supporting H1, H2 and H3, respectively. The effect sizes for QOS's impact on feedback meaningfulness and goal focus are large (Cohen's d = 1.0 and .92, respectively), while the effect sizes for QOS's impact on anticipated motivation and self-empowerment are moderately large (Cohen's d = .67 and .65, respectively). See figure 2.2.

Table 1: Impact of QOS in fitness (study 1) and carbon reduction (study 2)

	Study 1: Fitness				Study 2: Carbon reduction			
	QOS Mean	Non-QOS Mean	t score	P value	QOS Mean	Non-QOS Mean	t score	P value
Feedback meaningfulness	5.6	3.9	9.20	<.001	6.1	5.5	3.21	<.003
Self empowerment	5.4	4.5	5.16	<.001	5.7	5.1	2.51	<.02
Goal focus	5.6	4.2	7.53	<.001	6.0	5.4	3.10	<.004
Anticipated motivation	5.1	4.1	5.46	<.001	6.1	5.3	3.85	<.001

Since the QOS scenario involved a technological delivery mechanism (wristband tracker), and the non-QOS scenario lacked a technological element, I conducted an ANCOVA with anticipated motivation as the dependent variable, quantification (QOS versus non-QOS scenario) as the factor, and attitude toward technology as the covariate.

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The results showed attitude toward technology to be a significant covariate ($F = 5.55$, $p<.02$). The difference in anticipated motivation between the QOS and non-QOS scenario remained significant ($F=26.36$, $p<.001$).

As mentioned, distance from goal is operationalized as self-reported physical fitness. I created two segments for analysis, one ½ standard deviation above and one ½ standard deviation below the mean of 4.3 (standard deviation = 1.37). Among the group ½ standard deviation below the mean (n=79), and hence farthest from fitness goals, a t-test showed a significant impact of QOS on anticipated motivation ($M_{QOS} = 5.2$, $M_{Non-QOS} = 4.3$, $t=3.22$, $p<.01$). Among the group ½ standard deviation above the mean (n=76), and hence closest to fitness goals, a t-test also showed a significant impact of QOS on anticipated motivation ($M_{QOS} = 5.4$, $M_{Non-QOS} = 4.2$, $t=3.49$, $p<.001$). See figure 2.3.

There are significant differences by age in the impact of QOS. Since age is often examined as segments in marketing research, I compared three age groupings commonly analyzed: under 30, 30 to 49 and 50+. Among consumers under age 50, QOS has a significant, positive impact on anticipated motivation. However, there is no significant impact among respondents over age 50+ (see figure 2.3). Among age 21 to 29 year olds: $M_{QOS} = 5.3$, $M_{Non-QOS} = 4.1$, $t=4.11$, $p<.001$; among 30 to 49 year olds: $M_{QOS} = 5.2$, $M_{Non-QOS} = 4.0$, $t=4.38$, $p<.001$; among 50 to 64 year olds: $M_{QOS} = 4.7$, $M_{Non-QOS} = 4.5$, $t=0.25$, $p=.807$ (not significant). Similar results were found for feedback meaningfulness, self-empowerment and goal focus.

Figure 2: Impact of QOS in fitness – by age

Impact of QOS on motivation
by self-assessed fitness group
(Shown: mean on Motivation Scale)

━━━ 1/2 std dev below mean   • • • 1/2 std dev above mean

Impact of QOS on motivation
by age
(Shown: mean on Motivation Scale)

━━━ 21 to 29   ━ ━ 30 to 49   • • • 50-64
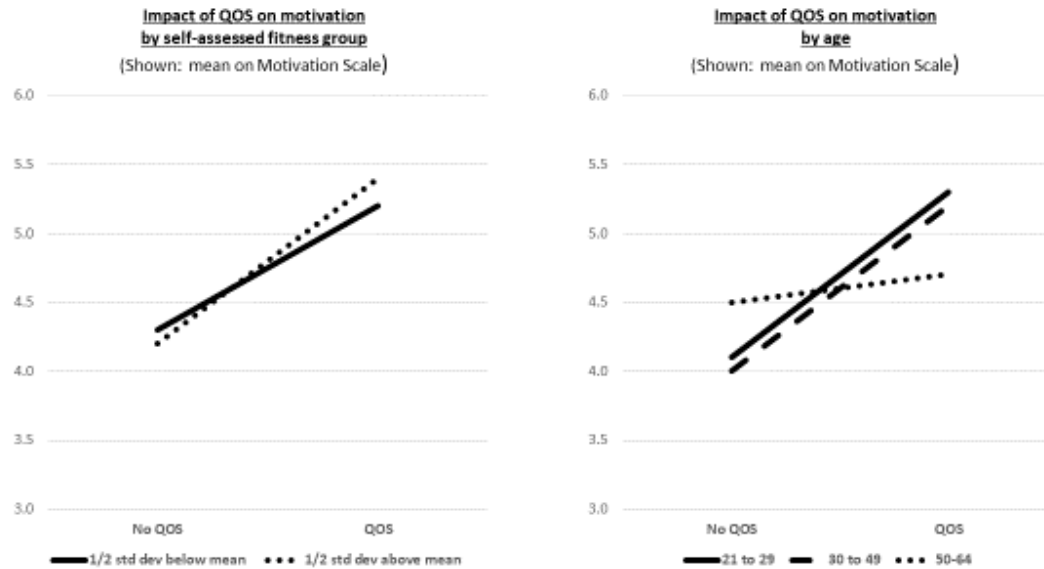
To test my hypothesized causal process, I conducted a serial multiple mediation

analysis utilizing PROCESS Multiple Mediation Model 6 (Hayes, 2013; Preacher and

Hayes, 2004). Reflecting my hypothesized model in figure 1, the tested model used

quantification (0 = not present, 1 = present) as the independent variable and anticipated

motivation as the dependent variable. The three mediators, in order, were feedback

meaningfulness, self-empowerment and goal focus. All ten potential relationships were

tested for significance. Per Hayes (2013), I applied a bootstrapping approach and derived

confidence intervals for direct and indirect effects on the basis of 5,000 resamples. The

results indicated that the full serial mediation model is significant with a 95% CI

excluding zero (0.272 to 0.587). Five additional analyses in which the order of mediators

was changed produced either non-significant or weaker models, suggesting that the predicted serial mediation model best explains our data, supporting H4b.

As shown in figure 2.4, seven of my ten hypothesized relationships are significant (five at p<.001 and two at p<.05). Each step of the core mediated path (QOS → feedback meaningfulness → self-empowerment→ goal focus → anticipated motivation) is significant at p<.001. Also found to be significant are the paths from feedback meaningfulness to both anticipated motivation and goal focus. On the other hand, quantification's direct effect on self-empowerment and goal focus are non-significant in a model where mediated effects are accounted for, suggesting QOS's impact on them is mediated by feedback meaningfulness. The path from self-empowerment to anticipated motivation was also found to be non-significant in the model, suggesting its effect is fully mediated by goal focus. Interestingly, the direct effect of quantification on anticipated motivation (outside the mediated path) is small (though significant at p<.05) and negative, suggesting the mediated path captures all the positive effects of quantification on anticipated motivation.

Figure 3: Study 1 (fitness) and study 2 (carbon reduction) mediation analysis

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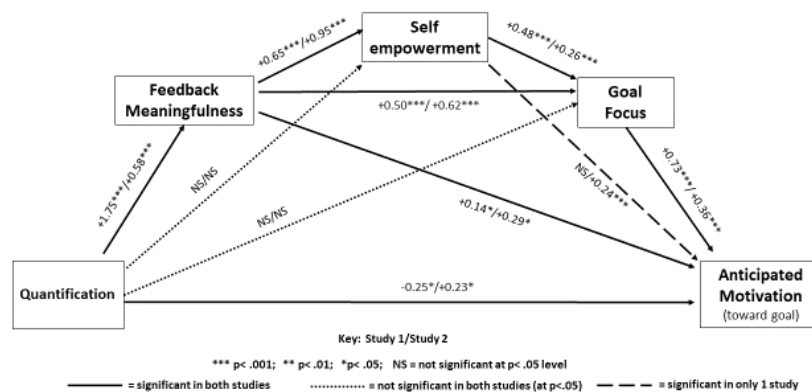
2.3.5 Discussion

Study 1 provides support for the significant impact of quantified self-data on increasing perceived feedback meaningfulness, self-empowerment, goal focus and anticipated motivation in the pursuit of a fitness goal (H1 through H4a supported). Further analysis found QOS has a significant impact on motivation regardless of distance to goal. However, analysis by age identified older age (50+) as a boundary condition for the "quantification effect." With regard to age, attitude toward technology may be playing a role. In the study, older respondents were significantly less optimistic about the possibilities offered by technology in general (based on agreement with the item "With technology, anything is possible"), although on the overall attitude-toward-technology scale there was no significant difference by age.

The hypothesized causal model was found to be significant (H4b supported). Each of the three constructs is a significant mediator along the causal path from QOS to anticipated motivation. Quantification works to strengthen anticipated motivation via the heightened meaning seen in the quantified feedback, the sense of empowerment provided by the information and the stronger goal focus generated. There is some residual impact of QOS on anticipated motivation outside of the mediated path (direct path of QOS → anticipated motivation). Interestingly, this direct effect outside of the mediated path is negative, suggesting that in a fitness context, there is a negative impact of quantification. However, it is far smaller than the large and positive impact captured by the mediated path.

2.4 Study 2: Impact of QOS on Carbon Footprint Reduction Efforts

A two-cell, between-subjects experiment manipulating quantification (quantified versus non-quantified program) was used to test the impact of quantification on perceived feedback meaningfulness, self-empowerment, goal focus and anticipated motivation in the context of personal carbon footprint reduction. This study was done to generalize results for the "quantification effect," and provide a second context for testing the mediation model.

2.4.1 Method

I collected responses from 96 US consumers using MTURK. Respondents were aged 18 to 64, owned a smart phone and expressed a desire to reduce their carbon footprint (rate it 5 to 7 on a 7-point importance scale). Respondents were restricted to individuals with MTURK ratings of 90% or higher. Attention checks were utilized to screen out inattentive respondents. The resulting sample was 45.8% male, with 26.0% age 18 to 29, 35.4% age 30 to 39, 17.7% age 40 to 49 and 20.8% age 50 to 64.

Participants were informed they would see a brief description of a (hypothetical) phone app that might help them reduce their carbon footprint. Respondents were randomly assigned to view either a QOS or non-QOS version. In both scenarios, the app, as described, would allow users to enter information about their daily consumption, transportation and other habits. Based on this input, the app would provide users with customized daily recommendations to reduce their carbon footprint. The only difference between the two scenarios was how they would track their progress. The non-QOS

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version emphasized general-level tracking, while the QOS version emphasized highly detailed, quantified tracking of their progress (see Appendix A for scenarios).

2.4.2 Measures

The four summated scales were repeated from study 1: feedback meaningfulness, self-empowerment, goal focus and anticipated motivation, all worded for carbon footprint reduction (α =.804, .861, .838 and .906, respectively). See Appendix B.

2.4.3 Manipulation Check

A t-test measured differences in the degree of detailed performance tracking perceived in each scenario. The QOS scenario scored significantly higher than the non-QOS scenario on the perceived level of detailed tracking provided ($M_{QOS} = 6.5$, $M_{Not-QOS} = 5.3$, t=7.17, p < .001).

2.4.4 Findings

As in Study 1, before testing the causal model, I compared results on the four outcome variables between the QOS and non-QOS cells. The QOS scenario was rated significantly higher on anticipated motivation than the non-QOS scenario ($M_{QOS} = 6.1$, $M_{Non-QOS} = 5.3$, t=3.85, p<.001), supporting H4a. The same occurred on perceived feedback meaningfulness ($M_{QOS} = 6.1$, $M_{Non-QOS}$ 5.5, t=3.21, p<.003), self-empowerment ($M_{QOS} = 5.7$, $M_{Non-QOS} = 5.1$, t=2.51, p<.02), and goal focus ($M_{QOS} = 6.0$, $M_{Non-QOS} = 5.4$, t=3.10, p<.004), supporting H1, H2 and H3, respectively. The effect size for QOS's

impact on motivation, meaningfulness and goal focus are moderately large (Cohen's d: .75, .66, .63, respectively) and moderate for self-empowerment (.51). See table 1.

As was observed in Study 1, there are significant differences by age in the impact of QOS. Among consumers under the age of 50, QOS has a significant, positive impact on anticipated motivation toward reducing their carbon footprint. However, there is no significant impact among respondents age 50+. Among age 21 to 29 year olds: $M_{QOS} = 6.1$, $M_{Non-QOS} = 5.0$, t=2.59, p<.02; among 30 to 49 year olds: $M_{QOS} = 6.0$, $M_{Non-QOS} = 5.3$, t=2.39, p<.03; among 50 to 64: $M_{QOS} = 6.1$, $M_{Non-QOS} = 5.4$, t=1.56, p=.137.

The same mediation analysis approach (PROCESS Multiple Mediation 6) utilized in study 1 was repeated for this study. The results from 5,000 bootstrapped samples suggest a significant model, with 95% CI = 0.01 to 0.16. The resulting model (see figure 3) shows results fairly similar to those seen in study 1. Importantly, the core mediated path (QOS → feedback meaningfulness → self-empowerment→ goal focus → anticipated motivation) was found to be significant at each step. Also similar to study 1, the paths from feedback meaningfulness to anticipated motivation and from feedback meaningfulness to goal focus were both significant. And, as in study 1, the paths from QOS to self-empowerment and QOS to goal focus were both not significant. However, there are two differences between the results from study 1 and 2. In this study, the direct path from self-empowerment to anticipated motivation is significant ($\beta = .24$, p<.001), making eight of the ten hypothesized relationships significant (six at p<.001 and two at p<.05). Also, in study 2 I found a positive (as opposed to negative as in study 1) direct relationship ($\beta = .23$, p<.05) between quantification and anticipated motivation.

Five additional analyses in which the order of mediators was changed produced similar results to our predicted model. This, along with the weaker confidence interval, suggests that although the predicted causal model is significant in the context of personal carbon footprint reduction, it is less robust than we found in the context of fitness. Hence, H4b is supported in study 2, but with less confidence regarding the order of mediators.

2.4.5 Discussion

Study 2 provides support for the significant, positive impact of quantification on goal motivation in a second context (H1 through H4a supported). As such, study 2 provides evidence of the generalizability of the core impact of the "quantification effect" across multiple behavior modification areas. As found in study 1, study 2 results suggest age (50+) is a boundary condition. My proposed causal model was again found to be significant, with path results fairly similar to what was found in study 1 (though with the two differences noted). However, unlike study 1, analyzing models with different ordering of the three mediators obtained fairly similar results in study 2.

2.5 General Discussion

Behavior modification is a widespread aspiration among many consumers, representing a significant business opportunity for firms offering products/services that consumers believe will help them during the course of their challenging journey. This paper provides insight into the consumer appeal of quantification and tests it as an element in the behavior change process. My research analyzed the appeal of

quantification in two contexts: fitness (where it already has significant marketplace presence) and reducing one's carbon footprint (where it does not). The ultimate dependent variable is anticipated motivation, which represents the vital initial step in getting an individual engaged in a behavior change process. The present studies build upon the small but growing body of research that suggests quantified self-data is successful at increasing goal-oriented motivation, at least initially. It expands this literature by: 1) finding support to generalize the quantification effect outside of health/fitness and 2) providing insight into the underlying process which drives the effect.

The findings suggest that there is a substantial "quantification effect," meaning a behavior modification approach with quantification garners significantly greater levels of anticipated motivation than a similar approach which lacks quantification. I found this effect in both studies, and among consumers both closer to and farther from goal. This suggests that marketers should consider adding a quantification element to products and services meant to assist in behavior change. While market data has established a track record for quantification in fitness, my research suggests quantification will also be effective in areas outside of fitness.

This research provides significant insight into the psychological process by which quantification increases anticipated motivation. My qualitative and quantitative research point to three factors which mediate the impact of QOS on anticipated motivation: 1) *feedback loop enhancer*: consumers believe the granular and numeric nature of quantified tracking metrics provide more meaningful feedback, 2) *self-empowerment amplification*: the self- and situational-awareness gained from quantification imparts a greater sense of individual control to a behavior modification journey, and 3) *goal focus*

strengthener: the greater meaning derived from quantified feedback along with the increased self-empowerment leads to strengthened goal focus.

Marketers can utilize these insights in a variety of ways. Communication themes highlighting the more meaningful feedback, greater self-empowerment and heightened goal focus that are derived from quantification can be worked into marketing campaigns. In particular, the theme of empowerment via quantification appears to be a significant untapped opportunity. These themes can also be incorporated into the products and services themselves as names for product features - a fitness tracker dashboard can be rebranded as an "Empowerment Dashboard." These insights can also be incorporated into training for customer-facing staff to help them better motivate customers, be they personal trainers using fitness trackers or salespeople selling "smart" mattresses.

Despite the overall positive impact of the quantification effect, these studies suggest that there is a boundary effect of age. While my research does not propose that older Americans view quantification negatively, it does suggest that Americans aged 50+ do not perceive the significant benefits in it that their younger counterparts do. This suggests that marketers need to work harder to communicate the benefits of quantification to older consumers. The technology involved in QOS may be part of the challenge, as previous research has found that older consumers are more hesitant to adopt new technologies, and our research found them less inherently optimistic about new technology. However, further research is needed to fully understand this boundary condition.

The findings help advance motivational theory by placing the quantification phenomenon into the context of goal setting theory. My results also add to the consumer

empowerment literature, by describing the vital role of information about oneself and one's activities as a driver of personal empowerment.

This research has some limitations. In study 1, the non-QOS fitness scenario was a traditional, non-tech-based program, while the QOS fitness scenario was tech-based. While my ANCOVA controlled for the potential confounding impact of attitude toward technology, there could also have been a difference in perceived effort involved in tracking between the two scenarios. Although the non-QOS scenario emphasized general-level tracking of activity, respondents exposed to that scenario may have perceived more effort involved in any results tracking they might have desired versus respondents exposed to the QOS scenario, where all tracking was automated.

The findings suggest avenues for future research. My work focuses on the initial presentation of a behavior modification program to consumers. More work is needed to see if quantification's motivation advantage is maintained long term. Additional work is also required to better understand why older consumers are less captivated by the promise of quantification. Further, while the casual model was found to be significant in both studies, there were a few differences that require further exploration. In both studies, the mediated path captured the large and positive impact of QOS on anticipated motivation. However, in both studies there was also a smaller remaining direct effect of quantification on anticipated motivation outside of the mediated path. While in the carbon footprint reduction context it was positive, in the fitness context it was negative, suggesting that there can be a partial negative impact of QOS in particular contexts. Also, while in the fitness context my predicted order of mediators was upheld, results

from the carbon reduction analysis suggested mediator order did not have a meaningful impact on model fit. More work is needed to understand these distinctions.

Future research can also explore how privacy concerns might impact consumer perceptions of QOS, since QOS involves highly personal data which could potentially be accessed by 3rd parties. On the other hand, research can also explore how consumers might want to share their quantified data, via group competitions and games, or via public bragging in social media forums (all of which is currently done), and how they might derive additional motivation from this sharing.

Incorporating quantification into consumer products is an exciting new development, and futurists expect the technology to radically advance in capability in the near future (Kelly, 2016). Marketers of products and services aimed at behavioral modification can benefit by taking greater advantage of quantification in their offerings. In such cases, the "quantification effect" can provide a rare "win-win-win" situation in which individuals experience greater success at personal goal attainment, society benefits from more positive behaviors (e.g. better public health) and the firms providing the products/services strengthen their bottom lines.

CHAPTER 3

ESSAY #2: QUANTIFICATION OF SELF IN THIRD-PARTY-ADMINISTERED WELLNESS PROGRAMS: THE IMPACT OF PERCEIVED SELF-EMPOWERMENT

3.1 Introduction

Judging by the successful uptake of numerous recently launched consumer products, many individuals appear to have an unquenchable thirst for information about themselves. Several market offerings introduced over the past few years, such as fitness wristband trackers (e.g. Fitbit®), Sleep Number Beds®, and Nest Thermostats®, provide users with frequent and highly-detailed information about themselves and their personal activities. The detailed tracking of oneself and one's routine activities via a systematic approach that results in quantified (numbers-based) output is commonly referred to as the "quantification of self" (QOS). QOS is often undertaken in pursuit of a personal behavior modification goal. While systemic self-observation is not a new phenomenon, current technology has allowed self-surveillance to become more comprehensive, more granular and more constant than was ever before possible (Hay, 2014; Kelly, 2016; Quart, 2013).

Past studies examining the impact of QOS, typically in the area of health and wellness, have found QOS to have a significant and positive impact in engaging users and motivating them toward self-regulatory goals (Cadmus-Bertram *et al*., 2015; Casey *et al*., 2014). However, these studies have taken place in self-directed environments, where

the participant him/herself is setting quantified goals and managing his/her own QOS activities, or is interacting in only a temporary context with study personnel. The impact of QOS has not yet been studied in wellness programs that are directed by a third party with whom the participant has an ongoing and significant relationship, such as an employer or health insurer. Third party administration of a wellness program involves the third party setting goals and overseeing the participant's progress in the program, which is typical for employer or insurer wellness programs. I test and show in this essay that self-directed QOS generates a higher interest in joining a wellness program and also generates greater anticipated intrinsic motivation (i.e. personal enjoyment and satisfaction) than a similar self-directed non-QOS program. However, when directed by certain third-parties these two benefits of QOS disappear.

I explore two potential reasons for this. The first is a loss in perceived self-empowerment. Previous research found QOS's boost in self-empowerment to be a key driver of its motivational impact in self-directed settings (Essay 1; Pettinco and Milne, 2017). Third party administration of a wellness program with a QOS component could negate this boost in perceived self-empowerment, particularly if the third party is viewed as power advantaged vis-s-vis the participant. As a result, interest in joining and expected intrinsic motivation can be diminished. A second potential reason is distrust regarding the use of QOS data. People are highly concerned about sharing personal information, particularly the type of detailed, individualized data generated by QOS. Hence, third party access to QOS data could diminish QOS's positive impact, particularly if there is lack of trust regarding the third party. I find significant support for the former reason but not the latter.

In addition, I propose, and find support, that while third party management of a wellness program with a QOS component reduces intrinsic motivation, when certain third parties are administering the program it can increase external regulation (i.e. doing something due to the demands or expected rewards from a third party). I presume this transitioning of motivation type is even more pronounced in a QOS (versus non-QOS) context, since QOS allows for more effective surveillance by the third party.

The purpose of this paper is to: 1) confirm that a self-directed QOS approach to a wellness program increases a user's interest in joining and anticipated intrinsic motivation (versus a similar non-QOS program), 2) test for an interaction effect between QOS (present or not) and type of program administration (self-directed versus third-party-directed) in a wellness program, which would result in a diminishing of the benefits of QOS in the context of third party administration, 3) test if third party administration of such a program transforms the type of motivation experienced, reducing intrinsic motivation and increasing external regulation, and 4) understand if perceptions of self-empowerment and/or distrust between the user and the program administrator are mediators of the differing impact of third party administration of wellness programs with a QOS component.

Growing numbers of products and programs are incorporating QOS features. Yet, research on this phenomenon is still fairly limited. The present research adds to our knowledge of QOS by identifying an important boundary condition, namely third party administration. This research explores potential underlying factors behind the boundary condition, namely the roles of perceived self-empowerment and trust. This research contributes to the literature on consumer empowerment and its impact on decision-

making. In addition, the managerial implications are numerous, given the growing use of QOS in wellness programs administered by employers, insurers and health care professionals. My work helps managers better understand a key barrier they may face in incorporating QOS in goal pursuit programs.

In the next section I provide more detail about different types of program administration along with industry background which supports the relevance of this research. I then review related literature, drawing principally from self-determination theory and writings on interpersonal power, and present my hypotheses. After this I describe the study, which was a 2 x 4 between subject experiment which presented wellness programs to a sample of 454 consumers, manipulating QOS (present or not) and type of administration (self-, doctor-, employer- or insurer-directed). Study results are then reviewed in detail, and insights from the study for both researchers and managers are discussed.

3.2 Third-Party Administration of Wellness Programs With a QOS Component

Individuals often direct themselves in wellness pursuits that have a significant QOS component. They generally buy their own QOS device (such as a Fitbit), set their own wellness goals and monitor their quantified results. While they may occasionally discuss their results with others, they do so on their own terms. I classify this as a self-directed approach. An alternative to this is third-party administration. Third-party administration means another individual or organization, such as a doctor, insurer or employer, manages two important functions in the process: 1) setting the wellness goals for the individual and 2) monitoring his/her quantified results. Such third-party

administered QOS programs are becoming increasingly common, as I discuss in the next section.

In response to rising health care costs, increasing numbers of employers and insurers are administering wellness programs to help improve the overall wellbeing of their employees and members (Kaiser Family Foundation, 2006 and 2013). However, employer- and insurer-directed wellness programs have long suffered from relatively low participation rates (Anderko, 2012). In an effort to entice more individuals to join, organizations have begun to incorporate QOS components into their wellness programs. Recently, BP, Bank of America, Time Warner, Target and other large corporations have distributed hundreds of thousands of Fitbit devices to their employees as part of their wellness programs (Farr, 2016). Even mid-sized companies are increasingly incorporating QOS elements into their wellness programs (Satariano, 2014), as are health insurance companies (Olson, 2014). A recently deployed marketing strategy for Fitbit involves partnering with companies to incorporate Fitbit tracking wristbands into their wellness programs (Farr, 2016; Satariano, 2014). Industry experts expect the number of employers and insurers incorporating QOS in their wellness programs to grow dramatically in the near future (Farr, 2016). These programs generally involve goal setting and monitoring by the employer or insurer, often with financial or other rewards for successful goal accomplishments.

Doctors have been somewhat slower to incorporate personal QOS devices into their interactions with patients, though that is beginning to change (Hernandez, 2014). Their initial hesitation was due to concerns about data accuracy as well as the added complexity it would bring to their practices. However, though still not commonplace,

increasing numbers of doctors see value in incorporating personal QOS devices into their patient care. Observers anticipate this trend to grow, particularly as the technology improves (Kelly, 2016).

3.3 Theoretical Framework and Hypotheses Development

A small number of experimental studies have been conducted to test the impact of a QOS approach to health and wellness. These studies have found QOS approaches, when compared to similar non-QOS alternatives, have a stronger impact on motivating users toward their goals over the course of the activity (Cadmus-Bertram *et al*., 2015; Casey *et al*., 2014). However, recent research by Etkin (2016) found that although QOS increases motivation, the act of quantified measurement can over time make the activity feel more like work and, as a result, possibly make the experience seem less enjoyable. This perception was measured after time was spent in an assigned activity, and not measured beforehand as an anticipated or expected reaction. Goal relevance was not factored into Etkin's research.

When focusing on initial reactions to QOS programs, recent research suggests QOS can generate significantly more anticipated motivation than a similar non-QOS alternative (Essay 1; Pettinico and Milne, 2017). The QOS advantage in anticipated motivation is derived from the value consumers see in the quantification, namely their expectations of greater meaningfulness in the granular feedback, enhanced ability to focus on goals and stronger sense of empowerment. The past research cited examined dependent variables of overall motivation, amount of goal-directed activity during the program and health outcomes. However, none looked at initial interest in joining a

program (a critical first step) or *type* of motivation anticipated. I will explore both of these issues in this paper, in self-directed and third-party contexts.

I hypothesize that upon initial review, a self-directed QOS wellness program will generate greater interest in joining than a similar non-QOS alternative. This is due to the added value that consumers perceive in quantification, as discussed above. Stated formally:

H1. Consumers will have greater interest in joining a self-directed QOS wellness program than a similar self-directed non-QOS program.

Motivation is a multidimensional construct. The concepts of intrinsic and extrinsic motivation are derived from self-determination theory (Deci, 1971; Deci and Ryan, 2000). Intrinsically motivated behaviors are those that are engaged in for the personal pleasure and satisfaction derived from the behavior itself. Extrinsic motivation is derived from forces apart from the behavior, such as financial rewards. External regulation, a type of extrinsic motivation, occurs when the impetus for the activity is concern for consequences (negative or positive) that can be imposed upon the individual by an authoritative third-party (Guay, Vallerand and Celine, 2000). External regulation generates the perception that something ought to/has to be done. According to self-determination theory, intrinsic motivation is more robust than any type of extrinsic motivation, because the former has more durability and is better able to withstand hardships encountered during a goal pursuit process (Deci and Ryan, 2000).

Similar to interest in joining, I hypothesize that upon initial review, a self-directed QOS wellness program will generate greater anticipated intrinsic motivation than a

similar non-QOS alternative. This is due to the added value that consumers perceive in quantification, as discussed earlier. Hence I hypothesize:

> H2. Consumers will have greater anticipated intrinsic motivation regarding a self-directed QOS wellness program versus a similar self-directed non-QOS program.

Since third parties with significant ongoing relationships with target participants, such as doctors, employers and insurers, are increasingly including QOS in wellness programs that they are implementing, it is important to understand what impact such third party administration might have on an individual's interest in joining a program. Power considerations play a critical role in relationships between individuals and organizations. According to the extensive literature on personal empowerment, individuals feel empowered when they believe they have control over their own choices, and have a sense of agency/autonomy regarding their life goals and activities (Labrecque *et al*. 2013; Rappaport, 1984; Wathieu *et al*. 2002). When individuals feel empowered, they experience a range of personal benefits, including more positive and less negative affect, higher self-esteem and greater assertiveness in their interactions (Anderson, John and Keltner, 2012; Keltner, Gruenfeld and Anderson, 2003).

Self-determination theory suggests that when people perceive an internal locus of control during a goal pursuit journey, they are more likely to derive personal enjoyment and satisfaction from that activity, and therefore more likely to remain adherent with the goal pursuit effort (Deci and Ryan, 1985 & 2000). Perceived self-empowerment has been found to play a critical role in sustaining motivation toward goal-directed behaviors in a variety of health and wellness contexts (Patrick and Hagtvedt, 2011).

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I expect third party management of a QOS wellness program causes the user to perceive the locus of control shifting from the individual to the third party. As a result, anticipated self-empowerment diminishes and there is less interest in joining the program.

H3. Consumers will have less interest in joining a QOS wellness program administered by a third party versus one that is self-directed.

As with interest in joining, I expect third party administration to impact motivation. According to self-determination theory, a personal feeling of autonomy is essential to intrinsically motivate an individual in a goal oriented pursuit (Deci and Ryan, 1985 & 2000). Due to the perceived power shift from oneself to the third party, one's sense of autonomy and self-empowerment diminishes and as a result there is less intrinsic motivation expected from the program. Hence, I propose:

H4. Consumers will have less anticipated intrinsic motivation regarding a QOS wellness program administered by a third party versus one that is self-directed.

A perceived loss of autonomy is more relevant in a QOS than non-QOS context. When individuals have access to greater amounts of information about themselves and their situations, they feel a heightened sense of personal empowerment (Nutbeam, 2008; Zimmerman and Rappaport, 1988). Perceived self-empowerment plays a critical role in the causal process behind the positive motivational impact of QOS. The self- and situational-awareness gained from QOS's detailed individual results, by reducing the unknown, imparts a greater personal sense of order and control to a goal pursuit journey

(Pettinico and Milne, 2017). This increased sense of personal empowerment, in turn, strengthens motivation toward the ultimate goal. As a result, I expect an interaction effect where third party administration has a significantly greater negative impact on the appeal of a QOS program than on a non-QOS program. I hypothesize:

H5. In wellness programs, there is an interaction between administration type and QOS. Type of administration will have a bigger impact on interest in joining for QOS programs compared to non-QOS programs.

As with interest in joining, I expect an interaction effect between QOS and administration type regarding anticipated intrinsic motivation. Specifically, I expect the QOS advantage in intrinsic motivation observed for self-directed wellness programs will be diminished for third-party administered programs.

H6. In wellness programs, there is an interaction between administration type and QOS such that the difference in intrinsic motivation between self-directed and third-party administered programs will be greater for QOS programs than non-QOS programs.

Following from the comments above, I suggest that the degree of empowerment a user feels while in a wellness program influences the predicted effects of third-party administration on interest in joining a QOS program. Stated formally:

H7. The effect of administration type on interest in joining a QOS wellness

program is mediated by the perceived degree of participant empowerment in the

program.

Acting in parallel to perceptions of empowerment, I propose that the degree of

trust a user feels while in a wellness program also influences the predicted effects of

third-party implementation on interest in joining a QOS program. Surveys show

widespread public concern regarding personal data privacy (Pew Research Center, 2014).

Trust in a third party is a significant factor in the level of comfort an individual has in

sharing personal information (Schoenbachler and Gordon, 2002). Further, recent

research has found that individuals place a particularly high degree of sensitivity on

personal information associated with behaviors, activities or choices versus static

descriptions/demographics (Milne et al., 2017). QOS in a wellness program involves the

generation of large amounts of detailed data relating to personal activities and behavior.

Sharing this granular data with third parties can be highly concerning, particularly if trust

in the third party is low. Employees have voiced concerns about the privacy implications

of QOS components in corporate wellness programs (Satariano 2014). Hence:

H8. The effect of administration type on interest in joining a QOS wellness

program is mediated by the participant's level of trust in how the QOS

information is being used.

While I expect intrinsic motivation to be diminished in QOS programs that are administered by third parties, I do not believe that all forms of motivation are lost in these cases. Rather, I suspect that when a QOS program is implemented by a third party, the anticipated motivation among individuals will be due to external regulation rather than intrinsic motivation. This is a common reaction to situations in which an authoritative entity is in charge of an activity (Guay, Vallerand and Celine, 2000). As suggested by self-determination theory, intrinsic and extrinsic motivation often move in opposing directions, as greater extrinsic motivation (of which external regulation is a subset) can subdue intrinsic motivation (Deci and Ryan, 1985 & 2000). Hence:

> H9. In QOS wellness programs, administration type will lead to differences in level of anticipated external regulation, which will be in an opposing pattern to the level of intrinsic motivation.

I suspect this impact to be even greater in a QOS versus non-QOS context, since QOS allows for greater surveillance by the third party, which leads to a perceived enhanced ability to regulate. Hence:

> H10. In wellness programs, there is an interaction between administration type and QOS such that the differences in anticipated external regulation across type of administration will be greater for QOS programs than non-QOS programs.

While I expect third party administered programs as a group to differ in interest in joining and motivation compared to self-directed programs, there are multiple third parties that currently play a role in the administration of QOS wellness programs. Given

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the novelty of this topic, I treat the question of differences across types of third parties as exploratory. Given my suppositions regarding the role power and trust play in impacting interest in joining and anticipated intrinsic motivation and the fact that third parties differ on these dimensions, I anticipate differences among third party types. Specifically, I expect, in a QOS context, interest in joining and anticipated intrinsic motivation will be rank ordered, and significantly different, from highest to lowest as follows: self-, doctor-, employer and insurer-directed, as trust and feelings of empowerment should similarity decrease in this order. For external regulation I would expect the opposite order.

3.4 Methods

A 2 x 4 between-subjects experiment manipulating QOS (QOS versus non- QOS wellness program) and program administration type (directed by self, doctor, employer or insurer) was used to test my hypotheses. I collected responses via an online survey of American consumers drawn from a national consumer panel. To reflect the type of consumer likely to be in an employer, insurer or doctor-administered program, respondents were screened to be aged 22 to 59, employed by a company with 30+ people, had health insurance, saw a primary care doctor at least once every two years, and were capable of doing light exercises. To qualify, respondents also had to rate living a healthy lifestyle as at least moderately important to them (this factors in goal relevance). Attention checks were utilized in the survey and only respondents who passed all checks were included in the analysis. The 454 respondents who satisfactorily completed the survey were 54.7% female. Thirty percent (30.2%) were age 22 to 29, 37.9% age 30 to 39, 19.2% age 40 to 49 and 12.8% age 50 to 59.

Survey respondents were informed that they would see a brief description of a wellness program and then were randomly assigned to one of the eight conditions. All scenarios contained the same program outline, which involved six months of moderate exercise, increased daily movement and healthier eating. The programs differed in either QOS or non-QOS tracking and in the type of administration. The QOS scenarios reflected the tracking functionality available with biometric fitness trackers, and showed a wristband and results dashboard (all de-branded) and emphasized detailed goals and granular daily tracking of personal fitness activities. The non-quantified scenarios emphasized general goals and high-level, less granular tracking of personal fitness activities.

Four types of program administration were tested, with scenarios developed to reflect real-world program features. The four program types: 1) self-directed, with guidance from a fitness professional supplied by the program; however the user makes all goals and program decisions and results are private, 2) directed by the respondent's primary care doctor, with goals and activities set by the doctor and results shared with doctor, 3) directed by the respondent's employer, with goals and activities set by a fitness professional working for the employer and results shared with the fitness professional and employer, and 4) directed by the respondent's health insurer, with goals and activities set by a fitness professional working for the insurer and results shared with the fitness professional and insurer. Scenarios for the employer and insurer condition stated that a "fitness professional" at the employer or insurer would manage the program to minimize any assumptions about lack of expertise. The self-directed scenario also stated that a "fitness professional" from the program would provide guidance, to equalize expertise,

though it was emphasized that the user him/herself had final say on all goals and activities. In the doctor scenario, the doctor served as the health and fitness expert (scenarios in Appendix A).

After viewing the scenario, manipulation checks were administered (discussed in next section). Respondents then answered several multi-item, 7-point scales to gauge their reaction to the scenarios. Three scales were utilized: interest in joining the program (4 items, α = .928), anticipated self-empowerment in the program (3 items, α = .930 – scale repeated from Pettinico and Milne, 2017) and trust in how the program handles personal information (4 items, α = .982). Two additional scales were adapted from Guay, Vallerand and Blanchard (2000): anticipated intrinsic motivation (enjoyment) (3 items, α = .898) and anticipated external regulation (3 items, α = .870). See Appendix B for scale details.

A t-test measured differences in the degree of quantified self-data perceived in the QOS versus non-QOS scenarios *("How would you describe the level of detail of the day-to-day personal health and fitness activity results supplied ... 1 = not detailed at all ... 7 = very detailed")*. The QOS scenarios scored significantly higher than the non-QOS scenarios (M_{QOS} = 6.1, $M_{Not-QOS}$ = 3.6, t = 20.56, p < .001). As an attention check, respondents had to recall the program administrator after viewing the scenario. Those who did not correctly select the program administrator from a list (109 individuals or 19.4% of the original sample of 563) were not included in the analysis.

3.5 Results

My first set of analyses were conducted among only those exposed to the self-directed scenarios (n = 121). Since interest in joining and anticipated intrinsic motivation have a moderately strong correlation among these respondents (Pearson's r = .778; p<.001), I conducted a MANOVA with these two dependent variables. QOS was the sole factor. The results were significant (Wilks' Lambda=.770; F=117.00; p<.001). Simple contrast was conducted for each variable. The results for interest in joining were significant (M_{QOS}=5.82, $M_{Non-QOS}$=4.43, t=5.92, p<.001, CI: 0.81 to 1.98), supporting H1. The results for anticipated intrinsic motivation were also significant (M_{QOS}=5.54, $M_{Non-QOS}$=4.35, t=4.63, p<.001, CI: 0.54 to 1.81), supporting H2.

This analysis includes only respondents exposed to a QOS scenario (n = 230). The two dependent variables, namely interest in joining and anticipated intrinsic motivation, are highly correlated among this sample (r = .864, p<.001). I conducted a MANOVA with these two dependent variables. Administration type (self or 3rd party – which combined doctor, employer and insurer) is the sole factor. The MANOVA results were significant (Wilks' Lambda=.867; F=17.29; p<.001). Simple contrast was conducted for each variable. The results for interest in joining were significant (M_{self}=5.82, $M_{3rd-party}$=4.42, t=5.85, p<.001, CI: 0.81 to 2.00), supporting H3. The results for anticipated intrinsic motivation were also significant (M_{self}=5.54, $M_{3rd-party}$=4.51, t=4.59, p<.001, CI: 0.48 to 1.58), supporting H4.

The next set of analyses involves the full sample. There are three dependent variables of interest among the full sample: interest in joining, anticipated intrinsic motivation and anticipated external regulation. Interest in joining and anticipated intrinsic motivation have a strong positive correlation (Pearson's r = .883; p<.001);

interest in joining and anticipated external regulation have a moderate, negative

correlation (Pearson's r = -.521; p<.001); and the same is true for anticipated intrinsic

motivation and anticipated external regulation (Pearson's r = -.449; p<.001). Due to

these correlations, I conducted a MANOVA with these three dependent variables. Two

factors were included: the presence of QOS in the program (present or not) and

administration type (self or 3rd party – which combined doctor, employer and insurer).

The MANOVA results showed a significant main effect for QOS (Wilks' Lambda=.924;

F=12.09; p<.001), and a significant main effect for administration type (Wilks'

Lambda=.788; F=12.23; p<.001). Results were also significant for the interaction

between the two (Wilks' Lambda=.936; F=3.26; p<.01).

The results show significant main effects for QOS on interest in joining

(M_{QOS}=4.79, $M_{Non-QOS}$=4.28, t=4.41, p<.001, CI: 0.28 to 1.28) and anticipated intrinsic

motivation (M_{QOS}=4.78, $M_{Non-QOS}$=4.32, t=4.01, p<.001, CI: 0.20 to 1.16). Results also

show a significant main effect for administration type on interest in joining (M_{self}=5.14,

$M_{3rdParty}$=4.28, t=4.50, p<.001, CI: 0.30 to 1.30) and anticipated intrinsic motivation

(M_{self}=4.95, $M_{3rdParty}$=4.41, t=3.15, p<.01, CI: 0.06 to 1.02). Results show a significant

interaction between administration type and QOS for both interest in joining (t=3.34,

p<.001CI: 0.19 to 2.2) and anticipated intrinsic motivation (t=2.83, p<.01, CI: 0.01 to

1.92), providing support for both H5 and H6, respectively. To tests the nature of the

interactions hypothesized in H5 and H6, I ran separate ANOVAs for the QOS and non-

QOS conditions. These results are reviewed in the next section.

Among respondents exposed to the QOS scenarios (n = 230), an ANOVA was

conducted with interest in joining as the dependent variable and administration type (all 4

levels individually – self, doctor, employer and insurer) as the factor. The results were significant (F = 21.25, p<.001). Post hoc Bonferroni analysis shows that self-directed is significantly higher on interest in joining than employer- and insurer-administered, but is not significant higher than doctor-administered. Doctor-administered is significantly higher than employer- and insurer-administered. There is no significant difference between employer or insurer-administered. See figure 3.1.

A similar ANOVA was conducted with anticipated intrinsic motivation as the dependent variable and administration type (all 4 levels) as the factor. This was also conducted among the QOS-only groups. The results were significant (F = 9.16, p<.001). Post hoc Bonferroni analysis shows that self-directed is significantly higher on anticipated intrinsic motivation than employer- and insurer-administered, but is not significant higher than doctor-administered. Doctor-administered is not significantly different from any condition. There is no significant difference between employer or insurer-administered. See figure 3.1.

I then analyzed outcomes among the non-QOS scenarios (n=224). Among these respondents, I conducted an ANOVA with likelihood to join as the dependent variable and administration type as the factor. Results were not significant (M_{self}=4.43, M_{dr}=4.45, $M_{employer}$=4.26, $M_{insurer}$=3.93, F=1.07, p=.363). A similar ANOVA was conducted among the non-QOS scenarios with intrinsic motivation as the dependent variable, and again the results were not significant (M_{self}=4.35, M_{dr}=4.14, $M_{employer}$=4.50, $M_{insurer}$=4.29, F=0.455, p=.714). This is distinct from the ANOVAs among the QOS scenarios (shown earlier) where differences across administration type were significant. See figure 3.1.

Figure 4: QOS impact across four admin types
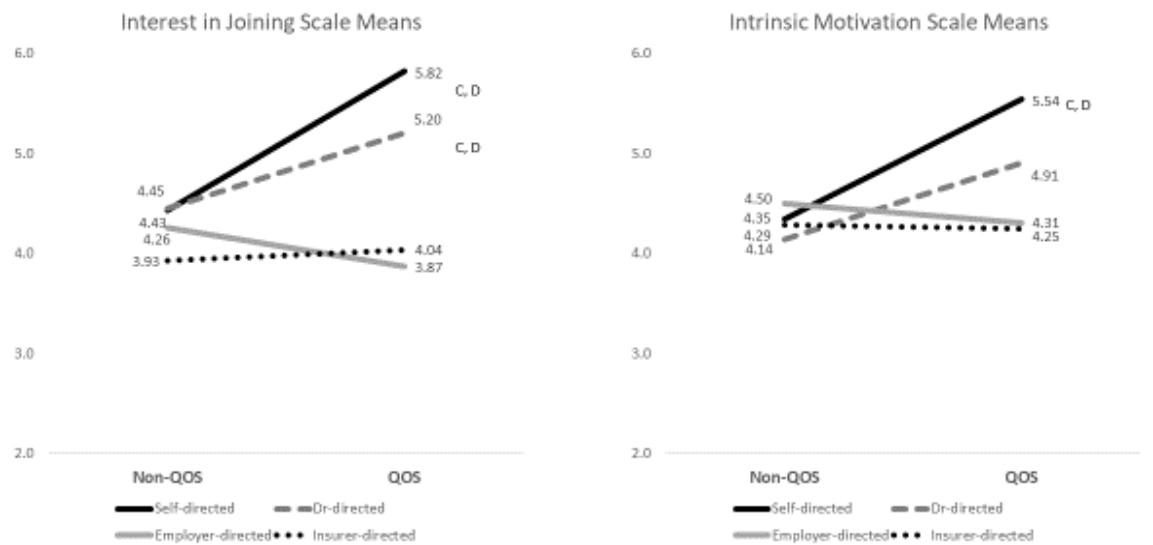
Note: lettering denotes results from Bonferroni post-hoc analysis, showing significantly higher than. Significance at p<.05. A = significantly higher than self-directed; B = significantly higher than Dr-directed; C = significantly higher than employer-directed; D = significantly higher than insurer-directed

Consistent with practice, my scenarios varied the extent to which individuals vs. a third party controlled the program and with whom the data was shared. These elements reflect differences in both power and trust. I hypothesized that differences in interest in joining between self-directed and third-party directed programs could occur due to differences in power and/or trust inherent in these administration types. Self vs. third-party programs differ in terms of who controls the program activities and goal setting (power) and QOS data is either shared with no one (self-directed scenario) or third parties (third party scenarios), reflecting both a power and a trust element. To test this underlying theory mechanism, I conducted a mediation analysis utilizing PROCESS Mediation Model 4, version 2.16.1 (Hayes, 2013; Preacher and Hayes, 2004). The

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analysis was conducted among only those exposed to a QOS scenario. The tested model

used administration type (self, doctor, employer, insurer) as the independent variable,

which was identified as multicategorical with the self-directed condition as the reference

group.   Interest in joining was the dependent variable. I ran the model first with

perceived empowerment in the program as the mediator. Per Hayes (2013), I applied a

bootstrapping approach and derived confidence intervals for effects on the basis of 5,000

resamples. The results indicated that the mediation model is significant with a 95% CI

excluding zero for all three comparisons (Dr vs. self: CI: -0.930 to -0.226; employer vs

self: CI: -1.994 to -1.043; insurer vs self: CI -1.933 to -1.063). The model is fully

mediated in the doctor and insurer cases, and partly mediated in the employer case.

Hence H7 is supported. See figure 3.2.

Figure 5: Mediation model with empowerment as mediator

Administration Type (4 levels)

Dr vs. Self: b = -0.741**
Employer vs. Self: b = -1.977***
Insurer vs. Self: b = -1.969***

Perceived Empowerment in the Program

b = +0.753***

Interest in Joining

Dr vs. Self: NS
Employer vs. Self: b = -0.463*
Insurer vs. Self: NS

*** p< .001; ** p< .01; *p< .05;   NS = not significant at p< .05 level
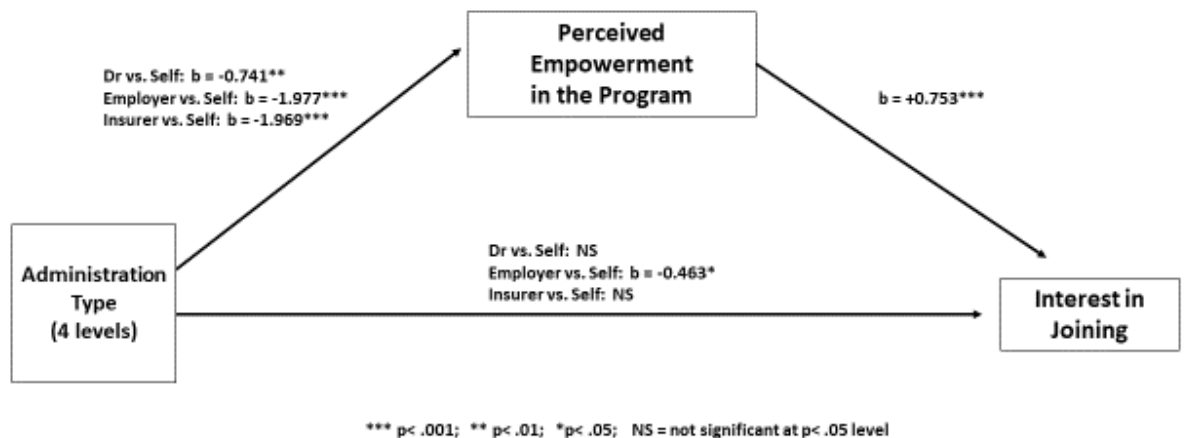
I then repeated the analysis with trust in the program as the mediator (PROCESS does not allow two simultaneous mediators with a categorical I.V.). The results showed an insignificant mediation model at the 95% confidence level for all three comparisons (Dr vs. self: CI: -0.1275 to +0.3767; employer vs self: CI: -0.7296 to +0.2921; insurer vs self: CI: -1.249 to +0.492). Hence, H8 is not supported.

Recall the MANOVA results shown earlier in this essay that included external regulation, interest in joining and anticipated intrinsic motivation as dependent variables. The MANOVA results were significant for the main effect of QOS, the main effect of administration type and the interaction between the two. Results of simple contrasts show no significant main effect of QOS on external regulation, as judged by the confidence interval ($M_{QOS}=3.46$, $M_{Non-QOS}=3.06$, t = -2.22, p<.05, CI: -0.90 to 0.11). Results show a significant main effect of administration type on external regulation ($M_{self}=2.46$, $M_{3rd-party}=3.58$, t = -6.16, p<.001, CI: -1.61 to -0.60). The interaction effect between QOS and administration type on external regulation is not significant (t=0.20, p = .84, CI: -0.94 to 1.08). Hence, H10 is not supported.

I then examined results among only participants exposed to the QOS scenarios. An ANOVA was conducted among these participants, with anticipated external regulation as the dependent variable and administration type (4 levels) as the factor. Results were significant ($M_{self}=2.63$, $M_{dr}=3.23$, $M_{employer}=4.41$, $M_{insurer}=3.74$, F=12.62, p<.001). Post hoc Bonferroni analysis of these results and also of the similar ANOVA with intrinsic motivation as the dependent variable are shown in figure 1. Intrinsic motivation and external regulation motivation move in roughly opposite directions, with the self-directed condition significantly higher than employer- or insurer-directed

conditions on intrinsic motivation, but the opposite is true for external regulation.

However, external regulation has an unexpected pattern with employer-directed

directionally higher than insurer-directed, and employer-directed significantly higher than

doctor-directed, while insurer-directed was not. Hence, H9 is partly supported. See

figure 3.3.

Figure 6: Intrinsic motivation and external regulation compared

Note: lettering denotes results from Bonferroni post-hoc analysis, showing significantly higher than. Significance at p<.05. A = significantly higher than self-directed; B = significantly higher than Dr-directed; C = significantly higher than employer-directed; D = significantly higher than insurer-directed
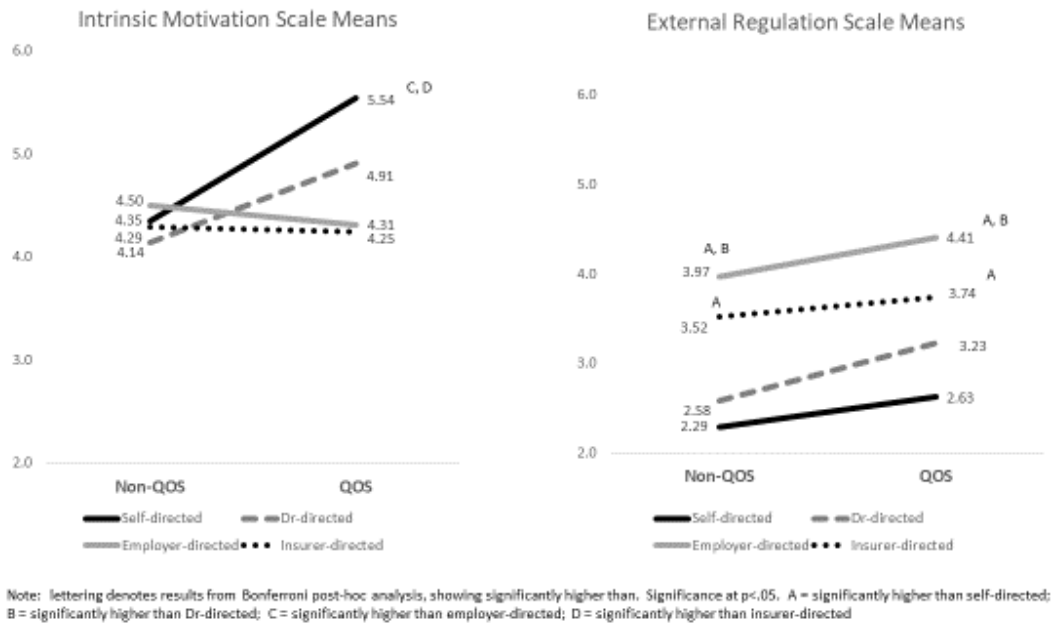
3.6 General Discussion

This research adds to the small but growing literature on the quantification of self

and its impact on goal pursuit attitudes and behaviors. My results found that QOS, in a

self-directed context, achieves higher interest in joining a wellness program and higher

anticipated intrinsic motivation in that program versus a similar non-QOS approach.

However, this research also identifies a significant boundary condition to this effect. When wellness programs are administered by certain third parties, these benefits of QOS are fully negated. Wellness programs with a QOS component administered by an employer or insurer generate significantly lower interest in joining and significantly lower anticipated intrinsic motivation than do QOS programs that are self-directed or administered by one's doctor. Further, QOS-based wellness programs administered by an employer or insurer have no advantage over similarly-administered non-QOS-based wellness programs (see Table 3.1 for a summary of our hypotheses and outcomes). In these third party contexts the benefits of QOS disappear completely.

Table 2: Essay 2 hypotheses summary

Hypotheses	Supported or not
QOS impact in a self-directed context	
H1. Consumers will have greater interest in joining a self-directed QOS wellness program than a similar self-directed non-QOS program.	Supported
H2. Consumers will have greater anticipated intrinsic motivation regarding a self-directed QOS wellness program versus a similar self-directed non-QOS program.	Supported
The effect of administration type in a QOS context	
H3: Consumers will have less interest in joining a QOS wellness program administered by a third party versus one that is self-directed.	Supported
H4: Consumers will have less anticipated intrinsic motivation regarding a QOS wellness program administered by a third party versus one that is self-directed.	Supported
Interaction of QOS and administration type	
H5. In wellness programs, there is an interaction between administration type and QOS such that differences in interest in joining across type of administration will be greater for QOS programs than non-QOS programs.	Supported
H6. In wellness programs, there is an interaction between administration type and QOS such that the differences in intrinsic motivation across type of administration will be greater for QOS programs than non-QOS programs.	Supported

Mediation effects – personal empowerment and trust

H7. The effect of administration type on interest in joining a QOS wellness program is mediated by perceived degree of participant empowerment in the program.	Supported
H8. The effect of administration type on interest in joining a QOS wellness program is mediated by the participant's level of trust in how the QOS information is being used.	Not Supported

QOS, administration type and external regulation

H9. In QOS wellness programs, administration type will lead to differences in level of anticipated external regulation, which will be in an opposing pattern to the level of intrinsic motivation.	Partial support
H10. In wellness programs, there is an interaction between administration type and QOS such that the differences in external regulation across type of administration will be greater for QOS programs than non-QOS programs.	Not Supported

This research uncovered perceived self-empowerment in the program as the mediator between administration type and interest in joining. The less self-empowered one believes he/she will be in a wellness program due to the type of administration, the less likely he/she will be to join. Interestingly, QOS appears to exacerbate the sense of decreased self-empowerment in third-party contexts. I propose this is due to the heightened power that the QOS approach, with its detailed and constant focus on individual behaviors and related goals, appears to endow to the third party. This is an insightful contribution to the consumer empowerment literature.

Within a QOS environment, I found external regulation motivation generally increases with third party involvement as intrinsic motivation decreases. Further, external regulation was found in this study to be negatively correlated with interest in joining. Self-directed and doctor-directed programs are both relatively high in intrinsic motivation and low in external regulation. The employer-directed scenario appears to

generate the highest level of external regulation (significantly higher than self or doctor), while the insurer-directed scenario was slightly less strong (only significantly higher than self-directed). However, on intrinsic motivation employer- and insurer-directed programs are equally low.

Thus, my research contributes to an increased understanding of the benefits and limits of QOS programs and provides guidance to how best administer wellness programs in a variety of contexts. My research also identifies the underlying mechanism by which administration type influences decisions to join wellness programs, thus providing insight into how one might mitigate negatives.

Improving public health is a worthwhile goal, particularly given the fact that the current health of Americans is far from optimal, with roughly one third of American adults obese and another one-third overweight (World Health Organization, 2010). Wellness programs with a QOS component can be part of the solution, but only if people are willing to join them. This research serves as a warning to employers and insurers that simply adding QOS components to wellness programs will likely not solve the problem of low employee/member enrollment. Employers and insurers are encouraged to test augmentations to QOS-based wellness programs to help boost perception of participant power, such as greater participant control in customizing their own eating/exercise activities and goals. Greater financial incentives should also be tested, though they may serve to bolster extrinsic motivation to a greater degree than the more impactful intrinsic motivation.

There are limitations to this research which suggest opportunities for future work. It would be worthwhile to test a variety of different augmentations to wellness programs

to: 1) help boost perceived self-empowerment (such as greater control over program features), 2) supply external rewards such as financial incentives, an extra vacation day or social recognition (such as name on an internal company website for successful program completion) or 3) increase the transparency of how the third parties create goals and utilize the resulting data.

My research found that perceived self-empowerment is a key driver behind the varying levels of interest in joining a wellness program, and this is impacted by type of third-party administration. Further research is needed to fully decipher the impact of third-party control of program activities/goals and the sharing of QOS data with third-parties, both of which can potentially play a role in diminishing a participant's sense of self-empowerment, even if the individuals has a strong degree of trust in the third party's use of that data.

There is certainly value in health and wellness programs administered by well-intentioned third parties. My research alerts these parties, particularly employers and insurers, that adding a QOS component to such a program is less straightforward than they might have assumed, and that perceptions of losing self-empowerment in the program can diminish the otherwise positive impact of QOS. I hope these results to not discourage efforts to incorporate QOS into wellness programs, but rather enlighten and spur those managing the programs to make the extra effort needed to minimize this barrier.

CHAPTER 4

ESSAY 3: GAMIFICATION AS A MARKETING TECHNIQUE:
OPPORTUNITIES AND LIMITATIONS FOR BUILDING CUSTOMER
ENGAGEMENT

4.1 Introduction

Game playing is an integral part of the human experience. There is evidence of
games being played in prehistoric societies, and games are present today in every human
culture on earth (McGonigal 2011). From board games to video games to sports, game
playing can be extremely effective at capturing the attention of participants, fully
immersing them in an activity and generating intense emotional involvement.

Gamification is defined as "The use of game design elements to enhance non-
game goods and services by increasing customer value and encouraging value-creating
behaviors such as increased consumption, greater loyalty, engagement and product
advocacy." (Hofacker et al. 2016, p 26). Gamification is not entirely new in marketing.
McDonald's launched its "McDonald's Monopoly" game in the 1980s and has
implemented it on and off ever since. However, there appears to be a new impetus
behind gamification in marketing, partly driven by technology that is making it easier to
do even more in this area. Marketers are increasingly incorporating game elements into
their products, services and marketing tactics in an effort to strengthen customer
engagement. Recent examples of this include the Zombie Run fitness app, Vail's

EpicMix, America's Army online game, United Airlines' Team Challenge, Heineken's Star Player game, Audi A4 Quattro Experience, and advergames, to name only a few.

There is no universally agreed upon list of game design elements. However, a review of the literature suggests six common components of game design: 1) rules (structure for winning and losing), 2) narrative (story or backdrop), 3) personal challenge (testing one's ability), 4) scoring/ranks (sense of achievement and competition), 5) chance (unexpected element) and 6) social interaction (Blohm and Leimeister, 2013; Seaborn and Fels, 2015; Schell, 2008; Hofacker *et al*., 2016; Zichermann and Linder, 2010, p. 199; Deterding *et al*., 2011; Hamari and Koivisto, 2013). All six components do not have to be present for an activity to be considered gamified. However, scholars suggest that the more game elements present and/or the more central the game elements are to the activity, the more appropriate it is to call it a gamified activity (Seaborn and Fels, 2015).

Consider a traditional customer loyalty program, administered via a smart phone app, where a consumer accumulates rewards for repeated visits to a coffee shop. The program can be gamified as follows. Rather than get a standard discount per visit, the consumer can spin a wheel on her phone that tells her how large her discount is for that visit, possibly getting a lot more or a lot less than she would normally get (a chance element). Or, a discount per visit can be determined by a puzzle she completes on her phone during a free moment any point before the visit – the more successful she is in that challenge, the more reward points she gets for that visit (a personal challenge element). She can also opt into a team event, where a group of her friends/family form a team and compete against other teams on earliest-in-the-day visit or most success at the word

puzzle challenges (scoring and social elements). Also, a narrative can be created, such as the program can be set up so the consumer, via visuals on her smart phone, is not simply accumulating points but instead trekking through an imaginary land called "Coffeetopia," winning various "treasures" that translate into real-world discounts.

Proponents of gamification have suggested that adding game elements can increase users' emotional attachment to an activity (Burke 2014). In the previous example, it is proposed that the consumer would enjoy the act of using the loyalty program more (versus a standard loyalty program) due to its gamification, and become more emotionally engaged in the activity than would be the case with a non-gamified loyalty program.

While there is significant interest among practitioners in the possibilities of gamification as a marketing technique, there is also cause for caution. Current gamified marketing tactics are often based on skill-based competitions or chance. Previous research suggests not all individuals react with equal enthusiasm to such conditions. Regarding competitions, research has found that some individuals are inherently attracted to competitive situations while others prefer to avoid them, due to the personal characteristic of innate competitiveness (Murayama and Elliot, 2012). Regarding chance-based activities, past research has found widely divergent risk-orientations in individuals, and as a result individuals have highly differing levels of interest in chance-based activities (Bromily and Curley, 1992). Due to these innate individual characteristics, gamification as a marketing technique is likely not equally effective on all consumers. There may also be differences by context. Gamification may seem more appropriate and appealing to consumers in hedonic contexts versus utilitarian contexts, since hedonic

contexts are more related to the fun and pleasure of the experience itself, while utilitarian contexts are more related to fulfilling practical needs (Hirschman and Holbrook, 1982).

This essay will explore the use of gamification in marketing contexts, with three areas of inquiry. First, I will gauge gamification's impact on the gamified marketing activity itself. Does gamification increase interest in participating in and enjoyment of the activity? Does it increase emotional attachment to the activity? Second, I will explore potential spillover benefits for the brand associated with the activity. Does a gamified activity that is associated with a brand bolster emotional attachment to the brand? Third, I will gauge potential moderators of gamification's appeal. How does an individual's innate competitiveness and innate propensity for risk play a role in modifying the impact of gamification? Does context, hedonic versus utilitarian, play a moderating role?

There has been limited empirical research on the effects of gamification in marketing contexts, and scholars have recently issued calls for more investigation of the topic (Searborn and Fels, 2015; Hildebrand *et al*., 2014). This essay provides a foundation of empirical knowledge to help build theory regarding the opportunities and limitations of gamification in building customer engagement with marketing activities and, further, with brands themselves. My hypotheses are based in large part on self-determination theory, and the role of intrinsic motivation (personal enjoyment) and how that impacts the manner in which an individual experiences an activity. Emotional attachment is a key construct in marketing today, particularly regarding building consumer relationships with brands (Thomson, MacInnis and Park, 2005). This research

adds to the literature on building emotional attachment between customers and brands by testing if gamification can play a role in this process.

There are numerous managerial implications to be drawn from this research. Brand managers are looking for ways to build customers' involvement and emotional engagement with marketing activities and with brands. This research shows that gamification can be somewhat successful at doing this, though the research also identifies significant limitations of gamification in this regard. This research helps marketing managers understand the types of customers for whom gamification is most, and least, effective, as well as suggests what situational factors may impact the effectiveness of gamification.

4.2 Theoretical Framework and Hypotheses Development

There are a handful of recently-published conceptual articles that describe the concept of gamification, offering a definition of it, a review of individual game elements and the theoretical underpinnings, which are heavily based on self-determination theory and its focus on enjoyment and intrinsic motivation (Hofacker *et al*., 2016; Seaborn and Fels, 2015). A significant amount of previous empirical research in this area focused on advergames, which are custom-built on-line games with the core purpose of advertising a product. These studies found advergames to be an effective way of engaging consumers, holding their attention longer than traditional advertising (Terlutter and Capella, 2013), able to elicit affective responses in children (van Reijmersdal, Rozendaal and Buijzen, 2012), and able to influence product preferences (Kou and Rice, 2015). Qualitative

research on gamification tactics in marketing, beyond advergames, found that

gamification has the ability to strengthen consumer engagement with the activity (Lounis,

Neratzouli and Pramatari, 2013). A survey study found the impact of gamification can

decline over time, as the novelty wears off (Koivisto and Hamari, 2014). Recently,

gamification was found to be successful in effectively communicating product

information by increasing consumer's playfulness while they absorb the information, and

also enhancing the vividness of the information (Muller-Stewens *et al*., 2017).

Self-determination theory emphasizes the distinction between intrinsic and

extrinsic motivation (Deci, 1971; Ryan and Deci, 2000). Intrinsic motivation occurs

when an activity itself is so personally enjoyable and satisfying that the individual wishes

to continue doing it, regardless of any external rewards. Extrinsic motivation, on the

other hand, occurs when the motivation comes not from the activity itself but from forces

that are external to the activity, such as financial rewards or pressure from an authority

figure. According to self-determination theory, intrinsic motivation is more durable than

extrinsic motivation because the former is able to continue to effectively motivate

individuals through long or difficult tasks during which extrinsic motivation may lose its

effectiveness (Deci and Ryan, 1985). For marketers, an additional benefit of finding

ways to intrinsically motivate customers to participate in a consumer activity is that it

could lessen the reliance on costly financial rewards such as discounts and coupons to

keep consumers involved.

Scholars suggest that well-designed gamification should increase the intrinsic

motivation experienced in an activity, because games are inherently enjoyable. The

enjoyment derived from games comes from the thrill and excitement that a game environment adds to an activity, by providing a structure and atmosphere that helps get participants more deeply involved (Werbach and Hunter, 2012; Nicholson, 2012). Additionally, according to self-determination theory, humans have an innate psychological need to experience and express their competence (Deci and Ryan, 1985; Ryan and Deci, 2000). Challenging oneself in a game environment provides individuals the opportunity to experience the sensation of skill development and competence expression. Research on video games has found that competence expression is a significant driver regarding why individuals play video games, and has a significant role in the enjoyment experienced and likelihood of future play (Przybylski, Rigby and Ryan, 2010). Research on gamification in education settings has found an increase in student enjoyment and satisfaction due to gamified classroom activities (Hong *et al*., 2009; Howard–Jones *et al*., 2010 & 2011; Robinson, 2007; Schell, 2008).

Building upon this literature, I hypothesize:

H1: Consumers will have greater interest in participating in a gamified marketing activity compared to a similar non-gamified one.

H2: Consumers will anticipate greater enjoyment from participating in a gamified marketing activity compared to a similar non-gamified one.

Humans have an innate need to form emotional attachments to other people and even to inanimate objects, which can include purchased products and brands (Ainsworth *et al*., 1978; Bowlby, 1979; Schouten and McAlexander, 1995; Shimp and Madden,

1988). Slater (2000) has found evidence of a variety of emotions, including love, towards brands such as Coke and Hallmark. Research suggests there are three components of emotional attachment: affection (feeling of friendship and love), passion (feeling of captivation) and connection (feeling a bond or attachment) (Thomson, MacInnis and Park, 2005). A core aim of marketing today is to strengthen consumers' emotional attachment to their brands, since it is expected that stronger emotional ties will lead to meaningful benefits for the firm, such as greater loyalty and a willingness to pay price premiums for brand products and services (Thomson, MacInnis and Park, 2005).

It has been suggested that gamification creates increased emotional attachment to the game activity among users, by getting individuals more personally engaged (Burke, 2014), though empirical research to support this is lacking. Gamification incorporates scores, rankings and/or an ultimate win or loss into an activity. As a result, individuals devote more focus and attention to the activity. Individuals also derive more fun and enjoyment from a gamified activity, which increases emotional engagement. Observers note the intense emotional engagement individuals demonstrate when playing video games (Przybylski, Rigby and Ryan, 2010). Research using electro-dermal activity measurement found educational games increased the affective response in players (Howard-Jones and Demetriou, 2008). Hence, I hypothesize:

H3: Consumers will experience greater emotional attachment (all three components) to a gamified marketing activity than to a similar non-gamified one.

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I use the term "gamification effect" to capture the three hypothesized benefits, namely that adding game components to a consumer activity increases the interest in joining (H1), enjoyment experienced (H2), and emotional engagement (H3) regarding the activity.

While I have hypothesized benefits for the gamified activity itself, perhaps a more important question for marketing strategy is what benefits does gamification offer to a brand? Can gamified consumer activities help build stronger attachment to brands themselves? I propose that via the mechanics of affect transfer, the positive feelings and emotional engagement associated with the gamified marketing activity will transfer to the brand as well. Affect transfer occurs when a stimulus arouses an affective response, and that stimulus is then meaningfully paired with a second stimulus. Subjects become aware of the contingency relationship between the two stimuli and the generated affect transfers from the original stimulus to the second. The success of affect transfer has been supported in various market contexts (Kim, Lim and Bhargava, 1998; Van Reijmersdal, Rozendaal and Buijzen, 2012; Grigorovici and Constantin, 2004; Raney *et al*., 2003). In this way, gamifying branded marketing activities will ultimately strengthen the consumer's relationship with the brand itself. Following the logic of affect transfer, I also propose that the heightened emotional attachment engendered by the gamified activity will transfer to heightened emotional engagement with the brand itself. Stated formally:

H4. Consumers will experience greater emotional attachment to a brand associated with a gamified marketing activity versus a brand associated with a similar non-gamified one.

I use the term "gamification brand spillover" to capture this hypothesized spillover benefit of increased emotional attachment to the brand (H4).

Gamified marketing activities often include competitive elements, where a consumer is competing against other consumers or against program-created objectives based on personal skills or abilities. Competitive elements generally include features such as scoring, rankings, leaderboards and winning and losing. For example, Vail's EpicMix (a branded online consumer community and associated phone app) allows visitors to any of Vail's resorts to compete with other visitors on several personal activity metrics, such as most distance skied/snowboarded per visit. United Airlines Team Challenge allowed groups of travelers to form teams and compete with other groups of travelers for most miles flown. However, past research suggests not all individuals are equally attracted to competitive situations. People vary significantly in their level of innate competitiveness, with some individuals enthusiastic about opportunities for competition while others prefer to avoid such situations (Smither and Houston, 1992). In a meta-analysis conducted in 2012, Murayama and Elliot propose what they term the "opposing processes model of competition and performance." Murayama and Elliot argue that competitive situations will lead to "performance-approach goals" in individuals who

are naturally predisposed to competition, which result in greater eagerness, task-absorption, and persistence. However, for individuals who are not predisposed, competition leads to "performance-avoidance goals," which result in worry, task-distraction, self-handicapping and ultimately inferior performance. This is driven by innate competitiveness. Hence, I hypothesize:

H5. Consumers who have greater innate competitiveness will experience a larger impact from competition-based gamification in the areas expressed in H1 through H4 versus consumers with less innate competitiveness.

Gamified marketing activities often include chance elements. For example, McDonald's Monopoly Game has a scratch off component where prizes vary randomly. Including an element of chance brings with it a sense of risk for the consumer – the rewards can vary substantially and the consumer has no control over this. Past research has found that individuals differ significantly in their propensity for risk (Bromiley and Curly, 1992). While some find thrill in risk taking, others prefer to avoid risk and opt for the stable and known. Differences in innate risk tolerance have long been viewed as a significant factor in the variation seen across consumer financial decision-making (Lucarelli and Brighetti, 2011). I expect innate risk tolerance to be a significant moderating force in consumers' interest in gamified marketing activities with a substantial chance element. Stated formally:

H6.   Consumers who have greater innate propensity for risk will experience a larger

impact from chance-based gamification in the areas expressed in H1 through H4

versus consumers with a lower propensity for risk.

I propose that context, namely a hedonic versus utilitarian setting, moderates the

influence of gamification. Hedonic purchases and activities are those motivated by the

desire for fun and pleasure, with a greater emphasis on the experience, while utilitarian

purchases and activities are those motivated by more practical needs, with a greater

emphasis on the functional results. An extensive literature has found hedonic versus

utilitarian components of the consumer experience to be significant factors in many

consumer behaviors (Hirschman and Holbrook, 1982; Khan, Dhar and Wertenbach 2005;

Kivetz and Simonson, 2002, Kivetz and Zang, 2017). Since games are associated with

fun and pleasure, I propose that consumers are more interested in and impacted by

gamification in a hedonic versus utilitarian context.

H7.   Consumers in a hedonic setting will experience a larger impact from

gamification in the areas expressed in H1 through H4 versus consumers in a

utilitarian setting.

The following sections review the three different studies I conducted to test these

hypotheses. In study 1, H1 through H5 are tested in the setting of a consumer online

community emphasizing skill-based competitions. In study 2, a coffee shop loyalty

program is used as the setting, with chance-based games and skill-based competitions

tested separately. This allowed me to test H1 through H6. Study 3 focuses on the impact of hedonic versus utilitarian contexts (H7).

4.3 Study 1: Gamifying A Consumer Online Community

Online customer communities, organized around interactive websites, are a relatively new marketing tactic that are being increasingly used by firms to strengthen customer engagement with their brands. Marketers hope that the online community experience will be enticing enough to have customers become active in the community – viewing the brand content provided, posting their own content and interacting with fellow customers. The purpose of study one is to see if a gamified approach to an online consumer community provides the hypothesized positive benefits regarding consumer reactions to the activity itself (H1, H2 and H3) and positive benefits regarding the brand sponsoring the online community (H4). The activity in this study utilizes competitive skill-based games, allowing for a test of H5.

4.3.1 Method

I conducted a two-cell, between subjects experiment manipulating gamification (gamified versus not gamified). The context was an online consumer community and associated phone app for a fictitious ski resort. In both versions, the online community, as described, allowed resort visitors to post pictures relating to their time at the ski resort, record and share their personal activity statistics (number of feet skied in a day, for example), share comments, blog and partake other interactive activities typical on these

consumer sites. The gamified version added game elements to these activities, such as contests for best picture (in various categories), contests based on their ski stats as well as the ability to achieve different blogging levels based on community reaction. There were no financial prizes, but rather the payoff of the games were public recognition on leaderboards and the joy of winning contests and moving up in levels (see Appendix A for complete scenarios). This marketing activity allowed me to test a context that combined gamification with elements of QOS (participants' individual ski statistics).

Undergraduate students at a major northeastern university participated in the study for course credit. To qualify for the study, respondents had to ski or snowboard at least twice a season and own a smart phone. Qualified participants were randomly assigned to one of the two conditions. Attention checks were utilized and respondents who failed these checks were excluded from the analysis. Out of 104 students who qualified, 19 failed the attention checks, leaving a sample of 85 for analysis. By gender, 70.6% were men and 29.4% were women.

4.3.2 Measures

After viewing the scenario, respondents rated their reaction using several scales. Three scales gauged reaction to the online community itself, and were used to test H1, H2 and H3. These include an interest in joining scale (3-item scale created by the author, α =.935) and an anticipated intrinsic motivation (enjoyment) scale (3-item scale adapted from self-determination theory, α =.905). Also included was a scale measuring emotional engagement regarding the activity (10-item scale from Thomson, MacInnis and Park,

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2005), composed of three subscales – affection (α =.762), passion (α =.809) and connection (α =.843). Affection subscale includes the feelings of "affection," "friendly," "loved" and "peaceful" toward the activity. Passion subscale includes the feelings of "passion," "delight" and "captivation" towards the activity. Connection subscale includes feelings of "connection," "bonded," and "attached" toward the activity.

Separate questions gauge potential spillover benefits (emotional engagement) for the brand, and are used to test H4. The emotional engagement scale repeated the ten items from Thomson, MacInnis and Park, 2005, but worded for the ski resort, organized into the same three subscales: affection (α =.876), passion (α =.862) and connection (α =.920). Finally, a 3-item innate competitiveness scale (α =.935) was used to profile respondents, adapted from Smither and Houston, 1992, which allowed for the testing of H5. Scales are shown in Appendix B.

4.3.3 Manipulation Check

An independent t-test was conducted to measure the perceived difference in gamification in each scenario ("*How would you describe the amount of game activities and contests that are offered to participants in the online community … 1 = no games activities or contest are offered and 7 = a great deal of game activities and contests are offered.")*. As expected, the gamified scenario scored significantly higher than the non-gamified scenario on this measure ($M_{Gamified}$ = 5.0, $M_{Not\text{-}gamified}$ = 2.6, t = 8.22, p < .001).

4.3.4 Findings

The two dependent variables for this analysis, namely interest in joining and anticipated enjoyment, are significantly correlated ($r = .84$, $p < .001$). I conducted a MANOVA with these two dependent variables, and gamification (two levels: gamified and non-gamified) as the sole factor. The results were significant (Wilks lambda = .872, $F = 6.01$, $p < .01$). Simple contrast was conducted. The results for interest in joining the activity were significant ($M_{Gamified} = 4.6$, $M_{Not\text{-}gamified} = 3.5$, $t = 3.42$, $p < .001$, CI: 0.28 to 1.82), supporting H1. The results for anticipated enjoyment were also significant ($M_{Gamified} = 5.1$, $M_{Not\text{-}gamified} = 4.2$, $t = 3.20$, $p < .01$, CI: 0.19 to 1.57), supporting H2.

Turning to emotional engagement with the activity, the three subscales are significantly correlated: "affection" and "passion" ($r = .75$, $p < .001$), "affection" and "connection" ($r = .63$, $p < .001$) and "passion" and "connection" ($r = .76$, $p < .001$). I conducted a MANOVA with these three dependent variables, and gamification (two levels: gamified and non-gamified) as the sole factor. The results were significant (Wilks lambda = .903, $F = 2.86$, $p < .05$). Simple contrast was conducted. The only significant result was for "connection" ($M_{Gamified} = 5.0$, $M_{Not\text{-}gamified} = 4.1$, $t = 2.97$, $p < .05$, CI: .02 to 1.63). Hence, H3 is only partially supported.

Examining emotional engagement with the brand, the three subscales are significantly correlated: "affection" and "passion" ($r = .88$, $p < .001$), "affection" and "connection" ($r = .78$, $p < .001$) and "passion" and "connection" ($r = .85$, $p < .001$). I conducted a MANOVA with these three dependent variables, with gamification (two

levels: gamified and non-gamified) as the sole factor. The results were not significant. Hence, H4 is not supported.

Innate competitiveness for each respondent is generated from a self-reported 7-point scale. I created two segments for analysis, one ½ standard deviation below and one ½ standard deviation above the mean of 4.7 (standard deviation = 1.38). They represent, respectively, the least and most innately competitive consumers in the sample (sample sizes 33 and 32, respectively).

Since the two relevant dependent variables, interest in joining and anticipated enjoyment, are correlated at the segment level, I conducted a MANOVA with gamification (gamified or not) as the sole factor. The MANOVA was conducted for each of the two consumer segments. The MANOVA was not significant for the least competitive segment (Wilks lambda = .967, F = 0.490, p = .618). The MANOVA was significant for the most competitive segment (Wilks lambda = .495, F = 14.80, p <.001). Simple contrast was then conducted among the most competitive segment. The results were significant for both interest in joining ($M_{Gamified}$ = 5.3, $M_{Not-gamified}$ = 3.0, t = 5.53, p <.001, CI: 1.21 to 3.40) and also anticipated enjoyment ($M_{Gamified}$ = 5.7, $M_{Not-gamified}$ = 4.0, t = 4.44, p <.001, CI: 0.66 to 2.59). Hence, H5 is supported in these areas.

Although not formally hypothesized, I tested a moderated mediation model to better understand the mechanism behind gamification's impact on interest in joining a marketing activity. In the model, gamification (present or not) is the independent

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variable, interest in joining is the dependent variable, anticipated enjoyment is the

mediator and competitiveness is the moderator (moderating gamification's impact on

anticipated enjoyment). To test this model I used PROCESS Moderated Mediation

Model 7, version 2.16.1 (Hayes, 2013; Preacher and Hayes, 2004). Per Hayes (2013), I

applied a bootstrapping approach and derived confidence intervals for effects on the basis

of 5,000 resamples. The results indicate that the model is significant with a 95% CI

excluding zero (CI: 0.284 to 1.07). See figure 4.1

Figure 7: Moderated mediation model of gamification (skill-based games)

$b = +0.88***$

$b = +2.64***$

$b = +0.913***$

$b = NS$

*p<.05; **p<.01; *** p< .001; NS = not significant at p< .05 level
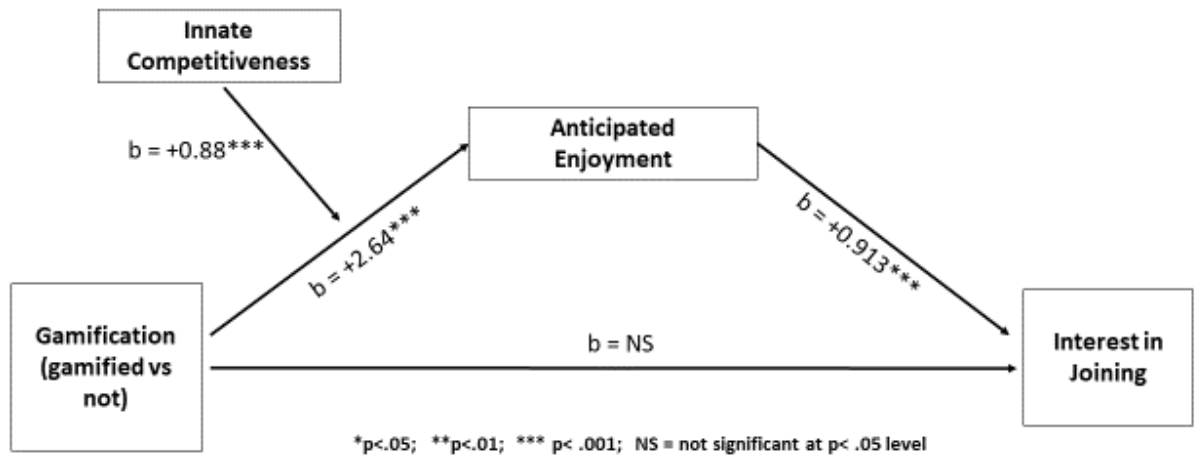
There were no significant results for the impact of gamification on emotional engagement with the activity nor with the brand among either the most or least competitive group. Hence, H5 is not supported in these areas.

4.3.5 Discussion

These research results provide support for the effectiveness of gamification in enriching the consumer experience in a marketing activity. Yet, they also point out substantial limitations. Among the total sample, gamification had a significant effect on increasing interest in joining the activity and also on anticipated enjoyment. As is supported by self-determination theory, the PROCESS modeling conducted suggests gamification's impact on anticipated enjoyment is the driver behind its impact on interest in joining an activity. Importantly, the PROCESS model shows innate competitiveness to be a significant moderator on gamification's effect in anticipated enjoyment. Further, subgroup analysis shows that this "gamification effect" is evident among the most competitive segment of consumers, but not among the least competitive segment. Regarding emotional engagement, gamification does not have the significant impact on emotional engagement with the activity nor with the brand as I expected. This was true even among the most competitive consumer segment. As tested, gamification did not deliver the hypothesized "brand spillover" benefits.

All in all, this research suggests gamification can serve as an effective tool in the marketing toolbox, but it should be employed with its limitations in mind. It is not an appropriate technique for every consumer, instead it only has a meaningful positive

impact among more competitive consumers. Hence, if gamification is used as a component of a marketing program, it should be an optional one, since it will be appealing to only a subset of consumers. Further, gamification cannot be assumed to significantly improve emotional engagement with the activity or brand.

There are limitations to this research, the most significant being that it tested consumer reactions to the presentation of gamification in a marketing activity. It did not study the impact of consumers participating in this type of activity over a period of time. It could be that it is difficult for individuals to anticipate emotional engagement, this may be something better measured over time as a consumer gets more deeply involved and invested in an activity. Additionally, the use of an online community for a ski resort, with an associated phone app, is a fairly novel context. Even without gamification, such as offering can appear exciting and engaging and hence it is harder for gamification to have a measurable impact on emotional engagement. Study two uses a more common and everyday context to account for this.

4.4 Study 2: Gamifying A Customer Loyalty Program

Loyalty programs are an integral part of consumer marketing, and marketers are looking for implementable tactics to help make loyalty programs more appealing to customers. Customer loyalty programs are also more routine and less novel than online consumer communities (with associated smart phone apps), allowing me to test gamification in a more commonplace context.

4.4.1 Method

Using a 3-cell design, study 2 explores the impact of gamification in the setting of a coffee shop's customer loyalty program. Two gamified versions of the loyalty program were tested, one emphasizing competitive skill-based challenges (answering trivia questions – topics of the respondent's choice) and one emphasizing chance (playing games involving a chance wheel and dice). Both types of games would be played on the customer's phone, and the results of the games would dictate the consumer's savings on his/her next visit. A third version did not contain any gamified elements. The non-gamified version had a standard 15% discount for each shop visit, while the two gamified versions explained that individual trip savings would vary from 5% to 25%, the precise savings discount would be determined by the consumer's performance in the games. Importantly, in both gamified scenarios it was noted that for the typical customer the annual savings would average out to 15%. This was done to keep all three scenarios financially consistent (see Appendix A for full scenarios).

As with study 1, the purpose of study 2 was to see if a gamified approach to a loyalty program provides the predicted benefits regarding the appeal of the loyalty program itself (H1, H2 and H3) as well as spill over benefits for brand relationship building (H4). Measures of innate competitiveness and risk tolerance were included, along with skill-based competitions and chance-based games, to test H5 and H6.

Participants were recruited from the Amazon MTURK online consumer panel. To qualify for the study, respondents had to be 18 to 49 years old, patronize a coffee shop

at least once a week and own a smart phone. Participants were restricted to individuals with MTURK ratings of 90% or higher. Qualified participants were randomly assigned to one of the three conditions. Attention checks were utilized and respondents who failed these checks were excluded from the analysis. Out of 516 panelists who qualified and completed the survey, 67 failed the attention checks, leaving a sample of 449 for analysis. By age group, 35.2% were ages 18 to 29, 42.8% were ages 30 to 39 and 22.0% were ages 40 to 49. By gender, 50.7% were men, 48.2% were women and 5 respondents preferred not to classify themselves as either.

4.4.2 Measures

After viewing the scenario, respondents rated their reaction using the same scales described in study one. Three scales gauged reaction to the loyalty program itself. These were the interest in joining scale ($\alpha = .923$), intrinsic motivation (enjoyment) scale ($\alpha = .853$) and emotional engagement regarding the activity scale, with three subscales – affection ($\alpha = .849$), passion ($\alpha = .851$) and connection ($\alpha = .891$). Emotional engagement regarding the brand was measured using the same three subscales worded for the coffee shop running the loyalty program, namely affection: ($\alpha = .875$), passion ($\alpha = .871$) and connection ($\alpha = .907$). A 3-item innate competitiveness scale ($\alpha = .836$) was again used to profile respondents. Finally, a single-item risk tolerance scale, which was not included in study 1, was used to allow me to test H6. Scales are shown in Appendix B.

4.4.3 Manipulation Check

An ANOVA was conducted to measure the perceived difference in gamification in each scenario ("*How would you describe the amount of game activities and contests that are offered to participants in the online community … 1 = no games activities or contest are offered and 7 = a great deal of game activities and contests are offered.*"). The ANOVA was significant ($M_{ChanceGames}$ = 5.2, $M_{SkillGames}$= 5.3, $M_{NoGames}$= 2.1, F = 209.09, p < .001). Bonferroni post hoc analysis showed both chance games and skill games were rated significantly higher on this than the no games scenario, and (as expected) the two gamified scenarios were not rated significantly differently from each other (all post hoc analyses conducted at the 95% confidence level).

4.4.4 Findings

The two dependent variables for this analysis, interest in joining and expected enjoyment, are significantly correlated (r = .77, p < .001). I conducted a MANOVA with these two dependent variables, and gamification (three levels: no games, skill games and chance games) as the sole factor. The results were significant (Wilks lambda = .837, F = 20.31, p < .001). Simple contrast was conducted. Results for interest in joining were not significant. Hence, H1 is not supported. However, results for anticipated enjoyment were significant for no games versus skill games ($M_{NoGames}$= 4.8, $M_{SkillGames}$= 5.5, t = 4.46, p <.001, CI: 0.21 to 1.17) and also for no games versus chance games ($M_{NoGames}$= 4.8, $M_{ChanceGames}$= 5.5, t = 4.03, p <.001, CI: 0.15 to 1.12). There is no significant difference between skill and chance games. Hence, H2 is supported.

Regarding emotional engagement with the activity, the three subscales are significantly correlated: "affection" and "passion" ($r = .84$, $p < .001$), "affection" and "connection" ($r = .82$, $p < .001$) and "passion" and "connection" ($r = .81$, $p < .001$). I conducted a MANOVA with these three dependent variables, and gamification (three levels: no games, skill games and chance games) as the sole factor. The results were not significant (Wilks lambda = .988, $F = 1.33$, $p = .162$). Hence, H3 is not supported.

Regarding emotional engagement with the brand, the three subscales are significantly correlated: "affection" and "passion" ($r = .88$, $p < .001$), "affection" and "connection" ($r = .86$, $p < .001$) and "passion" and "connection" ($r = .86$, $p < .001$). I conducted a MANOVA with these three dependent variables, and gamification (three levels: no games, skill games and chance games) as the sole factor. The results were not significant (Wilks lambda = .980, $F = 1.46$, $p = .188$). Hence, H4 is not supported.

As in study 1, for this analysis I created two consumer segments, one ½ standard deviation above and one ½ below the mean of 4.3 on the 7-point innate competitiveness scale (standard deviation = 1.64). They represent the most and least innately competitive consumers in the sample (sample sizes 141 and 129, respectively).

Since the two relevant dependent variables, interest in joining and anticipated enjoyment, are correlated, I conducted a MANOVA with gamification (three levels: no games, skills games and chance games) as the sole factor. The MANOVA was conducted for each of the two consumer segments. The MANOVA was significant for

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the least competitive group (Wilks lambda = .769, F = 8.72, p <.001). Simple contrast was then conducted. Regarding interest in joining, the only significant results were between skill games and no gamification ($M_{NoGames}$= 5.6, $M_{SkillGames}$= 4.4, t = 3.34, p <.001, CI: 0.063 to 2.05), where among the least competitive consumers, the no games scenario generated significantly greater interest in joining than the skill-based game scenario. Among the least competitive segment there are no significant differences on anticipated enjoyment.

Among the most competitive consumers, the MANOVA was also significant (Wilks lambda = .766, F = 9.98, p <.001). Simple contrast was then conducted. There were no significant differences for interest in joining. Regarding anticipated enjoyment, there is a significant difference between skill games and no games ($M_{NoGames}$= 4.9, $M_{SkillGames}$= 6.1, t = 5.04, p <.001, CI: 0.483 to 2.08), where the most competitive segment expresses greater anticipated enjoyment in the skill-based game scenario versus the no game scenario.

I tested the same moderated mediation model utilized in study 1. In the model, skills-based gamification (present or not) is the independent variable, interest in joining is the dependent variable, anticipated enjoyment is the mediator and innate competitiveness is the moderator (moderating gamification's impact in anticipated enjoyment). To test this model I used PROCESS Moderated Mediation Model 7, version 2.16.1 (Hayes, 2013; Preacher and Hayes, 2004). Per Hayes (2013), I applied a bootstrapping approach and derived confidence intervals for effects on the basis of 5,000 resamples. The resulting model was not significant (the C.I. did not exclude zero).

I then examined each competitive segment for the impact of gamification on emotional engagement with the activity and with the brand. Using MANOVA analysis and simple contrasts for each item, there are no significant results for either of the two competitive segments on these outcome variables.

All in all, H5 is only partially supported by these results.

Innate risk orientation is generated from a 7-point self-reported scale. I created two segments for analysis, one ½ standard deviation above and one ½ below the mean of 3.8 (standard deviation = 1.55). They represent the most and least innately risk oriented consumers in the sample (sample sizes 158 and 190, respectively).

Since the two relevant dependent variables, interest in joining and anticipated enjoyment, are correlated, I conducted a MANOVA with gamification (three levels: no games, skill games and chance games) as the sole factor. The MANOVA was significant among the high risk consumer segment (Wilks lambda = .792, F = 9.43, p <.001). Simple contrasts were then conducted. The only significant result was regarding the difference between chance games and no games on anticipated enjoyment ($M_{NoGames}$= 4.7, $M_{ChanceGames}$= 5.9, t = 4.76, p <.01, CI: 0.42 to 2.03). There were no significant results among the high risk orientation segment on interest in joining. There were no significant results at all among the least risk oriented group.

I tested the same moderated mediation model mentioned above, with chance-based gamification replacing skill-based, and innate risk-orientation replacing innate competitiveness. In the model, chance-based gamification (present or not) is the

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independent variable, interest in joining is the dependent variable, anticipated enjoyment is the mediator and innate risk orientation is the moderator (moderating gamification's impact in anticipated enjoyment). To test this model I used PROCESS Moderated Mediation Model 7, version 2.16.1 (Hayes, 2013; Preacher and Hayes, 2004). Per Hayes (2013), I applied a bootstrapping approach and derived confidence intervals for effects on the basis of 5,000 resamples. The resulting model was not significant (the C.I. did not exclude zero).

I then examined each risk orientation segment for the impact of gamification on emotional engagement with the activity and with the brand. Using MANOVA analysis and simple contrasts for each item, there are no significant results for either of the two competitive segments on these outcome variables.

All in all, H6 receives only very weak support.

Study one found a significant result for the impact of gamification on interest in joining among the total sample (H1), while study two did not. Since study one was conducted among younger respondents (undergraduates), I analyzed the results of study two by three age groups: 18 to 29, 30 to 39 and 40 to 49. MANOVA was conducted for each age group, with interest in joining and anticipated enjoyment as dependent variables and gamification (three levels) as the factor. Significant MANOVA results were followed by simple contrast analysis. Results for interest in joining were not significant for any age group. However, anticipated enjoyment results were significant for the 18 to 29 age group (Wilks lambda = .889, F = 4.54, p <.001; $M_{NoGames}$= 4.6, $M_{SkillsGames}$= 5.6, t

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= 3.54, p <.001, CI: 0.11 to 1.81) and also the 30 to 39 age group (Wilks lambda = .732, F = 15.55, p <.001; $M_{NoGames}$= 4.8, $M_{SkillsGames}$= 5.3, t = 3.75, p <.001, CI: 0.14 to 1.54), but not among the 40 to 49 age group. These results were evident for the skill-based games but not the chance-based games.

4.4.5 Discussion

As in study one, study two finds gamification to provide a significant increase in anticipated enjoyment of the marketing activity. However, unlike study one, this did not translate into a significant increase in interest in joining the activity. This finding is unexpected. I suggest four possible reasons for the differences between the two studies. The first is that the sample in study one was overall more innately competitive. The mean innate competitiveness rating for the sample in study one is 4.7, while the mean for sample two is 4.3. An independent sample t-test finds these to be significantly different (t = 2.36, p<.05). However, recall that in study two even among the most competitive segment I still did not find gamification to have a significant impact on interest in joining. Hence, this reason is unlikely. Second, skills-based gamification was operationalized in different ways. In study one, it was operationalized as competitions based on ski activities as well as social activities (posting pictures and blogging). In study two, it was based on trivia competitions. It may be that trivia is a less appealing form of skill-based gamification. Third, it may be the setting. Study one was set in a more hedonic setting (ski resort), while a coffee shop can likely be interpreted as either a hedonic (place to relax and sip gourmet coffee) or utilitarian (grab a coffee on the way to work to wake up). Study three will address this potential impact. Fourth, it may be that the financial

incentive included in study two's scenarios was significant enough to create equal interest in both the gamified and non-gamified approaches (recall there was no financial incentive included in study one scenarios). Even though self-determination theory suggests internal motivation (enjoyment) is, in the long run, more motivating than an external motivation source (financial reward), it may be that at the initial presentation of the scenario this external reward raised all interest to an equal level and thereby washes out any gamification effect. I suggest this as an avenue for future research

Study two found no impact of gamification at the total sample level on emotional engagement with the activity. While study one found a significant impact on the emotional engagement aspect of "connection," study two did not. This could be driven by contextual factors, since the games in study one involved an online community and placed a much greater emphasis on elements of social sharing. As with study one, study two found no significant impact from gamification on emotional engagement with the brand behind the activity.

Analysis of results by high and low innate competitiveness suggests competitiveness plays a role in how consumers are impacted by gamification. However, these results were mixed at best, and weaker than study one results in this area. Skills-based gamification was found to make the low competitive consumer segment less likely to join a loyalty program versus a no-game option. Among the most competitive group, skill-based gamification increased their anticipated enjoyment, however it had no impact on their interest to join (versus a no-game option). Results by high and low innate risk orientation found only one meaningful difference, namely high risk consumers derive

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more anticipated enjoyment from chance games versus no games. However, this did not translate into an increase in interest in joining.

Study two makes clear that gamification can play a role in helping a marketing program more effectively entice consumers, however it also suggests that it is a tool with clear limitations and hence should be used selectively. It is most effective when skill-base gamification is directed at innately competitive consumers. Among the least competitive, it has either no effect or can actually have a negative effect on likelihood to join a marketing activity. Gamification should also not be viewed by marketers as a way to immediately strengthen emotional attachment with an activity or a brand. This could be an impact that develops over time as a consumer becomes more involved and invested in the activity, however this was not studied in this research.

4.5 Study 3: Gamification in a Hedonic Versus Utilitarian Context

The purpose of study 3 is to understand the role of situational context on gamification, namely to test if the impact of gamification is moderated by a utilitarian versus hedonic context (H7).

4.5.1 Method

A 2 X 2, between subjects experiment manipulating gamification (gamified versus not gamified) and context (utilitarian versus hedonic) was conducted. The coffee

shop chance-based loyalty program from study 2 was repeated for this study. For this study, two different coffee shop settings were described to convey different contexts. One setting was meant to convey hedonic feelings, with the coffee shop described as a lounge-type atmosphere where the respondent would go with friends for relaxation. The other setting was meant to convey utilitarian feelings, with a more efficient, business-oriented atmosphere where the respondent would go on the way to work or when running errands. (see Appendix A for full scenarios). Importantly, the scenarios stated that the games did not have to be played while at the coffee shop, so a sense of being rushed or relaxed would not impact respondent reactions.

Participants were recruited from the Amazon MTURK online consumer panel. To qualify for the study, respondents had to be 18 to 49 years old, patronize a coffee shop at least once a week and own a smart phone. Respondents were restricted to individuals with MTURK ratings of 90% or higher. Qualified participants were randomly assigned to one of the four conditions. Attention checks were utilized and respondents who failed these checks were excluded from the analysis. Out of 212 panelists who qualified and completed the survey, 23 failed the attention checks, leaving a sample of 189 for analysis. By age group, 39.2% were ages 18 to 29, 35.4% were ages 30 to 39 and 25.4% were ages 40 to 49. By gender, 52.4% were men, 47.1% were women and one respondent preferred to not be classified as either.

4.5.2 Measures

After viewing the scenario, respondents rated their reaction using the same scales described in the previous studies. Three scales gauged reaction to the loyalty program itself. These were the interest in joining scale (α =.935), intrinsic motivation (enjoyment) scale (α =.867) and the emotional engagement regarding the activity scale, with three subscales – affection (α =.865), passion (α =.898) and connection (α =.918). As in the previous two studies, emotional engagement regarding the brand was measured using the same three subscales, namely affection: (α =.858), passion (α =.899) and connection (α =.922). However, it was reworded for the coffee shop sponsoring the program.

In addition, a 3-item scale was added to measure if the coffee shop was viewed as a hedonic experience ("Fun," "Exciting" and "Enjoyable"), α =.941. Another 3-item scale was added to measure if the coffee shop was viewed as a utilitarian experience ("Functional," "Necessary" and "Practical"), α =.807. Both of these scales were adapted from Voss, Spangenberg and Grohmann, 2003. The same single-item risk tolerance scale included in study two was repeated in this study. See Appendix B for scale details.

4.5.3 Manipulation Check

A t-test was conducted to measure the perceived difference in gamification between the gamified and non-gamified scenarios ("*How would you describe the amount of game activities and contests that are offered to participants in the online community … 1 = no games activities or contest are offered and 7 = a great deal of game activities and contests are offered.*"). The gamified scenarios scored significantly higher than the non-

gamified scenarios on this measure ($M_{Gamified}$ = 5.2, $M_{Not\text{-}gamified}$ = 2.4, t = 13.64, p <

.001). T-tests were also conducted to measure the perceived difference in utilitarian

versus hedonic contexts for the two coffee shops. On the utilitarian scale, the utilitarian

context scored significantly higher ($M_{Utilitarian}$ = 5.3, $M_{Hedonic}$ = 4.7, t = 3.73, p < .001).

On the hedonic scale, the hedonic context scored significantly higher ($M_{Utilitarian}$ = 4.9,

$M_{Hedonic}$ = 5.7, t = 3.72, p < .001). Finally, to ensure a sense of perceived busyness was

not impacting results between the hedonic and utilitarian scenarios, I added the measure

"*I would not have enough time to participate in this loyalty program*," with a 7-point

agreement scale. An independent sample t-test shows no significant difference on this

measure between the two contexts tested ($M_{Utilitarian}$ = 2.3, $M_{Hedonic}$ = 2.4, t = 0.642, p

=.522).

4.5.4 Findings

As in the previous studies, interest in joining and expected enjoyment are

significantly correlated (r = .73, p < .001). I conducted a MANOVA with these two

dependent variables. Two factors were included: gamification (gamified or not) and

context (hedonic versus utilitarian). The results were insignificant for the interaction of

gamification and hedonic/utilitarian context (Wilks lambda = .991, F = 0.88, p = .422).

Hence, H7 is not supported in these areas.

A similar approach was taken for emotional engagement regarding the activity.

No interaction effect between gamification and hedonic/utilitarian context was found for

any of the emotional engagement subscales.

Using a similar MANOVA and simple contrasts analysis, no significant interaction effect between gamification and hedonic/utilitarian context was found for any of the emotional engagement subscales regarding the company associated with the marketing program.

As in the previous two studies, the sample was divided into consumer groups of interest. Since this study involved chance-based games, the most relevant analysis is among risk orientation. On innate risk orientation I followed a similar approach to the previous study, creating two consumer segments, one ½ standard deviation above and one ½ below the mean of 3.7 on the 7-point innate competitiveness scale (standard deviation = 1.64). There are no significant interaction effects between gamification and hedonic-utilitarian context on the two key study variables (interest in joining and enjoyment) among either the high or low group.

On innate competitiveness I followed a similar approach of creating two consumer segments, one ½ standard deviation above and one ½ below the mean of 4.4 on the 7-point innate competitiveness scale (standard deviation = 1.77). There are no significant interaction effects between gamification and hedonic-utilitarian context on the two key study variables (interest in joining and enjoyment) among either the high or low group.

4.5.5 Discussion

H7 was not supported. Hedonic versus utilitarian context does not appear to be a moderator of gamification's impact on consumer attitudes toward a marketing program or the brand behind it.

4.6 General Discussion

The three studies together suggest gamification can be a useful tool for marketers to build consumer attachment to a marketing activity. However, the research also suggests it is a tool with many limitations. It is far from an omnipotent technique but rather appears to work in some contexts and not others, and works better with some consumers and could actually serve as a deterrent for other consumers. Hence, gamification must be used by marketers with caution.

Looking across the three studies, the following was consistently supported. First, gamification is effective at increasing anticipated enjoyment in a marketing activity among consumers. However, this impact varies significantly by consumer. This leads to the second consistent finding. Innate individual characteristics have a substantial moderating impact on the "gamification effect." For skill-based games, gamification is effective at increasing anticipated enjoyment among the most innately competitive but has no impact among the least competitive. The same is true for chance-based games among the most and least innately risk oriented.

Third, this increase in anticipated enjoyment among the most competitive sometimes translates into a similar increase in interest in joining a marketing activity (in

the ski resort online community setting in study one) but does not translate into an

increase in interest in joining in other instances (in the coffee shop loyalty program in

study two). I have suggested a variety of possible reasons for this, the most interesting

for future research being differences in setting and differences in other rewards offered

(financial rewards). Fourth, regarding setting, hedonic versus utilitarian contexts do not

seem to be a driving factor in the impact of gamification, at least as measured in study

three. The fifth consistent finding is that gamification is not effective at increasing

emotional engagement with the activity itself or with the brand, at least at the initial

presentation of a marketing program. The one exception to this is that a game with a

significant social component can increase the emotional engagement component of

"connection" with the activity.

While this research lays a solid foundation of theory building regarding

gamification, it also suggests several areas for further research. Context appears to act as

a modifier to gamification. However, not the context which was directly studied in this

research, namely hedonic versus utilitarian. It could be environments more associated

with recreational activities, such as skiing, are more conducive to gamification. Or

environments more associated with social activities, such as an online community. Also,

whether or not a financial reward (extrinsic motivator) is offered may also be a moderator

on gamification's initial impact. Having a financial reward may reduce the differential

impact of gamification on a respondent's interest in joining. This may be because the

financial offering, as an attention-getting external reward, detracts from the attention the

respondent gives to the intrinsic rewards of gamification. These topics are suggested for

further research because they are hinted at in my results, however my studies were not designed to isolate and measure them.

Also, my research tested consumer reactions to the initial presentation of a marketing program. This may not be the optimal context for measuring emotional engagement. People may not feel emotional engagement until they are more deeply involved and invested in the activity, in the "heat of battle" so to speak. Future research should measure consumer attitudes and behaviors over a period of time, while consumers participate in a gamified versus non-gamified activity. This would likely be a better way to measure emotional engagement, as well as a way to see if the bump in enjoyment derived from gamification holds over time. Also, my research did not find any significant "spillover" benefits regarding building emotional engagement with the brand. This may have to do with how fully integrated the brand is in the gamified activity. Affect transfer requires a prominent connection between the two. Future research can experiment with different degrees of integration and prominence of the brand and brand elements in the gamified activity.

Gamification appears to be a useful tool for marketers to utilize to increase consumer attraction to marketing activities. However, this research shows that it is a complex tool to wield, with markedly differential impacts by type of consumer, particularly around innate competitiveness and innate risk-orientation. The research also suggests there may be various contextual factors that modify gamification's impact as well, though not the one isolated for study in this research (hedonic versus utilitarian). However, the research does suggest several other contextual areas worthy of further exploration.

CHAPTER 5

CONCLUSION

5.1 Theoretical Contributions

Over the past few decades, marketers have come to learn the importance of moving past simple "selling" and instead establishing deeper and more meaningful relationships between brands and customers. As a result, there is currently a significant focus on the "customer experience," which involves interactions between a customer and a product, service or marketing activity which are meant to provoke a meaningful personal reaction in the consumer. Taking this a step further is the idea that this experience be a co-productive one, where the consumer plays an active role in shaping and personalizing the experience. Recent digital and mobile advancements have given marketers powerful new tools to make non-face-to-face interactions between brands and customers far more personal, co-creative and meaningful than was previously possible.

The quantification of self (QOS) and gamification are two examples of new, (mainly) digital, interactive technologies that marketers are using to strengthen the customer experience in a co-creative manner. QOS is being incorporated into increasing numbers of new consumer products and services, while gamification is being utilized in more and more marketing activities such as loyalty programs and customer online communities, as well as in new consumer products and services. Both QOS and gamification are often used together synergistically, in gamified activities based on QOS data (such as Vail's EpicMix and games available on Fitbit and other fitness trackers). Despite their growing use, empirical research on the impact of either technique has been minimal to date. The purpose of my research program is to gauge the opportunities and

limitations of these marketing tactics in enriching the customer experience, and tie our understanding of them to existing theoretical frameworks.

Essay one contributes to the marketing literature by providing a better understanding of QOS and its impact on consumer attitudes and behaviors. I found substantial support for the "quantification effect," meaning the positive impact QOS can have on a consumer's goal-oriented motivation. This makes QOS an appealing characteristic to include in consumer products and services aimed at goal completion. My research, drawing from goal setting theory, provides significant insight into the psychological process by which QOS increases motivation. My proposed model found empirical support for three factors that mediate the impact of QOS on motivation: 1) feedback loop enhancement, 2) self-empowerment amplification, and 3) goal focus strengthening. Via this model, my research advances the role of goal setting theory in new product and service design. My research also helps develop the literature on consumer empowerment, since an amplified sense of self-empowerment was found to be a key component of the causal model. Finally, my research identified age as a potential boundary condition for the positive impact of QOS, contributing to the literature on the role of age in consumer attitudes and behaviors.

Essay two contributes to marketing literature by providing empirical support for a key situational boundary condition for QOS, namely program implementation by a third party with a significant role in the individual's life. This research identified the mechanism for this boundary condition, namely perceived self-empowerment. In this way, the research contributes to the theoretical literature on consumer empowerment, by

identifying and analyzing a situation where a consumer's sense of self-empowerment is a critical factor in how he/she responds to a QOS-based offering. This essay also contributes to the literature on internal marketing, by identifying and understanding potential barriers employees may have regarding employer-sponsored health and fitness offerings

Essay three examined the impact of gamification in marketing programs, both on consumer attitudes toward the marketing activity itself as well as the brand behind the activity. With little previous research conducted on this topic, my work supplies a valuable theoretical foundation for future research. My research also shows gamification to be a highly nuanced tool. The studies in essay three found that gamification is effective in increasing anticipated enjoyment in a marketing activity. However, this impact varies significantly by consumer. Innate personal characteristics, particularly competitiveness and risk orientation, play a key role here. Skill-based games and chance-based games have different impacts vis-à-vis consumers with varying innate competitiveness and innate risk–orientation, respectively.

Besides different reactions by consumer type, there also appear to be differences by context in terms of translating this heightened anticipated enjoyment into interest in joining. Although not directly tested, results of my research suggest a variety of contextual factors such as degree of social interaction, type of skill utilized for skill-based competitions, other external rewards included (such as financial rewards), and setting (though not simply hedonic versus utilitarian) may impact how consumers react to gamification as part of a marketing activity, at least at initial presentation. My research

adds to the literature on self-determination theory and the role of internal motivation, i.e. enjoyment of an activity. It adds to the literature on consumer emotional engagement by suggesting that although predicted in many conceptual articles, gamification, at least when presented as part of an activity, does not lead to heightened expectations of emotional engagement. As early research on the topic, my work on gamification provides a starting point for future research.

Taken together, this research advances marketing theory regarding the customer experience and how it can be enriched through interactive digital platforms. My research provides models to understand the meaningful benefits consumers can derive from these marketing approaches, including enhanced motivation toward personal goals (QOS) and heightened enjoyment and, in the right contexts, interest in joining (gamification). It also identifies important boundary conditions and modifiers, including innate personal characteristics and situational contexts. It also adds to the discipline's theoretical foundations by adding insights from goal setting theory, self-determination theory and the consumer empowerment literature, and relating these theoretical streams to new consumer contexts. This set of research provides insights for strengthening relationships between consumers and products/brands via non-face-to-face digital tools, which is something today's marketing practitioners are keenly desiring.

5.2 Managerial Contributions

The managerial contributions of my research are numerous, particularly because the techniques studied, QOS and gamification, are being increasingly used by marketers in new product and service development as well as in marketing programs. Regarding QOS, the results of my research should encourage marketers to incorporate QOS features into products and services for consumer activities that are goal oriented. Behavior modification is a widespread goal-oriented pursuit among consumers, be it to lose weight, improve sleep quality, lower stress, reduce energy use, etc. Consumers have shown a willingness to spend significant amounts of money on products and services in various goal pursuits. My research suggests QOS features will make such products and services even more appealing, and helpful, to consumers. By identifying the mediators involved in the "quantification effect," my research provides ideas to marketers to utilize in marketing campaigns, including feedback loop enhancement, self-empowerment amplification and goal focus strengthening. These themes can be built into advertising, product packaging, the names of features and other marketing efforts relating to products or services with QOS components.

My research also provides critical insights to employers and insurers and other third parties who are considering incorporating QOS features into health and fitness offerings. I would hope that my results caution these organizations in their implementation of such programs. My research found that perceived self-empowerment is a key driver behind the varying levels of interest in joining a wellness program, and this is impacted by type of third-party administration. It is a public good for well-intentioned third parties to offer health and wellness programs. My research alerts these

parties, particularly employers and insurers, that adding a QOS component to such a program is less straightforward than they might have assumed, and that perceptions of losing self-empowerment in the program can diminish the otherwise positive impact of QOS. Hopefully my research can enlighten and spur those managing the programs to make the extra effort needed to minimize this barrier.

Regarding gamification, my research results provide guidance to managers in how they might utilize this tool in marketing programs. My findings suggest marketers should be cautious in how they utilize gamification, it is not a technique that works equally well with all consumers. My results suggest gamification is best offered as an option in a marketing activity, since it is appealing to some consumers but not appealing to others. Whenever gamification is offered, a non-gamified option should also be available.

5.3 Limitations and Future Research

All my studies involve consumer reactions to the initial presentation of a product, service or marketing activity. This represents the important first step in the process for a consumer, in deciding whether or not to purchase a product or join an activity. However, it only captures one step in a long process. Further research can look at the impact of QOS and gamification on consumer attitudes and behaviors over an extended period of time while they use a product or participate in a program. This would help better understand if certain effects wear out and weaken over time, such as the motivational impact of QOS or the enjoyment derived from gamification. It could also help understand if certain effects strengthen over time, such as emotional engagement caused by gamification.

My research found strong evidence of a boundary effect of age on QOS, and potentially a similar boundary effect of age on gamification. This fits with earlier research which suggests older consumers are more resistant to technology-based activities, which QOS and gamification (as tested in my studies) both are. Future research should be conducted to better understand the impact of age in these areas, why it exists as a boundary and what could be done to overcome it.

Regarding third party administration of QOS programs, future research should be conducted to find ways to overcome the negative impact of third party administration. My research suggests potentially fruitful areas of exploration would be tactics to bolster personal empowerment in the programs, such as greater ability of the individual to customize and control his/her program.

The gamification studies in essay three suggest several areas for further research. Context appears to act as a modifier to gamification. However, not the context which was directly studied in this research, namely hedonic versus utilitarian. Future research could help understand which contexts lend greater strength to the impact of gamification, such as more social elements. Future research could also dive deeper into different types of gamification, such as different skills to use in competitions or different types of chance games, to see if the appeal of each grow or lessens in different contexts, and also among different consumer groups. Further, my research did not find much impact of gamification on emotional engagement with the activity or brand. As stated earlier, this may be better understood in longer term studies, observing consumers as they participate in an activity over time. Regarding emotional engagement with the brand, future research could test different incorporations of brand elements into the games, to bolster

the brand's presence and possibly strengthen emotional engagement with the brand over time.

Taken together, my three essays help advance marketing theory regarding enriching customer experiences. Drawing from established theoretical foundations such as goal setting theory, self-determination theory and the consumer empowerment literature, my research helps build marketing insights regarding how interactive, digital-based environments can help marketers strengthen the interaction between their target consumers and market offerings aimed at them. These three essays focus on two techniques marketers are increasingly using to enrich the customer experience, namely quantification of self and gamification. Though quantification of self and gamification are distinct tools, they are both digitally-based marketing tactics that involve a significant co-creative element, where the consumer him/herself is an active participant in what is generally an ongoing activity. And, they are often used together to strengthen the consumer experience.

My research provides models to understand the meaningful benefits consumers can derive from these marketing approaches, including enhanced motivation toward personal goals and heightened enjoyment and increased interest in joining an activity. It also identifies important boundary conditions and modifiers, including innate personal characteristics, third-party involvement and situational context. It also provides actionable insights to marketing managers regarding two digital techniques they are increasingly using. Finally, my work also provides many ideas for future marketing research.

STUDY SCENARIOS (ALL ESSAYS)

Essay #1: QOS Scenario for Fitness Study

Here is a fitness program for you to consider. We'd like to get your reaction. It would last twelve weeks, and has three components:
1) You walk (or jog or some other form of physical activity – your choice) for at least 1 hour, at least 3 days a week
2) You also add more walking and movement to your normal daily routine -- by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day – adding as many steps to your day as possible.
3) Information would be supplied on healthy meals, along with calorie content. You would strive to follow the healthy eating guidelines.

KEEPING TRACK: To keep track of your activities, you would wear a wristband (see image A) which would automatically track many detailed metrics, such as: steps taken, distance covered, calories burned, and active minutes per day. This information would be constantly communicated wirelessly to your phone or computer – and you would see all your daily metrics via a customizable dashboard on your computer or phone (see image B). The software would also help you count all the calories you consume at every meal, and generate a daily calorie tally (calories eaten vs calories burned). All results are highly specific and detailed.

Essay #1: Non-QOS Scenario for Fitness Study

Here is a fitness program for you to consider. We'd like to get your reaction.   It would last twelve weeks, and has three components:
1) You walk (or jog – your choice) for at least 1 hour, at least 3 days a week
2) You also add more walking and movement to your normal daily routine -- by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day – adding as many steps to your day as possible.
3) Information would be supplied on healthy meals, along with calorie content. You would strive to follow the healthy eating guidelines.

KEEPING TRACK: You would not have to keep track of daily details, but instead retain an overall sense of your activities, such as if it was a more or less active day and whether or not it was a healthy eating day. You could keep these general notes on a notepad, personal web page, as a mental record or however you wish. The point is that this program asks you to keep track of activity on a **general** level and does not focus on detailed metrics. For example, you would be asked to NOT keep track of exactly how far you walked or jogged.

Essay #1: QOS Scenario for Carbon Footprint Reduction Study

One App To Teach You How To Reduce Your Carbon Footprint In All Aspects Of Your life
- Use this smart phone app and learn everything you need to know to reduce your carbon footprint.
- First, you enter some information about your transportation and home energy habits. The app will also (safely) link into your credit/debit card accounts and review the last several months of your purchases. It will also link to the GPS in your phone to understand your travel habits.
- Over the next few weeks, the app will offer you daily suggestions on how to reduce your carbon footprint, which will be customized to your lifestyle and activities. Some of the things it might suggest include:
  - Optimal tire pressure or tune-up schedule for your car to maintain maximum miles per gallon.
  - Which appliances in your home are energy guzzlers, and how to augment your use of them to save energy.
  - Alternative products that have a lower carbon footprint (less packaging or more sustainably manufactured) for things you buy often (with precise info on where they can be bought).
  - If you dine out often, the app will suggest alternative restaurants known for their eco-sustainability, as well as food options with lower carbon footprints.
- The app is run by a well-respected environmental organization with no ties to any businesses.
- As your life changes (you move, have children, buy new types of products, etc.), the app can provide new suggestions to fit your new life-stage. You can use the app as long as you like.

Tracking Your Improvement With Highly Detailed Feedback
- By maintaining a continuous wireless connection to your home (all appliances, heating/cooling/electrical systems), car and credit/debit accounts, the app will track, in detail, all aspects of your ongoing carbon footprint.
- The app will provide in-depth, easy-to-read online reports of your carbon footprint, tracked daily, weekly and monthly – summing up your total carbon footprint for all your activities and all your purchases, and also provide an itemized readout by life activity (transportation, eating, entertainment, home, etc.)
- The reports provide comparisons to local, regional and national norms – overall and by activity.
- Track – in detail - the improvement in your carbon footprint, for all different aspects of your life!

Essay #1: Non-QOS Scenario for Carbon Footprint Reduction Study

One App To Teach You How To Reduce Your Carbon Footprint In All Aspects Of Your life
- Use this smart phone app and learn everything you need to know to reduce your carbon footprint.
- First, you enter some information about your transportation and home energy habits. The app will also (safely) link into your credit/debit card accounts and review the last several months of your purchases. It will also link to the GPS in your phone to understand your travel habits.
- Over the next few weeks, the app will offer you daily suggestions on how to reduce your carbon footprint, which will be customized to your lifestyle and activities. Some of the things it might suggest include:
  - Optimal tire pressure or tune-up schedule for your car to maintain maximum miles per gallon.
  - Which appliances in your home are energy guzzlers, and how to augment your use of them to save energy.
  - Alternative products that have a lower carbon footprint (less packaging or more sustainably manufactured) for things you buy often (with precise info on where they can be bought).
  - If you dine out often, the app will suggest alternative restaurants known for their eco-sustainability, as well as food options with lower carbon footprints.
- The app is run by a well-respected environmental organization with no ties to any businesses.
- As your life changes (you move, have children, buy new types of products, etc.), the app can provide new suggestions to fit your new life-stage. You can use the app as long as you like.

Tracking Your Improvement
- Over time, as you follow the suggestions from the app, you will reduce your carbon footprint!
- You can keep track of how many suggestions you follow as a "scorecard" of your success.

Essay #2: Self Directed, Non-QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:
1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – GENERAL LEVEL TRACKING: You would not have to keep track of daily details, but instead retain an overall sense of your activities, such as if it was a more or less active day and whether or not it was a healthy eating day. You could keep these general notes in a notebook or private online journal (provided), or however you wish. The point is that this program asks you to keep track of your health and fitness activity on a general level and does not focus on detailed metrics. For example, you would not be asked to keep track of exactly how far you walked or jogged, or how long your exercise sessions were.

YOU WOULD BE DIRECTING YOURSELF IN THIS PROGRAM: This program has a fitness professional who is trained in this fitness system. He/she would oversee you in this program and provide general guidance at numerous points throughout the program (via your phone or computer), and set general goals on exercise, activity and eating. These general goals would be appropriate for someone at your fitness level. General goals would be things like increasing some aspects of your overall physical activity or changing some aspects of your eat habits. You could keep general track of your activities, but not focus on the details. The fitness expert will adjust guidance and general goals over the course of the program based on your progress. However, YOU are fully in charge of your exercise choices, activity levels and eating choices during the program.

Your results in the program would be completely private, no one else would receive this information. There are no costs to you associated with this program.

Essay #2: Self Directed QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:
1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – FOCUSING ON THE DETAILS: To keep track of your activities, you would wear an activity-tracking wristband (see image A) which would automatically track many detailed metrics, such as: steps taken, distance covered, calories burned, active minutes per day, blood pressure and heart rate. This information would be constantly communicated wirelessly to your phone or computer – and you would see all your daily metrics via a customizable dashboard on your computer or phone (see image B). The software would also help you count all the calories you consume at every meal, and generate a daily calorie tally (calories eaten vs calories burned). All results are highly specific and detailed.

YOU WOULD BE DIRECTING YOURSELF IN THIS PROGRAM: This program has a fitness professional who is trained in this fitness system. He/she would oversee you in this program and provide detailed guidance at numerous points throughout the program (via your phone or computer), and set detailed daily and weekly goals on exercise, activity and eating. These detailed daily and weekly goals would be appropriate for someone at your fitness level. Daily goals would be things like the number of daily steps, or number of calories to eat and burn each day. Weekly goals would be things like weight loss or blood pressure improvement. The fitness tracker wristband would keep highly detailed track of your progress on dozens of different health and fitness metrics. The fitness expert will adjust guidance and goals over the course of the program based on your progress. However, YOU are fully in charge of your daily goals and activities regarding your exercise choices, activity levels and eating choices during the program.

At the end of the program, you would get a full report of your final results (generated by a computer) – across all health and fitness metrics. Your results in the program would be completely private, no one else would receive this information. There are no costs to you associated with this program.

Essay #2: Doctor Directed, non-QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:

1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – GENERAL LEVEL TRACKING: You would not have to keep track of daily details, but instead retain an overall sense of your activities, such as if it was a more or less active day and whether or not it was a healthy eating day. You could keep these general notes in a notebook or private online journal (provided), or however you wish. The point is that this program asks you to keep track of your health and fitness activity on a general level and does not focus on detailed metrics. For example, you would not be asked to keep track of exactly how far you walked or jogged, or how long your exercise sessions were.

YOUR DOCTOR WOULD DIRECT YOUR ACTIVITIES IN THE PROGRAM: Your primary care doctor is trained in this fitness system. He/she would oversee you in this program and provide general guidance at numerous points throughout the program (via your phone or computer), and set general goals on exercise, activity and eating. These general goals would be appropriate for someone at your fitness level. General goals would be things like increasing some aspects of your overall physical activity or changing some aspects of your eat habits. You could keep general track of your activities, but not focus on the details. Your doctor will adjust guidance and goals over the course of the program based on your progress. You would be asked to do your best to meet the general goals given to you.

You would keep your doctor informed of your general progress throughout the program, and informed of your final results at the end. The results would be only for you and your doctor, no one else would receive this information. There are no costs to you associated with this program.

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Essay #2: Doctor Directed, QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:

1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – FOCUSING ON THE DETAILS: To keep track of your activities, you would wear an activity-tracking wristband (see image A) which would automatically track many detailed metrics, such as: steps taken, distance covered, calories burned, active minutes per day, blood pressure and heart rate. This information would be constantly communicated wirelessly to your phone or computer – and you would see all your daily metrics via a customizable dashboard on your computer or phone (see image B). The software would also help you count all the calories you consume at every meal, and generate a daily calorie tally (calories eaten vs calories burned). All results are highly specific and detailed.

YOUR DOCTOR WOULD DIRECT YOUR ACTIVITIES IN THE PROGRAM: Your primary care doctor is trained in this fitness system. He/she would oversee you in this program and provide detailed guidance at numerous points throughout the program (via your phone or computer), and set detailed daily and weekly goals on exercise, activity and eating. These detailed goals would be appropriate for someone at your fitness level. Daily goals would be things like the number of daily steps, or number of calories to eat and burn each day. Weekly goals would be things like weight loss or blood pressure improvement. The fitness tracker wristband would keep highly detailed track of your progress on dozens of different health and fitness metrics. Your doctor will adjust guidance and goals over the course of the program based on your progress. You would be asked to do your best to meet the general goals given to you.

At the end of the program, you and your doctor would get a full report of your final results – across all health and fitness metrics. The results would be only for you and your doctor, no one else would receive this information. There are no costs to you associated with this program.

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Essay #2: Employer Directed, non-QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:
1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – GENERAL LEVEL TRACKING: You would not have to keep track of daily details, but instead retain an overall sense of your activities, such as if it was a more or less active day and whether or not it was a healthy eating day. You could keep these general notes in a notebook or private online journal (provided), or however you wish. The point is that this program asks you to keep track of your health and fitness activity on a general level and does not focus on detailed metrics. For example, you would not be asked to keep track of exactly how far you walked or jogged, or how long your exercise sessions were.

A FITNESS EXPERT HIGHED BY YOUR EMPLOYER WOULD DIRECT YOUR ACTIVITIES IN THE PROGRAM: This program is part of a wellness program your company is running for its employees. Your employer has a fitness professional who is trained in this fitness system. He/she would oversee you in this program and provide general guidance at numerous points throughout the program (via your phone or computer), and set general goals on exercise, activity and eating. These general goals would be appropriate for someone at your fitness level. General goals would be things like increasing some aspects of your overall physical activity or changing some aspects of your eat habits. You could keep general track of your activities, but not focus on the details. The fitness expert will adjust guidance and goals over the course of the program based on your progress. You would be asked to do your best to meet the general goals given to you.

You would keep the fitness professional hired by your employer, as well as your employer themselves, informed of your general progress throughout the program, and informed of your final results at the end. No one else would receive this information. There are no costs to you associated with this program.

1

Essay #2: Employer Directed, QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:
1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – FOCUSING ON THE DETAILS: To keep track of your activities, you would wear an activity-tracking wristband (see image A) which would automatically track many detailed metrics, such as: steps taken, distance covered, calories burned, active minutes per day, blood pressure and heart rate. This information would be constantly communicated wirelessly to your phone or computer – and you would see all your daily metrics via a customizable dashboard on your computer or phone (see image B). The software would also help you count all the calories you consume at every meal, and generate a daily calorie tally (calories eaten vs calories burned). All results are highly specific and detailed.

A FITNESS EXPERT HIGHED BY YOUR EMPLOYER WOULD DIRECT YOUR ACTIVITIES IN THE PROGRAM: This program is part of a wellness program your company is running for its employees. Your employer has a fitness professional who is trained in this fitness system. He/she would oversee you in this program and provide detailed guidance at numerous points throughout the program (via your phone or computer), and set detailed daily and weekly goals on exercise, activity and eating. These detailed goals would be appropriate for someone at your fitness level. Daily goals would be things like the number of daily steps, or number of calories to eat and burn each day. Weekly goals would be things like weight loss or blood pressure improvement. The fitness tracker wristband would keep highly detailed track of your progress on dozens of different health and fitness metrics. The fitness expert will adjust guidance and goals over the course of the program based on your progress. You would be asked to do your best to meet the detailed goals given to you.

At the end of the program, you, the fitness professional hired by your employer, as well as your employer themselves, would get a full report of your final results – across all health and fitness metrics. No one else would receive this information. There are no costs to you associated with this program.

Essay #2: Insurer Directed, non-QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:
1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – *GENERAL LEVEL TRACKING*: You would not have to keep track of daily details, but instead retain an overall sense of your activities, such as if it was a more or less active day and whether or not it was a healthy eating day. You could keep these general notes in a notebook or private online journal (provided), or however you wish. The point is that this program asks you to keep track of your health and fitness activity on a general level and does not focus on detailed metrics. For example, you would not be asked to keep track of exactly how far you walked or jogged, or how long your exercise sessions were.

A FITNESS EXPERT HIGHED BY YOUR HEALTH INSURANCE COMPANY WOULD DIRECT YOUR ACTIVITIES IN THE PROGRAM: This program is part of a wellness program your health insurance company is running for its members. Your insurer has a fitness professional who is trained in this fitness system. He/she would oversee you in this program and provide general guidance at numerous points throughout the program (via your phone or computer), and set general goals on exercise, activity and eating. These general goals would be appropriate for someone at your fitness level. General goals would be things like increasing some aspects of your overall physical activity or changing some aspects of your eat habits. You could keep general track of your activities, but not focus on the details. The fitness expert will adjust guidance and goals over the course of the program based on your progress. You would be asked to do your best to meet the general goals given to you.

You would keep the fitness professional hired by your health insurance company, as well as your health insurance company themselves, informed of your general progress throughout the program, and informed of your final results at the end. No one else would receive this information. There are no costs to you associated with this program.

1

Essay #2: Insurer Directed, QOS Wellness Program Scenario

Here is a fitness program for you to consider. It would last 6 months, and has four components:
1) You walk or jog (your choice) for about 1 hour, at least 3 days a week
2) You do 2 to 4 sessions per week of exercising at home – some aerobic, some light weight lifting
3) You also add more walking and movement to your normal daily routine – by using stairs rather than elevators, parking farther and walking to entrances, and simply getting up and moving about more during the day, adding as many steps to your day as possible.
4) Information would be supplied on healthy meals, along with calorie content.

KEEPING TRACK – *FOCUSING ON THE DETAILS*: To keep track of your activities, you would wear an activity-tracking wristband (see image A) which would automatically track many detailed metrics, such as: steps taken, distance covered, calories burned, active minutes per day, blood pressure and heart rate. This information would be constantly communicated wirelessly to your phone or computer – and you would see all your daily metrics via a customizable dashboard on your computer or phone (see image B). The software would also help you count all the calories you consume at every meal, and generate a daily calorie tally (calories eaten vs calories burned). All results are highly specific and detailed.

A FITNESS EXPERT HIGHED BY YOUR INSURANCE COMPANY WOULD DIRECT YOUR ACTIVITIES IN THE PROGRAM: This program is part of a wellness program your health insurance company is running for its members. Your insurer has a fitness professional who is trained in this fitness system. He/she would oversee you in this program and provide detailed guidance at numerous points throughout the program (via your phone or computer), and set detailed daily and weekly goals on exercise, activity and eating. These detailed goals would be appropriate for someone at your fitness level. Daily goals would be things like the number of daily steps, or number of calories to eat and burn each day. Weekly goals would be things like weight loss or blood pressure improvement. The fitness tracker wristband would keep highly detailed track of your progress on dozens of different health and fitness metrics. The fitness expert will adjust guidance and goals over the course of the program based on your progress. You would be asked to do your best to meet the detailed goals given to you.

At the end of the program, you, the fitness professional hired by your health insurance company, as well as your health insurance company themselves, would get a full report of your final results – across all health and fitness metrics. No one else would receive this information. There are no costs to you associated with this program

Mountain Pines Ski And Snowboard Area Online Community

Mountain Pines Ski & Snowboard Area would like to create an online community web page where visitors can share pictures and comments about their experiences at the mountain, share ski statistics, communicate with each other, and provide input into new ideas Mountain Pines is considering.

Assume that Mountain Pines is close to where you live and you ski/snowboard at the area at least a few times a season. Mountain Pines would like to see if their draft ideas for the website are interesting enough to get people like you to visit the website several times during the ski season.

Here are some things you could do as a member of this online community:

Post Pictures: Post pictures that you take while at the mountain. Submit your pictures by different categories such as nature, action, funny, etc. You could view others people's pictures on the community webpage.

- Each week some of the pictures would be showcased on Mountain Pines' main website.

Share Stats: As a member of the community you can download a free phone app. If you wear your phone while at the mountain, you could track the # of feet and the number of trails you ski/snowboard each visit, each month and for the season. You could also track your speed on certain courses. Everyone's results could be posted on the community webpage, if they chose to do so.

Share Comments/Blog/Discuss: You could share comments about your experiences at the mountain via bulletin board conversations on different topics, or start your own blog. You could read the comments and blogs of other people.

Provide Feedback on Ideas: Mountain Pines will share different ideas it has for new services, food choices, activities or other possible developments at the resort. Community members will be asked to comment on the ideas and discuss them in the various community webpage forums.

Get info: You could also get the latest information on the mountain, such as snow conditions, open trails, lift wait times, etc.

Mountain Pines Ski And Snowboard Area Online Community

Mountain Pines Ski & Snowboard Area would like to create an online community web page where visitors can share pictures and comments about their experiences at the mountain, share ski statistics, communicate with each other, and provide input into new ideas Mountain Pines is considering, and participate in games and contests.

Assume that Mountain Pines is close to where you live and you ski/snowboard at the area at least a few times a season. Mountain Pines would like to see if their draft ideas for the website are interesting enough to get people like you to visit the website several times during the ski season.

Here are some things you could do as a member of this online community:

Post Pictures: Post pictures that you take while at the mountain. Submit your pictures by different categories such as nature, action, funny, etc. You could view and like others people's pictures on the community webpage.

- There would be weekly contests to get the top 10% and 25% of likes in each of the different categories, based on community member and resort staff likes. By simply posting pictures and also winning contests, participants would accumulate points over the season, and based on those points they could advance through the levels of "beginner," "intermediate" and "advanced photographer." There would be a leaderboard showcasing the leading pictures, and top rated pictures each week would be showcased on Mountain Pines' main website.

Share Stats: As a member of the community you can download a free phone app. If you wear your phone while at the mountain, you could track the # of feet and the number of trails you ski/snowboard each visit, each month and for the season. You could also track your speed on certain courses. Everyone's results could be posted on the community webpage, if they chose to do so.

There would be daily and weekly contests for those who get into the top 10% and 15% of feet and trails skied/boarded. There would also be contests for fastest times. All these contests would be organized by age group and ability level. Participants would accumulate points over the season, and based on those points they could advance through the levels of "beginner", "bronze", "silver" and "gold medalist." There would be a leaderboard showcasing the leading medalists.

Share Comments/Blog/Discuss: You could share comments about your experiences at the mountain via bulletin board conversations on different topics, or start your own blog. You could read the comments and blogs of other people.

Depending on how many people read your blog, you would earn points and advance up to "master blogger" level.

Provide Feedback on Ideas: Mountain Pines will share different ideas it has for new services, food choices, activities or other possible developments at the resort. Community members will be asked to comment on them and discuss them in the various community webpage forums.

You would receive points for how often you provide feedback and how helpful staff/community members find your feedback. Over the season you could advance from "junior," to "intermediate" to "master advisor."

Get info: You could also get the latest information on the mountain, such as snow conditions, open trails, lift wait times, etc.

Essay #3 – Study 2: Non-gamified scenario

Tasty Brew Coffee Shop Loyalty Program

Save money (via a phone app) every time you visit the coffee shop

- Use this phone app anytime you buy food or drinks from a Tasty Brew Coffee Shop location.
- It takes only 2 seconds to scan your phone screen at checkout to get the savings.

- With this program you will save 15% on everything you buy at Tasty Brew over the course of a year.
- For example, the average customer spends $950 a year at Tasty Brew. If that customer used the loyalty program he/she would save $140 a year.
- Just use your phone app to save money – and saving money is always good!

Essay #3 – Study 2: Chance-based gamified scenario

Tasty Brew Coffee Shop Loyalty Program

Play chance-based games (via a phone app) to save money!!

- Use this phone app anytime you buy food or drinks from a Tasty Brew Coffee Shop location.
- It takes only 2 seconds to scan your phone screen at checkout to get the savings.

Tasty Brew wants to make the loyalty program fun, so the program would work as follows:

- Once a week, select from a list of different <u>chance games</u> on the phone app – such as rolling dice, slot machines or spinning a chance wheel. The results of the chance game will determine how much you save at Tasty Brew that week, which can be anywhere from 5% to 25% based on your game results.
- Since you're busy when you stop at a Tasty Brew, you would play the game once a week whenever you have time (games would take less than 2 minutes) and your results would apply for any visit that week. You may play alone or you can chose to play with other anonymous players or friends/family if they are also part of the loyalty program.
- Depending on the outcome of your games, you would save anywhere from 5% to 25% of your spending at Tasty Brew. For the typical customer, that would average to about 15% of savings a year. The typical customer spends $950 a year at Tasty Brew, saving 15% = saving $140 a year.

Tasty Brew Coffee Shop Loyalty Program

Play trivia games (via a phone app) to save money!!

- Use this phone app anytime you buy food or drinks from a Tasty Brew Coffee Shop location.
- It takes only 2 seconds to scan your phone screen at checkout to get the savings.

Tasty Brew wants to make the loyalty program fun, so the program would work as follows:

- Once a week, select from a variety of different <u>trivia games</u> on the phone app – you can pick the trivia subjects (sports, history, movies, music, etc). How well you do on the trivia games will determine how much you save at Tasty Brew that week, which can be anywhere from 5% to 25% based on your game results.

- Since you're busy when you stop at a Tasty Brew, you would play the game once a week whenever you have time (they would take less than 2 minutes) and your results would apply for any visit that week. You may play alone or you can chose to play with other anonymous players or friends/family if they are also part of the loyalty program.

- Depending on the outcome of your games, you would save anywhere from 5% to 25% of your spending at Tasty Brew. For the typical customer, that would average to about 15% of savings a year. The typical customer spends $950 a year at Tasty Brew, saving 15% = saving $140 a year.

Tasty Brew Coffee Shop

Assume this coffee shop is in your home town.

The coffee shop is set up like a lounge with comfortable couches and soft chairs. There is live music many nights. The coffee shop specializes in rich gourmet coffee and other hot drinks, as well as sumptuous snacks. It is a fun and pleasant atmosphere for people to relax, socialize and enjoy life.

Imagine you regularly hang out in this coffee shop with friends /family, or you hang out there on your own to relax and enjoy great tasting drinks and snacks.

Tasty Brew Coffee Shop Loyalty Program

Save money (via a phone app) every time you visit the coffee shop

- Use this phone app anytime you buy food or drinks from the Tasty Brew Coffee Shop.
- It takes only 2 seconds to scan your phone screen at checkout to get the savings.

- With this program you will save 15% on everything you buy at Tasty Brew over the course of a year.
- For example, the average customer spends $950 a year at Tasty Brew. If that customer used the loyalty program he/she would save $140 a year.
- Just use your phone app to save money – and saving money is always good!

Tasty Brew Coffee Shop

Assume this coffee shop is in your home town.

The coffee shop is set up like a lounge with comfortable couches and soft chairs. There is live music many nights. The coffee shop specializes in rich gourmet coffee and other hot drinks, as well as sumptuous snacks. It is a fun and pleasant atmosphere for people to relax, socialize and enjoy life.

Imagine you regularly hang out in this coffee shop with friends /family, or you hang out there on your own to relax and enjoy great tasting drinks and snacks.

Tasty Brew Coffee Shop Loyalty Program

Play chance-based games (via a phone app) to save money!!

- Use this phone app anytime you buy food or drinks from the Tasty Brew Coffee Shop.
- It takes only 2 seconds to scan your phone screen at checkout to get the savings.

Tasty Brew wants to make the loyalty program fun, so the program would work as follows:

- Once a week, select from a list of different <u>chance games</u> on the phone app – such as rolling dice, slot machines or spinning a chance wheel. The results of the chance game will determine how much you save at Tasty Brew that week, which can be anywhere from 5% to 25% based on your game results.
- You would play the game <u>once a week whenever you have time</u> (games would take less than 2 minutes and you do <u>not</u> have to play then while at Tasty Brew). Your results would apply for any visit that week. You may play alone or you can chose to play with other anonymous players or friends/family if they are also part of the loyalty program.
- Depending on the outcome of your games, you would save anywhere from 5% to 25% of your spending at Tasty Brew. For the typical customer, that would average to about 15% of savings a year. The typical customer spends $950 a year at Tasty Brew, saving 15% = saving $140 a year.

Tasty Brew Coffee Shop

Assume this coffee shop is in your home town.

The coffee shop specializes in getting quality coffee and snacks to people on the go. The drive-through window and the service on the inside is always quick and accurate. It is an efficient spot for people who want to grab quality coffee or other hot drinks and snacks speedily when on the go to.

Imagine you go to this coffee shop regularly on your way to and from work and when running errands.

Tasty Brew Coffee Shop Loyalty Program

Save money (via a phone app) every time you visit the coffee shop

- Use this phone app anytime you buy food or drinks from the Tasty Brew Coffee Shop.
- It takes only 2 seconds to scan your phone screen at checkout to get the savings.

- With this program you will save 15% on everything you buy at Tasty Brew over the course of a year.
- For example, the average customer spends $950 a year at Tasty Brew. If that customer used the loyalty program he/she would save $140 a year.
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- Once a week, select from a list of different <u>chance games</u> on the phone app – such as rolling dice, slot machines or spinning a chance wheel. The results of the chance game will determine how much you save at Tasty Brew that week, which can be anywhere from 5% to 25% based on your game results.

- You would play the game <u>once a week whenever you have time</u> (games would take less than 2 minutes and you do <u>not</u> have to play then while at Tasty Brew). Your results would apply for any visit that week. You may play alone or you can chose to play with other anonymous players or friends/family if they are also part of the loyalty program.

- Depending on the outcome of your games, you would save anywhere from 5% to 25% of your spending at Tasty Brew. For the typical customer, that would average to about 15% of savings a year. The typical customer spends $950 a year at Tasty Brew, saving 15% = saving $140 a year.

STUDY MEASUREMENT SCALES (ALL ESSAYS)

Note: Unless otherwise noted, these are 1 to 7 agreement scales

Essay #1 Scales

Fitness Study: Feedback meaningfulness scale (author created)
Would provide meaningful feedback on your progress
Would provide useful feedback on your progress
Would help increase your understanding of fitness and health

Fitness Study: Self-empowerment scale (author created)
Would give you more control over your fitness
Would give you more autonomy over your fitness
Would make you feel more in charge of your fitness

Fitness Study: Goal focus scale (author created)
Would help you stay focused on your fitness goals
Would make your fitness goals more tangible (more real)
Would help you set more impactful fitness goals

Fitness Study: Anticipated motivation scale (author created)
Would keep you motivated through the 12 week program
Would push you to do your best during the program
Would increase the effort you put towards fitness during the program
Would keep you motivated even if you did the program for a year or more

Fitness Study: Self-assessed physical fitness scale (adapted from Abadie, 1988)
I am in good physical condition
I need to lose weight in order to improve my physical health (reverse coded)
I am more out-of-shape than most individuals my age (reverse coded)
When I exercise I tire easily (reverse coded)
I am more physically fit than most individuals my age

Fitness Study: Attitude toward technology scale (from Rosen *et al*. 2013)
I feel it is important to be able to find any information whenever I want online.
I feel it is important to be able to access the Internet any time I want.
I think it is important to keep up with the latest trends in technology.

I get anxious when I don't have my cell phone.
I get anxious when I don't have the Internet available to me.
I am dependent on my technology.
Technology will provide solutions to many of society's problems
With technology anything is possible.
I feel that I get more accomplished because of technology.
New technology makes people waste too much time. (reverse coded)
New technology makes life more complicated. (reverse coded)
New technology makes people more isolated. (reverse coded)

Carbon Footprint Study: Feedback meaningfulness scale (author created)
Would provide meaningful feedback on your progress toward reducing your carbon footprint
Would provide useful feedback on your progress toward reducing your carbon footprint
Would help you increase your understanding of what is needed to reduce your carbon footprint

Carbon Footprint Study: Self-empowerment scale (author created)
Would give you more control over the process of reducing your carbon footprint
Would give you more autonomy over the process of reducing your carbon footprint
Would make you feel more in charge of the process of reducing your carbon footprint

Carbon Footprint Study: Goal focus scale (author created)
Would help you stay focused on your carbon footprint reduction goals
Would make your carbon footprint reduction goals more tangible (more real)
Would help you set more impactful carbon footprint reduction goals

Carbon Footprint Study: Anticipated motivation scale (author created)
Would motivate you to really try to reduce your carbon footprint
Would increase the effort you put towards trying to reduce your carbon footprint
Would keep you motivated to reduce your carbon footprint for the long term
Would motivate you to try harder than you have in the past to reduce your carbon

footprint

Essay #2 Scales

Likelihood to Join Scale (author created)
I would participate in this program if it was offered to me

This program is highly appealing to me
I would be enthusiastic about joining this program
I have serious concerns about this program (reverse coded)

Anticipated Intrinsic Motivation Scale (adapted from Guay, Vallerand and Blanchard 2000)
I would enjoy doing this program very much
This program would be fun to do
This program would not hold my interest at all (Reversed coded)

External Regulation Scale (adapted from Guay, Vallerand and Blanchard 2000)
I would feel like this is a program I would have to do, even if I didn't want to
I would feel like this is a program I had no choice but to do
I would feel like this is a program I was forced into

Self-empowerment In Program Scale (author created)
Would give me more control over my fitness
Would give me more autonomy over my fitness
Would make me feel more in charge of my fitness

Trust In The Program Scale (author created)
I trust that the information about me gathered by the program will only be used to help me and not be used against me in any way
I trust that the information about me gathered by the program will be used ethically
I trust that the information about me gathered by the program will be kept secure
I trust that the information about me gathered by the program will not be shared with others beyond the fitness program

<u>Essay #3 Scales</u>

Interest in joining (author created)
I would participate in this online community of it was offered to me
This online community is highly appealing to me
I would be enthusiastic about joining this online community

Anticipated Intrinsic Motivation (Enjoyment) (from self determination theory)
Participating in this online community would be fun to do
Participating in this online community would be boring (reversed)
Participating in this online community would be interesting

Emotional Engagement – 1 to 7 describes poorly/describes well scale (from Thomson, MacInnis and Park, 2005)
How well do each of the following words describe the feelings you might experience if you participated as a member of this online community

Affection subscale
    Affectionate
    Friendly
    Loved
    Peaceful
Passion subscale
    Passionate
    Delighted
    Captivated
Connected subscale
    Connected
    Bonded
    Attached

Innate Competitiveness (from Smither and Houston, 1992)
Please rate your level of disagreement/agreement with the following. Please use the 1 to 7 scale provided, where 1 = strongly disagree and 7 = strongly agree. Use any number on the scale.
I don't like competing against other people (reversed)
I find competitive situations unpleasant (reversed)
I am a competitive individual

Hedonic/Utilitarian (from Voss, Spangenberg and Grohmann, 2003)
How well do the following words describe the coffee shop just shown to you? Use the 1 to 7 scale below. Where 1 = does not describe at all, and 7 = describes perfectly. Use any number on the scale

Functional (utilitarian subscale)
Necessary (utilitarian subscale)
Practical (utilitarian subscale)

Fun (hedonic subscale)
Exciting (hedonic subscale)
Enjoyable (hedonic subscale)

APPENDIX C

QUALITATIVE METHODOLOGY (ESSAY 1)

As part of essay one, I conducted a qualitative review of relevant online blogs posted on Tumblr.com and Reddit.com during a 12-month period from July 2014 to June 2015. Tumblr.com and Reddit.com are among the largest US blogging sites, with tens of millions of active users (Luden 2013). They also offer user-friendly search features that are helpful for research. The point of this qualitative research was to assist in hypothesis generation, since published research is scarce in the area of quantification of self. No findings are based on this qualitative research. Rather, I used this qualitative research for exploratory purposes. Reading blog posts by fitness tracker users gave me a sense of how consumers use these devices, what they like about them, what benefits they derive from them and what limitations they perceive in the trackers (for another example of using blog posts to explore consumer perspectives see Scaraboto and Fischer 2013). This research helped me understand what might be driving consumer interest in QOS in fitness, to begin to formulate hypotheses and assist in the development of a causal model.

This research consisted of three steps: 1) locating relevant blog posts, 2) initial review and open coding of posts and conceptualizing of general themes, and 3) agreeing on themes and reviewing the posts a second time via focused coding. Below I provide an overview of each of these steps.

Step 1: Locating relevant blog posts

I used the following search terms to locate relevant blogs on the two sites: Fitness tracker (including trackers and tracking), fitness monitor (including monitors and monitoring), fitness wristband (s), Fitbit (s), Nike Fuelband (s), Jawbone (s). As a result of these searches, 1,209 consumer blog postings about user's experience with fitness trackers were located and reviewed. Other phrases were tried (such as "quantification of self"), but discarded because they produced essentially no results. The 1,209 consumer blog postings were placed into an excel file. Most of the blog posts were fairly short (less than 250 words). For longer posts, only the relevant sections were maintained.

Step 2: Initial review and open coding

Two coders, an independent coder and myself, read the blog posts independently. We adhered to the coding protocols outlined by Taylor and Bogdan (1998). In our first round of reading, we followed procedures for open coding. We each generated lists of general themes we believed were reflected in the blogs, letting the blog content direct the list items.

Step 3: Themes and focused coding

The independent coder and myself then met and decided on the most common themes we saw in the blogs. We decided on seven key themes:

1) Detailed feedback (user comments on the detailed, granular feedback)
2) Goal focus (user comments regarding on the role the trackers play in their ability to set and focus on their fitness goals)

3) Educational impact/empowerment (user comments regarding how users believed the trackers educated them on their bodies and fitness, and also help them feel more in control of the fitness process as a result of this knowledge)

4) Motivation (user comments regarding the impact the trackers had on their fitness motivation – general items not specifically tied to items 1, 2 or 3)

5) Social interaction (user comments on interacting with others via the trackers, or talking about the trackers with others)

6) Gamification (user comments on the games and competitions played using fitness trackers)

7) Equipment complaints (user comments about problems with the devices – not directly relevant to this research but since it constituted the largest negative theme, I wanted to capture it)

In a second review of the blog comments, we undertook focused coding, in which the independent coder and I coded each blog post with one or more of the seven codes. Overall, the inter-rating agreement was 86%. Areas of disagreement were discussed between coders until consensus was reached. Blog excerpts were then read a third time by theme, and this final activity was used to help develop the hypotheses and model proposed in essay #1.

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