THE MORE IMMERSION IS NOT ALWAYS BETTER!

TECHNICAL REPORT

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THINK FORWARD INITIATIVE

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The Risk Of Using Immersive Technologies To Stimulate Saving Behaviour *

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December, 2019

Abstract

Negative life-changing events (such as a job loss or a divorce) can have serious financial consequences, and saving for such events is important for financial health and well-being. Yet, individuals find it difficult to envision such events to be occurring to them. As a result, they neglect the responsibility to save for such events and are often financially unprepared. One possible way to raise awareness for the financial risk of such events is to expose consumers to a simulation of a (negative) life event. New technologies (such as virtual reality) provide exciting opportunities for such endeavours. Consumers can experience a conversation with their boss, in which they are told that they will be fired, or with a divorce lawyer, in which they discuss terms diving their estate. While intuitively, this might serve as an eye opener and could motivate consumers to increase their savings, significant risks could be attached to this strategy. Envisioning very negative experiences (especially if they are very immersive) can trigger cognitive defence mechanism in consumers. Examples include thinking of reasons why such an event will likely not occur to them. As a result, the exposure could have no (or even adverse) effects on their saving motivation. This work tests this prediction, and examines the effectiveness of exposing consumers to positive and negative life event simulations (in different immersion levels such as video and VR) on their saving intentions and behaviours. Results ring a cautionary bell to the often-applied wisdom that "the more immersion is better", and provide actionable advice to designing interventions to stimulate saving behaviour.

***Keywords*:** Life events, Immersive technology, Virtual reality, Event valence, Cognitive defence

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* This report has been prepared by the authors for the Think Forward Initiative. It is based on a working paper currently under review at Journal of Marketing.

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1. Introduction

Tom is in his early fifties. He has a wife, and two children (both of them about to start college). He is the breadwinner of the family and has worked as an accountant for the same company for many years. One day, his boss calls him to the office and informs him that while he is doing very satisfying work, the company faces serious financial issues, and similar to many competitors has decided to outsource his role to a digital solution and a support facility abroad. As a result, they have to let him go… Loosing employment is just one of many examples of (negative) life events consumers can unexpectedly face. These events are unique experiences that bring about significant changes in a person's life (Bartels & Rips, 2010; Mathur, Lee, & Moschis, 2006). Other examples include divorce, or serious health issues. Very often these type of life events entail significant changes in the financial situation of the consumers, who have to deal with them (McKay & Kempson, 2003). And just as often, especially for negative life events, the financial impact is negative. In extreme cases, it can endanger the financial health, and well-being of entire families.

It is therefore extremely important that consumers financially prepare for such events and put aside money to create a "safety buffer". Yet, savings rates for many consumers fall painfully short (Macrae et al., 2017). Consumers have difficulties in making well-considered financial decisions, and are generally not saving enough for future events (Lusardi, 1999; Peetz & Buehler, 2009). Instead, they increasingly spend all their salary on current consumption, or borrow to spend even more (Skinner, 2007). The reasons why consumers have difficulties saving are complex, but when it comes to financially preparing for (negative) life events, one of the main reasons for their lack of responsibility is that they are inherently bad in envisioning their future (and with that in envisioning the occurrence of such events; Gilbert & Ebert, 2002). They tend to find it difficult to imagine future circumstances and the possible economic resources they may require (Bartels & Rips, 2010; van Gelder et al., 2013). People are more capable of identifying with their near future self, compared to an older version of themselves (Frederick, Loewenstein, & O'Donoghue, 2002), and have a fundamental inability to project the distant future (Hershfield, 2011). As a result, many consumers are financially unprepared for (negative) life events.

One strategy discussed to help consumers overcome this lack of preparation is to expose them to simulations of the future. Loewenstein (1996) theorized that a vivid impression of engaging in some action in the future can have a powerful impact on current behaviour. As a result, exposing consumers

to a simulation of a future event might help them envisioning the event occurring to them, and motivate them to financially prepare. Traditionally, such simulations could be created in the form of showing consumers a video of a future situation. However, with the development of new technologies, more immersive instruments are available. Immersive technologies are defined as technologies inducing a psychological state, where one perceives the self as being included in and interacting with an environment that provides a continuous stream of stimuli and experience (Witmer & Singer, 1994; Witmer, Jerome, & Singer, 2005).

One of the technological innovations particularly suited to create immersion is virtual reality (VR). An increasing number of studies have found that immersive, interactive media technologies such as VR have the capability to help and encourage people to improve their behaviour. Hershfield et al. (2011) for example used VR to expose their participants to an aged-progressed avatar of themselves, and showed that they were more willing to save money for retirement after the exposure. The characteristics of VR technology, as well as the powerful outcomes of the studies like that of Hershfield et al. (2011), shed a positively light on the potential of using immersive technologies such as VR to motivate consumers to put aside savings and to be financially prepared for negative life events. However, developing VR stimuli is costly, especially if trying to meet the often-requested industry goal of reaching "the more immersion the better". Understanding the efficiency of simulating life events is therefore important, especially since there might be an unforeseen risk to the idea of making the life event as realistic and immersive as possible.

Using a very immersive medium to simulate life changing events also means that consumers will experience more realistic emotions, and most importantly, more *confrontation* (McMahan & Bowman, 2007). For instance, experiencing an extremely realistic simulation of a conversation with an employer, in which one is informed that (s)he will be laid off , is likely to be painful and uncomfortable. As a result, imaging a very negatively life event might trigger cognitive defenses (Miceli & Castelfranchi, 1998). Consumer might misjudge the likelihood of the event occurring to them (Parfit, 1984; Taylor, 1991), deny the potential impact of the event (Parfit, 1984; Taylor, 1991), or reinterpret or minimize the information in such a way that it decreases the negative consequences (Sims et al., 2015). Thoughts such as "this would never happen to me", or "this would not have a big effect on my finances" when experiencing the simulation of a negative life event, might fail to have an effect on saving motivation or even decrease it. To test this prediction, two types of technology (video and VR) are used in a series of experimental settings to simulate a positive and a negative life event. Consumers experience a simulation of temporary unemployment of six months, which is either framed as sabbatical (positive) or temporary lay-off (negative). Saving intention and behaviours are assessed to better

understand the potential of immersive technologies to financially prepare for (negative) life events.

This manuscript makes important contributes to four different literature streams: Firstly, it contributes to understanding how different simulation techniques can be applied to influence consumers' financial behaviour. Whereas previous work has focused on establishing a connection to the future self in general (van Gelder et al., 2013; Hershfield et al., 2011; Oyserman, Destin, & Novin, 2015), this study presents a new approach to initiate this connection, by simulating a specific future life event through VR. Secondly, it contributes to a rather new stream of literature examining the potential of VR to nudge consumers. We extend previous work on the positive effects on weight loss (Fox & Bailenson, 2009), self-esteem (Kim, Lee, & Kang, 2012), overcome phobias (North, North, & Coble, 1998), better estimation of emotional interpersonal experiences (Szpunar & Schacter, 2013), and test the potential for financial health and well-being. Thirdly, this works contributes to the ongoing discussion whether or not positive or negative simulations of the future are more powerful and motivating. One stream of research suggests that negatively valenced information is (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), as it leads people to narrow and focus their attention in a greater degree than positive information (Peeters & Czapinski, 1990). Other evidence supports the idea that a positive (future) experience could be given more weight as it contains more sensorial and contextual details (Baños et al., 2004; D'Argembeau & Van der Linden, 2004). This work introduces an important moderator (level of immersion/realism), which might contribute to better understanding the conflicting findings. Lastly, this work extends the literature on cognitive defenses by showing that they seem to be stronger when immersion level is high. In sum, this research supports the growing literature on the intersection of financial, technological, and behavioural sciences and application of the insights of this study can ultimately lead to providing consumers greater financial empowerment (Addis, Wong, Schacter, 2008; Baxter, Buchler, Perales, Western, 2014; Hershfield et al. 2011; van Gelder et al., 2013).

The practical contribution extends to public policy makers, companies, and consumers. Understanding if and how exposing consumers to (positive versus negative) life event simulations, and guiding the choice of medium (video versus VR) provides concrete guidelines in designing the best instrument to better prepare consumers for the financial implications of such events. These insights can be firstly used by public policy makers or banks, as they share the goal of ensuring consumer financial well-being. In addition, consumers dislike income-uncertainty. Increased (precautionary) saving, to ensure a steady income in case (negative) life events require unforeseen funds, is both profitable for themselves, as well as for banking institutions due to increased interest rates (Lusardi, 1999). Results also ring a cautionary bell to the current excitement of using new technologies to nudge consumers. The

often-quoted approach of “the more immersion the better” needs to be evaluated with caution, as there might be unforeseen risks accompanying the exciting new opportunities.

2. Theoretical Framework

2.1 The financial consequences of life-changing events

Being financially responsible is a difficult task. For a lot of adults saving rates fall painfully short (Macrae et al., 2017; Celie, 2018) and consumers are often incapable of saving enough money to facilitate long-term planning (Ülkümen & Cheema, 2011). One of the reasons that consumers lack the ability to save for the future, is the disproportionate emphasis on their present compared to their future (Lynch & Zauberman, 2006). One area where not taking into account one's future sufficiently can be particularly stressful, is the occurrence of a (negative) life changing event (Lusardi, 1999; Peetz & Buehler, 2009). A life-changing event is an experience that introduces substantial changes to a person's identity and shapes the standard of their living conditions. Life-changing events, hereafter referred to as 'life events', happen at various stages in life and affect consumers' emotional or physical well-being, purchases and spending habits. Examples of life events are notably the transition to parenthood, changes in employment status, or healthcare issues (Bartels & Rips, 2010, Baxter et al., 2014, Mathur, Moschis, & Lee, 1999).

The manifestation of a life event is often linked to changes in financial behaviour. For example, having children can reduce time in paid labour and increase domestic purchase. Entering the labour market increases purchasing power whilst a job loss might necessitate upfront savings (Baxter et al., 2014). In addition to these more direct effects of life events on spending and income, they often lead to additional financial strain through the indirect effect of an increased spending to deal with the increase in stress often accompanied by such events. Consumers exhibit different purchase behaviour as an attempt to deal with high stress levels. Going on vacation, over-spending, eating out, or changing lifestyles are examples of consumption-coping behaviours often linked to such life events (Mathur et al., 1999). As a result, most life events have a negative effect on the financial situation of consumers. A research report for the US Department for Work and Pensions shows that events such as having children, getting a divorce, or becoming unemployed highly affect consumers' ability to keep saving money when they occur (McKay & Kempson, 2003). This clearly indicates that funds are needed to directly and indirectly cope with the financial demands which accompany such events.

Even though, most consumers will eventually experience one or more of these life events, most consumers are inherently bad in envisioning their future and with that in envisioning the occurrence of such events (despite the financial impacts they

bring). They have difficulties envisioning how these life events could turn out for them personally and if they actually think of their future, they oftentimes mis predict their feelings about these events (Gilbert & Ebert, 2002). This is especially true for negative life events. While one probably envisioning the joys of parenthood (while still often underestimating the related financial costs and the initiation of related saving actions), most consumers will have difficulties thinking of themselves losing a job, having to hire a divorce lawyer, or even experiencing severe health care issues. People abstractly understand that dramatic events can alter social and economic conditions in one's future life, but these modified life conditions often seem unrecognizable. The ability to envision these life events is further increased as the event is further removed from the present self (Loewenstein, O'Donoghue, & Rabin, 2003), or in different words, for events that are more likely to occur in the "far" future. As a consequence, people believe that certain (negative) events in the distant future will not happen to them (Harari, 2017; Weinstein, 1980). This denial causes a lack in saving intention to prepare for the possible times of need (Bartels & Rips, 2010; Harari, 2017; Wilson & Gilbert, 2005).

2.2 The use of immersive experiences to stimulate saving behaviour

Loewenstein (1996) theorized that a vivid impression of engaging in some action in the future can have a powerful impact on current behaviour, because it intensifies the emotional connection to this event. These emotional links to future events might lead to more rational (financial) decision making, since people are more engaged with the future consequences of a present decision (Hershfield et al., 2011; Loewenstein, 1996). Using immersive technologies to simulate such "vivid impressions" may provide an opportunity to overcome consumers' difficulty to envision life changing events occurring to them, and might increase their motivation to financially prepare for such events. Immersive technologies are defined as technologies inducing a psychological state where one perceives the self as being included in and interacting with an environment that provides a continuous stream of stimuli and experience (Witmer & Singer, 1994; Witmer, Jerome, & Singer, 2005). The term immersion is often used as an equivalent to the concepts of presence, engagement and involvement (Nillson, Nordahl, & Serafin, 2016). One of the technological innovations, which is particularly suited to create immersion is VR. Immersive VR removes all real-world stimuli and increases realism and active interaction with the virtual environment and has a unique ability to simulate real situations and contexts. In addition, time is sequential in virtual spaces, and therefore allows consumers to experience certain events before they take place in real life (Blascovich & Bailenson, 2011; Rueda, Godínes, & Rudman, 2018). As a result, it offers ample opportunities to investigate and change human behaviour (Diemer, Alpers, Peperkorn, Shiban, & Mühlberger, 2015).

First research attempts have been made to understand the potential of such VR to change the saving behaviour of consumers (Hershfield, 2011; Macrae et al., 2017). For example, Fox and Bailenson (2009) showed that exposing people to their virtual representation losing weight whilst exercising, makes them likely to exercise more. VR can be used to persistently boost one's confidence by manifesting the illusion of a more attractive avatar in the virtual world (Kim, Lee, & Kang, 2012). It can help an individual overcome phobias through effective exposure treatments (North, North, & Coble, 1998), and is used for training purposes for doctors and the military in either clinical or combat settings (McMahan & Bowman, 2007). Szpunar and Schacter (2013) have come closer to the topic of the current study and examined the effect of repeated simulation on future experiences, resulting in a better estimation of emotional interpersonal experiences. And even more closely related to the realm of this work (stimulating saving behaviour), research of Hershfield (2011) focused on how conceptions of the future self through virtual reality (VR) transform intertemporal financial choices. They used immersive VR with very realistic aged avatars of current college students, and demonstrated that identifying with the future self is a key component of positively affecting saving behaviour (Hershfield, 2011). What most of these studies have in common, is that by taking a simulated virtual glimpse into an identifiable (future) condition, people invest more to prepare for future circumstances (van Gelder et al., 2013; Hershfield et al., 2011).

The characteristics of VR technology, as well as the powerful outcomes of the cited studies in their endeavor to positively nudge consumers, shed a positive light on using immersive technologies such as VR to expose consumers to simulated (negative) life events, and to motivate them to put aside savings to be financially prepared for them. However, developing such stimuli is costly, especially if trying to meet the often-requested industry goal of reaching "the more immersion the better". It is therefore crucial that their efficiency needs to be tested. This is even more important as there might be an unforeseen risk to the idea of making the life event as realistic and immersive as possible to help consumers to envision the event.

2.3 The risk of being too immersive and the role of cognitive defenses

The more immersive the medium, the more emotions, and most importantly, the more *confrontation* people experience (McMahan & Bowman, 2007). Accordingly, the next section serves to establish that the valence of the life event plays an important role when using immersive technologies to simulate life events. The term 'valence' refers to the categorization on either a positive valence (attractiveness) or negative valence (aversiveness; Frijda, 2016). Valence is an influential concept in the psychological and financial fields, as research shows that one's (saving) behaviour can be modified merely by altering whether people think positively, or negatively about a savings goal (Ülkümen & Cheema, 2011; Wilson & Gilbert, 2005). Similarly,

Hershfield et al. (2011) extended their experiments by virtually presenting a sad or happy-looking avatar of their participants' future faces in accordance with how much money they wanted to save for retirement. This implies that, by framing the conditions positively or negatively in virtual environments, technology could steer people's saving behaviour into a preferred direction.

The discussion which valence (positive versus negative) in general is more powerful is debated in previous research. One stream of research suggests that negatively valenced information is more powerful than positive (Baumeister et al., 2001). Advantages of negative framing effects could be that it leads people to narrow and focus their attention in a greater degree than positive events and information (Peeters & Czapinski, 1990). As a consequence, negative information is more persuasive than positive information because people closely examine and process information systematically (Homer & Yoon, 1992). Besides, negative events lead to more cognitive work and more complex cognitive representations than do positive events (Peeters & Czapinski, 1990). Even when the information value is equal, negative stimuli are perceived as more complex. Ito, Larsen, Smith, and Cacioppo (1998) showed that negative photographs resulted in greater processing than equally intense positive photographs. It is suggested, such as the prospect theory notion, that negative aspects of an event are weighted more heavily than positive aspects in judgments (Tversky & Kahneman, 1992; Peeters & Czapinski, 1990). While the above-mentioned studies were not specifically focused on immersive technologies or VR, increased realism would likely strengthen the effect of greater processing and therewith increase motivation of consumers to save, especially for *negative* life events. While both positive and negative life events entail costs, comparably, the risks of endangering one's financial well-being are often greater for negative life events (McKay & Kempson, 2003). As such, a more powerful effect of exposure to a negative (compared to a positive) life event would be favorable in the endeavor to protect consumers' financial situations.

On the other hand, there is a different set of studies to consider when predicting the potential effect of event valence on saving behaviour in the context of immersive technologies (Oyserman et al., 2015; Vignoles, Manzi, Regalia, Jemmolo, & Scabini, 2008). In contradiction to the previous paragraph, research also provides evidence that a positive (future) experience could be given more weight as it contains more sensorial and contextual details (Baños et al., 2004; D'Argembeau & Van der Linden, 2004). More importantly, a positive possible future is more motivationally powerful in contexts that feel success-likely (e.g. students going to college which offers them opportunities for their future well-being) than one's negative possible future (Oyserman et al., 2015). Individuals care about striving to reach a desired (and avoid an undesired) possible future (Vignoles et al., 2008). Naturally, people want to create and maintain a positive self-image

(D'Argembeau & Van der Linden, 2004). For example, the pleasant state of feeling 'powerful' fosters optimism and makes people feel in control of their future. It also improves the ability to await future rewards (savings) and to pursue goals (life events) (Garbinsky, Klesse, & Aaker, 2014).

In line with the argument that envisioning a positive future (or a positive future life event) could be more motivating, there is evidence that consumers even go as far as to "protect themselves" from envisioning a negative future for themselves. This could particularly be relevant when experiencing a highly immersive version of the future – as imaging a very negatively life event might trigger cognitive defenses (Miceli & Castelfranchi, 1998). It might be favorable to experience a *positive* life event in an immersive fashion – experiencing one's wedding day in all details and high levels of realism in VR is likely to be pleasant and motivating, and can promote putting aside money for it. However, when being exposed to an extremely immersive simulation of meeting with your wife, and a divorce lawyer, consumers will likely feel uncomfortable and might apply cognitive defenses to protect themselves from the related negative thoughts. Kwon (2000) defines cognitive defenses as self-protective responses to threat, whereas maladaptive responses incline towards a distortion effect. Vaillant (1971; 1994) contributes to this by mentioning that the defense mechanisms can alter the feeling, subject, object, or idea of a persons' perception of an event, what possibly influences the decision-making process. Subsequently, people with active cognitive defenses protect their "positive" selves and avoid negative (external) influences (Chessell, Rathbone, Souchay, Charlsworth, & Moulin, 2014; Weiss & Lang, 2009). In the context of life events, due to such cognitive defenses individuals can completely misjudge the likelihood of the event occurring to them (Parfit, 1984; Taylor, 1991). For instance, when asking a married woman if she will ever be divorced, she will (obviously) avoid the imagination of this future-scenario, because she is currently happily married and does not want to believe this will ever occur to her. And even if consumers allow themselves to consider a negative life event to be part of their future, cognitive defenses contribute to them denying the potential impact such an event would have (Parfit, 1984; Taylor, 1991). Consumers reinterpret or minimize the information in such a way that it maximizes the positive aspects and decreases the negative consequences (Sims et al., 2015). Individuals can also fundamentally overestimate how bad they would feel about negative outcomes and therefore avoid thinking about them at all (Hershfield, 2011). Thoughts such as "this would never happen to me", or "this would never have such big effects on my finances", or "maybe it would be for the best", when experiencing the simulation of a negative life event, might not encourage saving at all, but fail to have an effect or might even decrease one's motivation to save.

Based on the somewhat contradictory findings on the opportunities of exposing consumers to positive and negative simulations of their future (and future

events), and the potentially interesting role of highly immersive technologies, this work uses a series of experiments to test the effect of event valence (positive vs. negative), and immersion level (low vs. high) on saving intention and behaviour. The expectation is that a high immersion level technology (such as VR) compared to more traditional and less immersive technologies (such as video) is beneficial to motivate consumers to save for positive life events, but could have no (or even adverse) effects for negative life events.

2.4 Overview of Studies

To test this hypothesis, we first provide information on the selection of the life event and stimuli used. We pre-tested the scenario to be framed as different in valence and construed a positive and negative version of the temporary unemployment. Study 1 then tests the prediction that exposing participants to a negative future life event in high immersion (VR instead of video) has an adverse effect on participants' willingness to save for that future event. Study 2 provides evidence for the process underlying the negative behavioural reaction. Participants apply cognitive defenses (such as telling themselves that the event is unlikely to occur to them) if the event is portrayed as immersive and negative. It further introduces an intervention which can be used to attenuate the negative reaction of consumers in the negative immersive condition.

3. Pre-test

3.1 Choice of Life-changing Event

There are numerous life events, which can negatively impact a consumer's financial situation and which require saving motivation (and behaviour) to financially prepare for them. Examples include the loss of one's job, a divorce, or a serious health issue. In this study, the life event used is the (temporary) loss of one's employment, and with that the loss of a considerable amount of one's income. The choice for this particular life event was made for numerous reasons: Losing employment is a negative life event that a large number of consumers experience at some point in their life time. According to a recent yearlong online survey more than half of 1,000 fully employed Americans between 18 and 65 years old have either been unemployed or experienced career gaps (Business News, 2019). It is therefore an event which is relevant and which can be realistically imagined by many consumers. It further happens at different life stages. Many life events are closely associated with a specific age: most consumers will experience marriage and parenthood in their late twenties/beginning thirties, divorce is most likely to occur a later moment in life. On the contrary, losing employment is not particularly linked to a specific age. It is important for this work to keep the time horizon of the occurrence of the simulated future event constant as saving intentions are volatile to changes in time horizon (Frederick, Loewenstein, & O'Donoghue, 2002). As a result, all participants are informed that the event will occur in 5 years' time. In addition, and with a focus on the practical implications of the work, a study by McKay and Kempson (2003) provides evidence that unemployment has the strongest (negative) impact on consumers' financial situation (compared to i.e., parenthood, divorce, or bereavement). For the simulation of the event developed for this study, consumers were informed that they would experience a significant decrease in income for a period of 6 months. Lastly, and for reasons related to methodological rigor, (temporary) unemployment is a life event, which can be framed as positive or negative, and which can be presented as independent to one's own responsibility.

3.2 Valence

Event valence was accordingly manipulated the following way. In the negative condition, people were exposed to a situation in which their employer told them that they will be temporarily unemployed for six months. Caused by the economic instability of their employers' company, their contracts would have to be paused, and they would receive a lower income. The scenario was modelled after several real-life scenarios in Europe (such as the wave of layoffs and short-time working contracts by car manufacturer Opel in Germany (Financial Times, 2017).

Employees are often protected by labour laws, and companies work with labour unions to significantly reduce the work forces, work time, and salary to help the company financially stabilize. In the positive condition, consumers were told that they were randomly chosen for a new HR initiative, which allows them to take some time off to spend more time with family/friends. The opportunity however comes with a significant decrease in salary. The instructions prior to treatment introduced the life event in a personalized way that made the temporary unemployment personally relevant and more believable to occur to respondents in 5 years' time. In both conditions, the respondents were told that the temporary unemployment will bring the same negative financial implications (please see Appendix A for the exact description of both simulations). We further pre-tested the two scenarios to ensure that they are indeed different in valence, but similar in the extent that participants (N = 80, M_{age} = 38.06, 35% female) consider them likely to happen. Participants exposed to the positive scenario classified the scenario as significantly more positive (M = 1.98, SD = .66) compared to those exposed to the negative life event (M = 3.93, SD = .91; $t(10.19) = 10.19$, $p < .001$, *Cohen's d* = 2.44; on a 5-point Likert scale, 1 = happy, 5 = sad). There was no difference between the scenarios on the likelihood of their occurrence.

3.3 Level of Immersion

For the manipulation of immersion level, the categorization by Miller and Bugnariu (2016) is used. According to their categorization, the lowest of immersion does not allow the user to interact with the media and remains an abstract imagination, like reading a text. Second, photo and video provide more visual information that enables users to imagine situations more vividly. These are non-interactive two-dimensional media and are therefore higher in immersion (Farra, Smith, & Ulrich, 2018; Schlosser, 2003; Miller & Bugnariu, 2016). Third, VR is a three-dimensional vivid projection of a virtual, fictive world, where users feel present and can actively interact with objects (Green & Brock, 2000; Steuer, 1992). Since it allows the most realistic simulations of visuals, sounds, and movement in a full 360° information experience, VR can be seen as the highest immersive medium (Hershfield et al., 2011, Miller & Bugnariu, 2016). The final stimuli were a variation on the 3-level categorization and focused on video (low immersion) and VR (high immersion). Textual information was excluded as it entails a very different processing style and effort, and video was chosen over photos or a story board to keep the sensory experiences (such as perception of sound) similar. These two levels of immersion were also used in the studies of Kalawsky (2000), van Herpen, van den Broek, van Trijp, and Yu (2016), and Baños et al (2004). The VR footage was a head-set based medium shot with a 360° camera. The VR experience was immersive in terms of visual experience, but did not allow different interaction with the scenario than the video (i.e. moving objects in the simulation was not possible). Both video and VR footage were shot by a professional VR company, oblivious to the research question. The choice of actor, a

professional with several years of experience in the industry, was done in accordance with the company. The apparatus used for the treatment was the VR headset ‘Occulus Go’, which was a highly advanced technology at the time of writing. Fundamental characteristics of the Occulus Go are: 1) fine visual clarity, 2) spatial audio drivers, and 3) comfortable form factor (“Oculus Go” n.d.). The setting of the video and VR footage was kept identical: the same actor played the hypothetical boss, in the same office-environment and – apart from positive or negative framing – the same script was presented to the participants. This allowed to focus on the effect that the level of immersion and valence realized, rather than the effect of different contents (van Herpen et al., 2016).

4. Study 1

After choosing the life event, and developing and pre-testing the stimuli, Study 1 proceeded to test the expectation that a high immersion level technology (such as VR), compared to more traditional and less immersive technologies (such as video), is beneficial to motivate consumers to save for positive life events, but could have no (or even adverse) effects for negative life events.

4.1 Method

4.1.1 Participants. Two hundred thirty-seven students from a college subject-pool (48.1% female, M_{age} = 19.98) participated in this lab study. Students are an interesting participant group because they place less emphasis on time constraints, in accordance with their seemingly 'infinite' future (Anong & Fisher, 2013). In addition, many students have significant study debts after graduation, but only 12% view this as a financial problem (Haegens, 2017). Furthermore, the content of this study's stimuli (simulation of the temporary unemployment) is relevant to students, as they are likely to enter the labour market in due time. This makes the simulated life event a plausible occurrence in their near future (5 years from now). To test the hypotheses, a 2x2 factorial between-subjects design was conducted: 2 (Valence of life-event: Negative versus Positive) x2 (Level of immersion: Low - video versus High - VR).

4.1.2 Procedure. Participants came to the lab, signed an informed content and started the survey by filling in some information about themselves (i.e., name, preferred drink, city that they want to work in). They were then asked to imagine that they would receive an email by their future boss in 5 years' time. The email was personalized and stated the following:

> Dear **Chris**,
>
> Please come to our **San Francisco** office at 10 am tomorrow.
> I have some news for you, and would like to talk to you over a **tea**.
>
> Best regards,
>
> Tim van Graaf

They were then informed that they would now experience the meeting with the boss, and were randomly assigned to one of the four experimental conditions. Participants in the VR conditions were asked to give a signal to one of the research assistants, who brought the VR devices, explained to them how they work and started the experience. Participants in all four conditions were asked to watch the simulation twice (which was specifically important for participants in the VR conditions, as familiarizing with the technology could distract them from the content of the simulation).

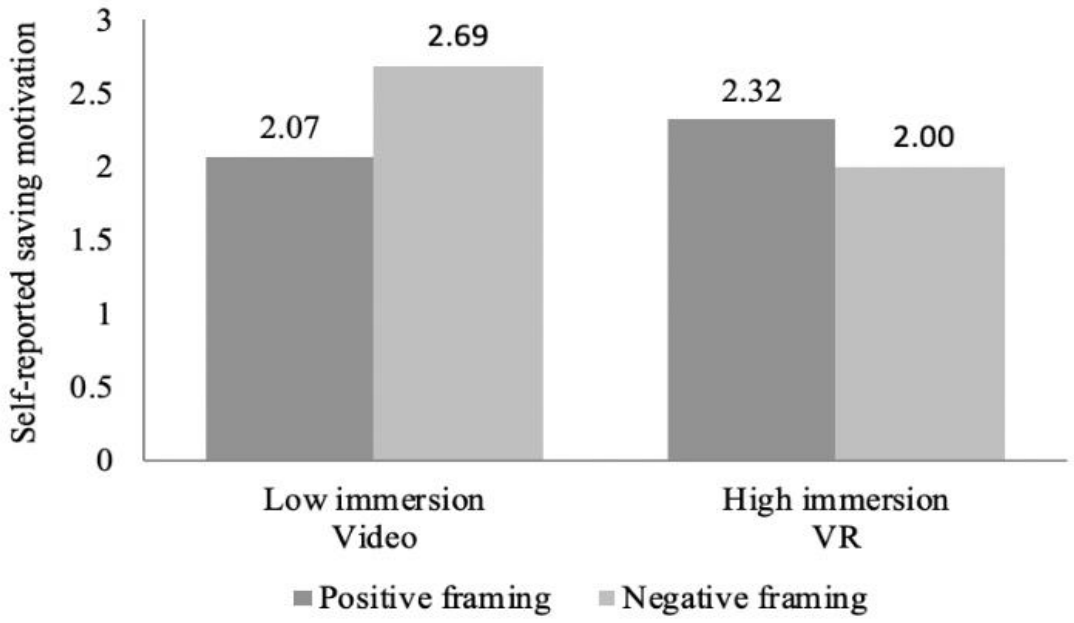
After experiencing the simulations, the participants moved to the next part of the survey, in which their willingness to save and their saving behaviour were assessed. Saving intention is a common variable among various research fields and a variety of measurements exist. Most of these measurements however, contain slight shortcomings in capturing realistic saving behaviour. For example, the widely used *money allocation task*, used by Hershfield et al. (2011), tells participants to imagine that they will receive a certain amount of money and are asked to allocate it among spending and saving options. For this study however, the windfall gain would counteract the negative financial implications the simulation was supposed to manipulate. As a result, two different dependent variables were used and presented to participants in random order. First, they were asked to state to which extend they agreed with the following statement: "I intend to save more money in the future", on a 7-point Likert scale (1=strongly disagree; 7=strongly agree). Second, we wanted to assess saving motivation in a more incentive conform way. Participants were told that in addition to the credits received in this study, they would also enter a lottery and receive a free E-book. They were asked to choose one out of three books: The Wilderness Survival Guide, Funny Facts about the City of Amsterdam, and Personal Finance for Starters. The order of presentation of the three books was randomized, and the books were pre-tested not to be differently attractive to the lab subject pool (see Appendix B for the exact wording and display of the books). We classified those participants choosing the book on personal finances as having a saving motivation, and those choosing one of the other two books as not having a saving motivation.

After this, they moved to answer some questions about the two simulations. We again assessed the valence, but also the perceived level of immersion, temporal distance to the event, perception of responsibility for the situation, as well as the negative financial impact the event would entail. Before exiting the lab, participants answered a number of additional questions about their income and their familiarity with VR technology, passed an attention-check focused on recalling the content of the simulation, provided demographic information, and were allowed to give comments about the study. They were then debriefed and thanked for their participation.

4.2 Results

4.2.1 Saving intention. We conducted an ANCOVA with event valence (positive vs. negative), presentation medium (VR [high immersion] vs. video [low immersion]) and their interaction as predictors. We used income, familiarity with VR technology, age, and gender as covariates. Results showed that there are no significant main effects of event valence ($F(228) = 1.41$, $p = .236$, $\eta_p 2 = .006$), or presentation medium ($F(228) = 2.23$, $p = .125$, $\eta_p 2 = .009$), but a significant interaction effect ($F(228) = 10.82$, $p = .009$, $\eta_p 2 = .030$) on people's self-reported saving intention. None of the included covariates had a significant effect on saving intention. First, those participants exposed to the

Figure 1: Self reported saving motivation across conditions in Study 1.



video condition reported a significantly lower saving intention when seeing the positive scenario (*M* = 2.07, *SD* = 1.15) than when seeing the negative scenario (*M* = 2.69, *SD* = 1.65; *t*(114) = 2.39, *p* = .019, *Cohen's d* = .437). In the VR condition, being exposed to a positive version of the temporary unemployment only directionally led to higher saving intentions (*M* = 2.32, *SD* = 1.28) compared to seeing a negative version (*M* = 2.00, *SD* = 1.07, *t*(119) = 1.504, *p* = .135, *Cohen's d* = .271). More important for the scope of this work, when wanting to simulate a negative life to help people financially prepare for it, a less immersive medium (e.g., video) is more efficient to motivate saving intention (*M* = 2.69, *SD* = 1.65) compared to a more immersive technology (e.g., VR; *M* = 2.00, *SD* = 1.07; *t*(106) = 2.63, *p* = .010, *Cohen's d* = .050. When simulating positive events, there was no significant difference between media chosen.

4.2.2. Saving behaviour. Results were similar for the actual behaviour variable. A logistic regression (model 1, Hayes, 2013) assessed the effect valence (positive vs. negative), presentation medium (VR [high immersion] vs. video [low immersion]), and their interaction as predictors. Income, familiarity with VR technology, age, and gender were set as control variables on saving behaviour. There was again no main effect of event valence or presentation medium, but a significant interaction effect of the two predictors (*b* = -1.13, *p* = .037, *CI* = [-2.19; -.07]. The interaction effects were reflected in actual book choices: In the video condition, 53% choose the book on personal finance after exposure to the negatively-framed event, while only 43% did so in the positively-framed event condition. The effect flipped for the VR condition; 33% choose the book on personal finance book after exposure to the negatively-framed event, while 50% of participants portrayed saving motivation

through their book choice in the positively-framed event condition.

Lastly, an evaluation of the a-posteriori manipulation checks confirmed a main effect of event valence - participants exposed to the positive scenario classified the scenario as significantly more positive (M = 3.15, SD = .95) compared to those exposed to the negative life event (M = 3.81, SD = .88; $F(233) = 30.67$, $p < .001$, $\eta_p 2 = .116$; on a 7-point Likert scale, 1 = happy, 7 = sad). There is no interaction effect with presentation mode and how responsible participants felt for the situations, or on perceived temporal distance to the future event. As expected, when testing the different presentation modes, we observed a main effect - the VR presentations of the events were judged to be more immersive (M = 4.37, SD = 1.63; $F(233) = 6.90$, p = .009; on a 7-point Likert scale, 1 = not at all immersive, 7 = very immersive) than the video presentations (M = 3.85, SD = 1.58, $\eta_p 2$ = .029). There were again no significant interaction effects with valence, perceptions of being responsible for the situations, and perceived temporal distance to the future event.

4.3 Discussion

Results provide first evidence that the use of simulations of life events to motivate consumers to save for them might not be as straight forward as one could expect, as they point to an important role of event valence and immersion level. For low immersion technologies (such as video) using a negative life event is more effective than using a positive life event. For high immersion levels (such as VR) however, using a positive event seems to be more effective. Most importantly, when wanting to motivate consumers to financially prepare for negative life events, there is a considerable risk attached to using (too) immersive technologies. VR simulations led to significantly lower saving intention than video simulations. This could indicate that when the simulation (and the related perceived emotions) become very immersive and realistic, consumers indeed apply cognitive defenses, such as telling themselves that such an event would never occur to them in order to cope with the negative emotions. As a result, the simulation does not have a positive effect on their saving motivation.

5. Study 2

Study 2 served to provide evidence for the process that underlies the effect of VR (vs. video) technology and framing of the event (i.e., positive vs. negative) on saving motivation. When the event simulation is immersive and negative, consumers likely apply cognitive defenses to cope with the confrontation. This study manipulates whether people apply cognitive defense mechanisms. By doing so, it also demonstrates an intervention that effectively mitigates the negative effect of cognitive defenses when VR technology is used for negatively-framed life events.

5.1 Methodology

5.1.1 Participants and procedure. Three hundred thirty-three students from a college subject-pool (52.9% female, M_{age} = 20.18) participated in this lab study. The introductory e-mail and stimuli were the same as in the previous study and manipulated event valence (positive vs. negative) and immersion level (low versus high). To assess the role of cognitive defenses, an additional condition was included: a negative scenario (both in video and VR) with an intervention aimed to remove possible cognitive defenses. As argued, participants likely use arguments such as "this will never happen to me". To mitigate this, we asked participants after exposure to the negative scenario to provide one or more reasons why such a temporary unemployment is likely to occur to them (see Appendix C for wording). As a result, the study made use of a 3x2 factorial between-subjects design: 3 (Valence of life-event: positive versus negative vs. negative with intervention) x 2 (Level of immersion: Low - video versus High - VR). We did not expose participants in the positive life event conditions to the intervention, as for them there is no evidence of a desire to lower negative emotions by applying cognitive defenses. The reminder of the procedure was similar to study 1: participants stated their self-reported saving intentions, made a book choice, provided their income and familiarity with VR technology, and answered questions about the scenarios and demographics.

5.2 Results

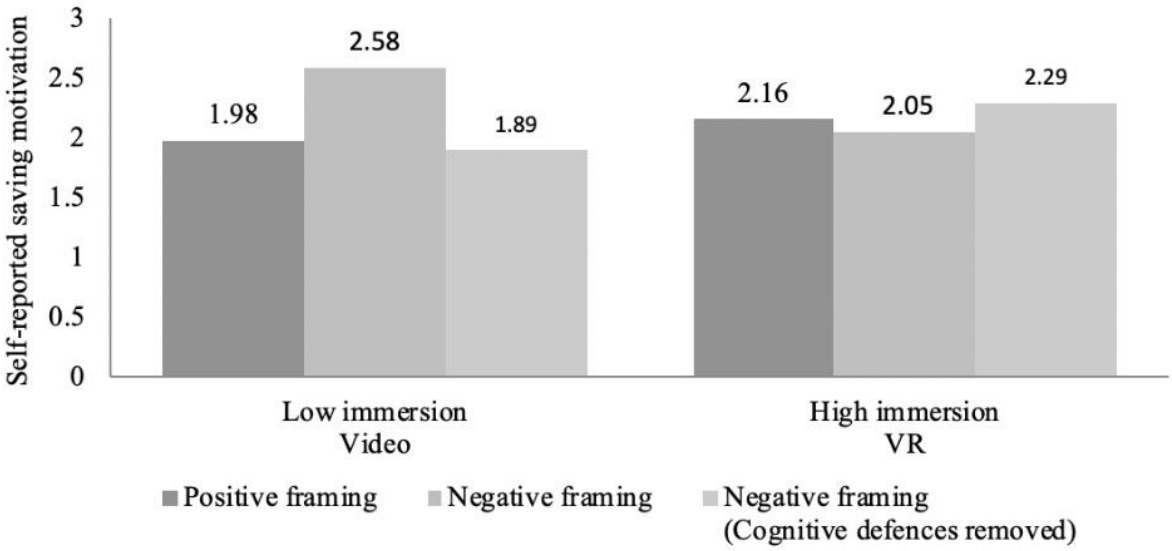
5.2.1 Saving intentions. Similar to Study 1, first the effects on self-reported saving intention were assessed by using an ANCOVA, with event valence (positive vs. negative), presentation medium (VR vs. video), and their interaction as predictors. Income, familiarity with VR technology, age, and gender were set as covariates. Results showed that there are no significant main effects of event valence ($F(317) = 1.17$, $p = .312$, $\eta_p 2 = .007$), or presentation form ($F(317) = .019$, $p = .890$, $\eta_p 2 = .000$), but a significant interaction effect ($F(317) = 5.00$, $p = .007$, $\eta_p 2 = .030$) on participants' self-reported saving intention. Income had a positive effect on self-reported saving

intention. None of the other covariates had a significant effect on saving intention.

Contrasts analyses performed matched the results of Study 2. Participants in the video condition again reported a significantly lower saving intention when being exposed to the positive scenario (*M* = 1.98, *SD* = .96) than when seeing the negative scenario (*M* = 2.58, *SD* = 1.69; *t*(104) = 2.27, *p* = .025. *Cohen's d* = .436). We also saw the same directional trend as in the previous study for the VR condition—seeing a positive version of the temporary unemployment in VR led to lower saving intentions (*M* = 2.16, *SD* = .97) compared to seeing a negative version (*M* = 2.05, *SD* = 1.06, *t*(109) = .557, *p* = .589. *Cohen's d* = .108). Using the negative scenario in VR and asking people to list reasons why the scenario is likely to them ('removed cognitive defenses') leads to similar saving intentions (*M* = 2.29, *SD* = 1.38) than the positive version of the temporary unemployment (*M* = 2.16, *SD* = .97, *t*(99) = .53, *p* = .60, *Cohen's d* = .109). More important for the scope of this work, we replicated that when wanting to simulate a negative life event, using a video (i.e., a non-immersive medium), led to significantly higher saving intentions (*M* = 2.58, *SD* = 1.69) than VR (an immersive medium; *M* = 2.05, *SD* = 1.06; *t*(110) = 2.03, *p* =.001, *Cohen's d* = .380). The negative effect of using VR was attenuated when accompanying it with a task to remove cognitive defenses (*M* = 2.29, *SD* = 1.38). There is no longer a significant difference between using video or using VR technology when including a task to remove cognitive defenses (*t*(100) = .956, *p* = .250, *Cohen's d* = .188).

To assess the effects on more incentive compatible saving behaviour, we ran a logistic regression (model 1, Haye, 2013). The three conditions (positive event simulation, negative event simulation, and negative event simulation with task to remove cognitive defenses) were entered as independent variables, and classified as categorical. Presentation format (VR vs. video) was entered as moderator. Income, familiarity with VR technology, age, and gender were again used as control variables. The negative simulation was classified as reference category. Results revealed two significant interaction effects, one between negative and positive simulation with presentation medium (*b* = 1.08, *p* = .05, *CI* = [.02; 2.19]), and one between negative simulation and negative simulation with cognitive defenses removed and presentation medium (*b* = 1.32, *p* = .017, *CI* = [.24; 2.41]. Likelihood ratio test of the highest order unconditional interaction revealed a $\chi 2$ value of 3.83 (*p* = .039). The significant interactions were reflected for participants' book choices. For the video condition, negative framing is the most effective, with 36% choosing the book about personal finances, versus 32% in the positively framed condition. The reverse holds for the VR condition, 31% opt for the book about personal finances in the negative framing, whereas 33% opt for the same book when the positive simulation is used. When removing cognitive defenses, the number raises to 36%. When simulating negative life events to help people to

Figure 2: Self-reported saving motivation across conditions in Study 2.



financially prepare for it, 33% choose the book about personal finances in the video condition, while only 31% chose it in the VR condition. This number goes up to 35% when removing cognitive defenses in the negative VR condition. The results of the a-posteriori manipulation checks matched those of the previous study. Participants exposed to the positive scenario classified the scenario as significantly more positive compared to those exposed to the negative one, and the immersive scenarios as more immersive than the less immersive scenarios. There were no significant differences between the scenarios on perceptions of being responsible for the situations, and perceived temporal distance to the future event.

5.3 Discussion

Results replicate the findings of Study 1: For low immersion technologies (such as video) using a negative life event is more effective than using a positive life event. For high immersion levels (such as VR), using a positive event seems to be more effective. More importantly, and similar to Study 1, there is a negative risk attached to exposing participants to immersive technologies when wanting to help them to prepare for a negative life event. Results also support the use of cognitive defenses (such as telling oneself that the event is unlikely to occur to oneself) as an underlying process. When accompanying the negative simulation with a task asking participants to specifically focus on why the event *is likely to occur to them,* the negative effect on their saving motivation can be attenuated.

6. Discussion

Negative life-changing events (such as a job loss or a divorce) can have serious financial consequences for consumers, and often seriously endanger the financial health of individuals and families. While consumers abstractly understand the (financial) risks of, for example. losing a job, they often find it difficult to envision such events to be occurring to them. As a result, they neglect the responsibility to save for such events and are often financially unprepared to deal with them. Research has shown that, exposing consumers to simulations of their future (selves) can help them to better envision their future. Accordingly, showing them a simulation of a financially risky negative life event could help them to be more aware and could motivate them build a financial safety buffer. New immersive technologies such as VR, provide exciting opportunities to make these type of event simulations realistic and engaging. The VR industry continuously tries to make experiences more immersive and increase a state of “being present”, and one could be exposed to a realistic simulation of being fired or meeting a divorce lawyer. On the other hand, such intense levels of immersion could also come with an unforeseen risk. Envisioning very negative experiences (especially if they are very immersive) can trigger cognitive defence mechanism in consumers to reduce negative emotions. Examples include thinking of reasons why such an event will likely not occur to them, or why it would have little implications. As a result, the exposure could have no (or even adverse) effects on saving motivation. This work tested this prediction, and examined the effectiveness of exposing consumers to positive and negative life event simulations in different immersion levels (such as video and VR), on their saving intentions and behaviours. Results ring a cautionary bell to wanting to use immersive technologies in order to encourage consumers to save for negative life events. When simulating negative life events, using non-immersive technologies such as a video, proved to be more effective than using immersive technologies such as VR. Results also provided evidence that cognitive defenses are used by consumers when the simulations become too realistic. When being asked to specifically think of reasons why the event is likely to happen to them (to counter the activated cognitive defenses), the negative effects on saving motivation were attenuated. In the video simulation on the other hand, the level of realism for the negative event seemed to be high enough to trigger attention and awareness, while not being “scary” enough to trigger cognitive defenses. This work further compared the effectiveness of using different event valences (negative versus positive life) in the two different immersion levels. When using video, using a negative life event actually proved to be more

effective than using a positive event, while the effect was reversed in VR.

These results help evolve different literature streams. While previous work has focused on establishing a connection to the future self in general (van Gelder et al., 2013; Hershfield et al., 2011; Oyserman et al., 2015), this study presents a new approach to initiate a future self-connection, by simulating a specific future life event through VR. This approach seems to motivate people to prepare for the future if the event used is *positive*, but not when it is negative. As a result, using VR to create a strong future self-perception should be considered in accordance with literature on cognitive defenses. The results further contribute to a rather new stream of literature examining the potential of VR to nudge consumers. Previous studies used VR technology to create positive effects on weight loss (Fox & Bailenson, 2009), self-esteem (Kim, Lee, & Kang, 2012), overcoming phobias (North, North, & Coble, 1998), better estimation of emotional interpersonal experiences (Szpunar & Schacter, 2013), and tested the potential for financial health and well-being. The results are very important to this literature stream for two reasons. Firstly, they show the risk of showing negative VR experiences, namely that they can trigger cognitive defenses. As a result, and in line with the above-mentioned studies and the recommendations made to create a stronger future-self connection, positive framings seem to be a better choice when developing successful nudges. Secondly, they show the potential of using lower cost, and less immersive technologies when working on more negative displays. This work further contributes to the ongoing discussion of whether positive or negative simulations of the future are more powerful and motivating. One stream of research suggests that negatively valenced information is (Baumeister et al., 2001), as it leads people to narrow and focus their attention in a greater degree than positive information (Peeters & Czapinski, 1990). Other evidence supports the idea that a positive (future) experience could be given more weight as it contains more sensorial and contextual details (Baños et al., 2004; D'Argembeau & Van der Linden, 2004). This work introduces an important moderator (level of immersion/realism), which might contribute to better understanding the conflicting findings. The effectiveness of negative frames to be more deeply processed seems to be guided by an optimal balance between being engaging and realistic enough to trigger attention and awareness, but not too realistic as to induce fears and negative emotions, which in turn trigger cognitive defenses and distract from processing the "more powerful" information. Lastly, this works extend the literature on cognitive defenses by showing that they seem to be stronger when immersion level is high. Human beings are continuously seeking, remembering and interpreting information in ways that satisfy themselves as much as possible, and experience outcomes in the most positive way (Gilbert & Ebert, 2002). Previous work has already shown that cognitive defenses are applied when people are asked to think about negative life events (Chessell et al., 2014; Kwon,

2000). In these studies, the intensity of the situation, and there with the personal relevance triggered the defenses. This work shows that immersion can have a similar effect, and more importantly contributes to this stream of literature by showing that a cognitively initiated task can be used to remove some of the cognitive mechanism applied by consumers. In sum, this research supports the growing literature on the intersection of financial, technological, and behavioural sciences and application of the insights of this study can ultimately lead to providing consumers greater financial empowerment (Addis et al., 2008; Baxter et al., 2014; Hershfield et al., 2011; van Gelder et al., 2013)

This work further provides several practical implications for stakeholders such as public policy makers, companies, and consumers. Understanding if and how exposing consumers to (positive versus negative) life event simulations has the potential to motivate them to save for such events can be an interesting strategy to help improve consumers' financial health. In addition, guiding the choice of medium (video versus VR), provides concrete guidelines in designing the best instrument to better prepare consumers for the financial implications of such events. Results also ring a cautionary bell to the current excitement of using new technologies to nudge consumers. The often-quoted approach of using "the more immersion the better" needs to be evaluated with caution. Results show that when wanting to simulate negative life events, less immersive and more cost-efficient technologies such as a video of the event is more efficient to motivate saving. Results further show that event valence is important when creating such simulations. For VR technologies, positive events are a better choice to motivate consumers compared to negative events. Interestingly, the reverse is true for video technology. When creating video simulations, negative events are more powerful than positive events.

This work has some limitations, which can guide future research suggestions. First, the event chosen for this manuscript was a temporary unemployment, but the reasoning should hold for other negative life events. Yet an important variable to consider when replicating these results for other events could be the perception of failure and personal responsibility for the situation. This was kept constant between the conditions and framed in a way that participants were not feeling responsible for the temporary unemployment. However, this variable has been shown to be important when considering one's future, and should therefore be further examined. Especially, as it is likely that cognitive defenses will be even stronger when feeling responsible (such as i.e. when admitting a failed relationship and getting a divorce).

Second, actually having experienced an event can alter how future simulations are processed. One way to simulate the future is by recollecting past events and imagine the future as far as possible, dependent on the episodic memory (Addis, Wong & Schacter, 2008). In this work, the sample consisted of students

and most of them had not yet experienced temporary unemployment. The likelihood for the event to occur was further pre-tested. Yet, interesting results could come from looking at a consumer who already experiences a negative life event and have to prepare for a re-occurrence.

Furthermore, the participants were relatively inexperienced with VR technology. Self-reported familiarity with VR technology was rather low in both samples (*M*= 3.27 in Study 1, and *M*= 2.32 in Study 2 on a 7-point Likert scale with 1=not familiar at all, 7=very familiar; and *M*=1.73), and so was frequency of use (*M*=1.73 in Study 1, *M*=1.20 in Study 2 on a 7-point Likert scale with 1=never, 7=almost daily). The effect of immersion and the triggered cognitive defenses might become lower with higher levels of experience.

Lastly, the sample's overall motivation to save was relatively low. We measured saving intention by assessing one's intention to save more (i.e., self-reported intention scale), but also tried to asses a more incentive-conform/ behavioural way to capture saving motivation. We asked participants to choose between different books as additional incentive for their participation. One book's content (Personal Finance for Starters) was clearly related to a saving motivation, as the sub-title stated "The latest on how to save more". Choosing this book (over more hedonic and entertainment-oriented titles) therefore is "costly" for participants, and represents an honest interest and motivation. While the life event simulations led to a relative improvement of saving intentions (for both the self-reported measure and the book choice), the general motivation remains low. This points to 1) the complex factors contributing to the lack of saving motivation in consumers, and 2), the need to further examine saving intention in a more real-world setting. Accordingly, a follow-up study is currently developed in which participants will register their expenses and savings for a month after exposure to the life event stimulus.

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8. Appendix

Appendix A: Story board – Positive Life Event

 Hello! Thanks for coming! How are you? Please take a seat.	 I hope you are doing well and enjoying your time in the company so far. We have some news for you!
 As you might have heard, our HR team has launched a new initiative for our employees. As a result, we are selecting a couple of employees and allow them to take a 6-month sabbatical. The purpose of the initiative is to enhance employee satisfaction and reduce work stress.	 To make sure that the selection is fair, and in agreement with the company's workers union, we randomly picked employees from our human resources pool. In this process, fortunately, your name has come up and you have been chosen for a six-month **temporary** sabbatical.

During this period, you will not be working for us. This will have financial implications for your salary.

As you will not be working, we will only be paying you the minimum wage. This will unfortunately cut your salary considerably.

The purpose of the sabbatical is that you have a timeout from your busy work schedule.

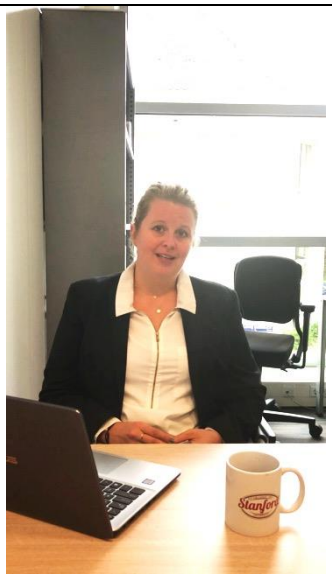
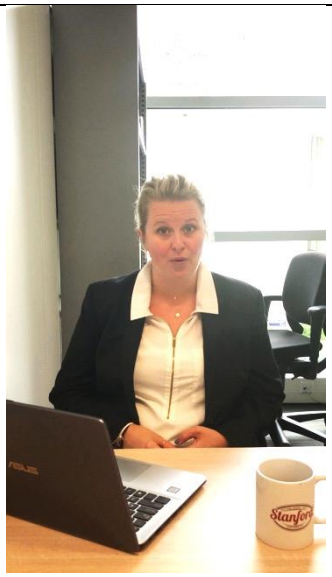
You can spend some quality time with your family and friends. You can use it to enjoy yourself with activities that you like, or you can simply relax.

We hope you enjoy the gesture and will see you when you are back!

Have a good rest of the day.

Bye!

Story board – Negative Life Event

 Hello! Thanks for coming! How are you? Please take a seat.	 I hope you are doing well and enjoying your time in the company so far. We have some news for you!
 As you might have heard, the company is experiencing some difficult times. As a result, we are selecting a couple of employees and temporarily pause their contracts. The purpose of these temporary lay-offs is to reduce our HR cost. until we are economically more stable again.	 To make sure that the selection is fair, and in agreement with the company's workers union, we randomly picked employees from our human resources pool. In this process, unfortunately, your name has come up and you have been chosen for a six-month **temporary** lay-off.

During this period, you will not be working for us. This will have financial implications for your salary.

As you will not be working, we will only be paying you the minimum wage. This will unfortunately cut your salary considerably.

We hope you could make use of this timeout from your busy work schedule.

You can spend some quality time with your family and friends. You can use it to enjoy yourself with activities that you like, or you can simply relax.

We hope you could understand and will see you when you are back!

Have a good rest of the day.

Bye!

Appendix B: Dependent variable used in Studies 1 & 2

Additional Incentive

You will be granted credits for your participation in this study.

For this study, we will also let you enter a lottery in which you can win a book. The book store we are collaborating with has suggested the following books to be interesting to students based on their purchase record.

In case you win, which book would you like to receive?

Appendix C: Intervention to remove cognitive defenses used in Study 2

In the video, you were informed that you would be temporarily laid off and that your salary would be reduced to minimum income during that period.

Why is the temporary unemployment a likely scenario that could happen to you in 5 years time? Please come up with **one or more reasons** (e.g. a lot of jobs are going to be taken over by artificial intelligence and robots in the future, so companies will struggle with their workforce).

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