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**THE GOOD OLD DAYS: HOW TECHNOLOGY MAKES PEOPLE NOSTALGIC**

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MARÍLIA THOMAZ AYRES DA SILVA

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Dissertação apresentada à Escola de  
Administração de Empresas de São Paulo da  
Fundação Getulio Vargas, como requisito para  
obtenção do título de Mestre em Administração  
de Empresas.

Campo de Conhecimento: Estratégias de  
Marketing

Orientador: Prof. Dr. Delane Botelho

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*"So we beat on, boats against the current, borne  
back ceaselessly into the past"  
(F. Scott Fitzgerald)*

## **ABSTRACT**

In the last decades, nostalgia has attracted considerable attention from writers, journalists, consumers and marketing researchers, and has been widely used as a marketing tactic. Researchers agree on the effectiveness of nostalgia but the mechanism underlying this emotion lacks comprehension. Through a Structural Equation Model this research examines the relationship between loneliness and nostalgia, mediated by the excessive Internet use, and its negative outcomes (i.e. anxiety). The results indicate that loneliness antecedes excessive Internet use, which subsequently increases anxiety, then boosting nostalgia. The dissertation contributes to the idea that the excess of technology makes people long for “the good old days”.

**KEYWORDS:** nostalgia, excessive Internet use, loneliness, consumer behavior, double mediation, structural equation modeling.

## **RESUMO**

Nas últimas décadas, a nostalgia atraiu considerável atenção de escritores, jornalistas, consumidores e pesquisadores de marketing, e tem sido amplamente utilizada como tática de marketing. Os pesquisadores concordam com a eficácia da nostalgia, mas o mecanismo subjacente a essa emoção carece de compreensão. Através da modelagem de equações estruturais, essa pesquisa examina a relação entre solidão e nostalgia, mediada pelo uso excessivo da Internet, e seus resultados negativos (ou seja, ansiedade). Os resultados indicam que a solidão promove o uso excessivo da Internet, o que subsequentemente aumenta a ansiedade, aumentando a nostalgia. A dissertação contribui para a ideia de que o excesso de tecnologia faz as pessoas ansiarem pelos “bons velhos tempos”.

**PALAVRAS-CHAVE:** nostalgia, uso excessivo da Internet, solidão, comportamento do consumidor, dupla mediação, modelagem de equações estruturais.



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# CHAPTER 1

## INTRODUCTION

### 1.1 CONTEXT

In the last decades, nostalgia has attracted considerable attention from writers, journalists, consumers and marketing researchers (Holbrook & Schindler, 2003), and has been widely used as a marketing tactic (Barauskaitė & Gineikienė, 2017). In 2019, the Coca-Cola Company brought back the infamous New Coke as a part of the limited campaign for the third season of the Netflix series *Stranger Things*, which took place in the summer of 1985, when the beverage was launched (Morris, 2019). Volkswagen, the manufacturer of the famous *Kombi*, will relaunch a new electric version of the vehicle, called “*Kombi of the Future*” (Meneguelli, 2020) (Figure 1).



**Figure 1.** An example of nostalgia as a marketing tactic: New Coke (left) and *Kombi of the future* (right).

A range of studies shows that the use of nostalgia in products and advertising results in a more favorable attitude toward the brand (Muehling & Sprott, 2004; Bambauer-Sachse & Gierl, 2009; Ju et al., 2016; Marchegiani & Phau, 2010), the ad (Muehling & Sprott, 2004; Bambauer-Sachse & Gierl, 2009; Marchegiani & Phau, 2010), higher purchase intentions (Ju et al., 2016; Marchegiani & Phau, 2010) and a propensity to pay more for the products and services capable of reliving pleasant memories of a past time (such as adolescence and childhood) or even of a period not experienced personally (Lasaleta, Sedikides, & Vohs, 2014). This is arguably because research has evidenced that nostalgia, a sentimental longing for one’s past (Sedikides & Wildschut, 2018), counteracts adverse stimulus (Bialobrzeska et al., 2019), neutralizes

negative feelings (Wildschut et al., 2006), increases psychological health and well-being (Routledge et al., 2011, 2013), protects and promotes mental health (Zhou et al., 2008), as well as other motivational consequences (Sedikides et al., 2015).

Lonely individuals seek refuge in nostalgic experiences (Wildschut et al., 2006, 2010; Wildschut, Sedikides, & Cordaro, 2011; Sedikides et al., 2015; Kim, 2017), mainly because nostalgic memories often involves fond recollections between the self and close others, regulating deficiencies in social connectedness caused by loneliness (Wildschut et al., 2006). Moreover, loneliness, defined as a painful feeling of being isolated (Weiss, 1973; Russell, Peplau, & Cutrona, 1980; Ernst & Cacioppo, 1999; Masi et al., 2011), is one of the major motives driving individuals to use Internet (Kim, LaRose, & Peng, 2009) to search for social interaction (Nowland, Necka, & Cacioppo, 2018), thus increasing social connectedness and the sense of belongingness (Shepherd & Edelman, 2005).

However, those who attempt to obtain social benefits via the Internet are also likely to experience negative outcomes from such exposure and may be at risk of developing an excessive Internet use behavior (Caplan, 2002). A study conducted by Kim, LaRose, & Peng (2009) showed that individuals who were lonely could develop strong compulsive Internet use behaviors resulting in negative outcomes instead of relieving their original problems. One of the negative outcomes of excessive Internet use is the increase of unpleasant feelings, such as anxiety, defined as an emotional and unpleasant inner state often accompanied by nervous behavior (Memmedova & Selahattin, 2018). “Technology helps us manage life stresses but generates anxieties of its own. The two are often closely linked” (Turkle, 2017, p.243). Lonely individuals may be particularly attractive to Internet social media because of the possibilities of connectedness that they provide (Morahan-Martin & Schumacher, 2003). However, excessive social media use is also associated with elevated anxiety symptoms and more severe anxiety-related impairment (Vannucci, Flannery, & Ohannessian, 2017).

There are evidences that the anxiety caused by excessive Internet use increases nostalgia proneness, since nostalgia “occurs in the context of present fears, discontents, anxieties, and uncertainties” (Davis, 1979, p. 34). As a consequence, the nostalgic memory tends to neutralize negative feelings (Wildschut et al., 2006) and adverse stimulus (Bialobrzaska et al., 2019), and may enhance psychological health and well-being (Routledge et al., 2011, 2013).

There is strong empirical evidence that connects loneliness and nostalgia (Wildschut et al., 2006, 2010; Zhou et al., 2008; Loveland, Smeesters, & Mandel, 2010; Wildschut, Sedikides, & Cordaro, 2011; Seehusen et al., 2013; Sedikides et al., 2015; Kim, 2017). However, to the best of my knowledge, no research has studied the excessive use of Internet and its negative outcomes as mediators between loneliness and nostalgia. I posit that loneliness raises nostalgia through the underlying mechanisms of excessive Internet use and anxiety. Therefore, the research questions are: Does loneliness affects nostalgia propensity via excessive Internet use and anxiety? Specifically, does loneliness imbue individuals with excessive Internet use, which in turn lifts anxiety? I tested whether this sequential path constitutes a basis for loneliness' effect on nostalgia.

## 1.2 OBJECTIVE

The objective of this research is divided into two parts: i) *to analyze the relationship between loneliness and nostalgia, in such a way that the lonely individual/consumer will present a higher level of nostalgia*; ii) *to explain the underlying mechanisms within such relationship, through the multiple mediation effect (excessive Internet use and anxiety)*.

## 1.3 CONTRIBUTIONS

My research contributes to the literature in several ways. First, prior studies reveal the relationship between technology and nostalgia (see Cartwright, Besson, & Maubisson, 2013; Harborth, & Pape, 2019), but they have not considered the excessive use of the Internet as an antecedent to nostalgia. Second, prior research has already studied loneliness as a trigger to nostalgia (Wildschut et al., 2006) mediated by need to belong (Loveland, Smeesters, & Mandel, 2010) and moderated by resilience (Zhou et al., 2008), but they have not considered excessive Internet use and anxiety, two phenomena that characterizes the contemporary consumption society (Caplan, 2006; Elhai et al., 2020) as underlying mechanisms in the relationship between loneliness to nostalgia. Finally, from the marketing perspective, this research contributes with the idea that the nostalgia movement may to some extent be a reaction against the stresses of modern life. The more consumers' lives become defined by technology in a world that has become overcomplicated, the stronger will be their desire to refer back to slower, cozier times (Euromonitor, 2012; Turkle, 2017). Therefore, nostalgia will continue to be a popular and

profitable marketing tool for the consumer seeking to escape (even for a brief moment) from the difficulties of modern life.



## **CHAPTER 2**

### **THEORY AND HYPOTHESES**

#### **2.1 A BRIEF HISTORY OF NOSTALGIA**

The word “Nostalgia” is based on two Greek roots: “nostos”, meaning to “return to one’s native land,” and “algos”, meaning “pain, suffering, or grief” (Holak & Havlena, 1992; Sedikides, Wildschut, & Baden, 2004; Sedikides & Wildschut, 2018). Although the term was not used until the late seventeenth century, references to its meaning can be traced back as far as the writings of Shakespeare, Caesar, Hippocrates, and Homer (Wildschut et al., 2006). According to Holbrook & Schindler (1991, p.330), “the sense of nostalgia has always inextricably infused the consciousness of the basic human condition”.

Johannes Hofer, a Swiss physician coined the word “nostalgia” in 1688 to describe a medical condition of soldiers away from home (Davis, 1979). The term was considered a psychiatric disorder, “a cerebral disease of essentially demonic cause” (Hofer, 1934/1688, p.387). Its symptoms included respiratory disturbances, irregular heartbeat, insomnia, circulatory disturbances, and high blood pressure (McCann, 1941). The view of nostalgia as a medical or neurological disease persisted in the eighteenth and nineteenth centuries (Sedikides et al., 2015). By the beginning of the twentieth century, nostalgia came to be considered a psychosomatic disorder, a condition similar to melancholia or depression (McCann, 1941), and it remained relegated to the realm of psychological disorders for much of the twentieth century (Wildschut, Sedikides, & Cordaro, 2011). Its symptoms included sadness, anxiety, and anorexia (Sedikides & Wildschut, 2016).

It was only in the mid-twentieth century that nostalgia began to take on its current meaning, which includes more positive than negative feelings (Holbrook & Schindler, 2003; Loveland, Smeesters, & Mandel, 2010) of an idealized past (Stern, 1992). The sociologist Fred Davis (1979) was one of the first researchers to consider nostalgia as a positive evocation of the past, involving negative feelings about the present and the future, manifested by the belief that life was better in the old days. The negative reputation of nostalgia was due to an inferential error. “Scholars drew an inference from the temporal coincidence of nostalgia and misfortune, concluding that nostalgia causes psychological problems. Instead, they should have concluded

that misfortune triggers the onset of nostalgia as a coping mechanism” (Sedikides & Wildschut, 2016, p.319).

Today, nostalgia is defined as a sentimental longing for one’s past (Sedikides et al., 2015). It is a complex yet pervasive aspect of the human condition (Holbrook & Schindler, 2003), rooted in human nature (Boym, 2008), prevalent, universal, and experienced across ages (Sedikides et al., 2015). Nostalgia is regarded as a past-oriented (because it arises from fond memories mixed with tender reflections of one’s past), self-relevant (because the self is the protagonist in nostalgic accounts), intensely social (because the self is almost invariably surrounded by close others), and bittersweet, albeit more sweet (e.g., pleasant) than bitter (e.g., sad) emotion (Sedikides et al., 2015; Bialobrzaska et al., 2019; Luo et al., 2019).

It arises from personally meaningful recollections of momentous (i.e., atypical) life events (e.g., graduations, anniversaries, vacations) that center on close relationships (e.g., family, friends, partners) or childhood. In nostalgic reverie, the mind is ‘peopled’ as one reestablishes symbolic connections with important others. One views the past fondly through rose-colored glasses, misses it, and may yearn to return to it; one feels tender and content, yet tinged with longing (Sedikides & Wildschut, 2016, p.319).

There are two separate dimensions on which nostalgia or nostalgia-like experiences differ: i) the personal versus collective nature of the experience; and ii) the basis of the feeling in direct versus indirect experience (Holak, Havlena, & Matveev, 2006). Holak and Havlena (1998) used these dimensions to develop a classification of four types of nostalgic experiences: personal nostalgia (based on a direct and individual experience); interpersonal nostalgia (based on an indirect and individual experience, e.g. a child’s own memories of the parent and the retelling of a story); cultural nostalgia (based on direct and collective experience, experiences that exhibit considerable commonality across members of the group); and virtual nostalgia (based on an indirect and collective experience, e.g. members of re-enactment societies who display a nostalgia for eras or locales with which they have no direct experience or connection) (Holak, Havlena, & Matveev, 2006).

Sometimes, nostalgia can be mistaken for rumination or counterfactual thinking. However, while rumination and counterfactual thinking are negative memories related to bitterness and to depression (for example, using memories to remind oneself of how poorly one has been treated or to reinforce regret), nostalgia is always related to intimacy maintenance. The nostalgic individual wants to remind him/herself of the people who are no longer with him/her and what they meant. It serves to remind of what intimacy one has achieved and therefore what

one is capable of. In the grouping of past-oriented thought, nostalgia stands out as adaptive (Adam, 2014).

The integration between nostalgia and consumer research took place in the last decades of the twentieth century (Holbrook & Schindler, 1989).

## **2.2 A RETROMARKETING REVOLUTION**

In the late twentieth century, there was substantial discussion concerning the emotional aspects of products, and the fantasies they were able to fulfill (Fontenelle, 2017). The seeking of emotional arousal was posited to be a major motivation for the consumption of certain product classes (Holbrook, 1980). At this point, nostalgia began to be used as a marketing tool (see Holbrook & Schindler, 1989). According to Havlena and Holak (1991, p.323), “one notable trend as we leave the 1980’s and enter the decade of the ’90s is the increasing visibility of nostalgia in marketing, advertising, and entertainment media”. At that time, “despite the popularity of nostalgic products and messages, little research has studied nostalgia within the context of consumer behavior” (p. 232).

Today, nostalgia continues to be widely used in marketing tactics (Barauskaitė & Gineikienė, 2017) and has caught the attention of researchers in a variety of fields, including marketing (Kopf & Wolf, 2007). In the field of consumer behavior, this dissertation will adopt the conceptualization of nostalgia with emphasis on the role of consumer experiences, proposed by Holbrook and Schindler (2003, p.108), as “a preference (general liking, positive attitude or favourable effect) towards experiences associated with objects (people, places or things) that were more common (popular, fashionable or widely circulated) when one was younger (in early adulthood, in adolescence, in childhood or even before birth)”. Brown, Kozinets, and Sherry (2003) called the use of nostalgia in marketing a “retromarketing revolution” (p.133), “a big hit with twenty-first century consumers” (p.134), a “search for authenticity in an inauthentic world” (p.140).

In 2012, a study by Euromonitor International confirmed that most consumers had a positive view of the past and were willing to buy products that could help them to recreate such feelings (Euromonitor, 2012). In 2016, the same research group stated that interest in the nostalgic theme continued to guide the aspirations and buying choices of many consumers (Kasriel-Alexander,

2016). Shutterstock, a provider of stock photography, footage, music, and editing tools, presented its creative trends for 2020, which identifies global and local trends that will influence design aesthetics and visual culture. According to the document, the biggest trend for 2020 is “The Roaring 2020s”, a reference to the 1920s. A century after the loud and lavish 1920s, the look that defined it is well on its way to reclaiming the center stage globally in 2020 (Shutterstock, 2020).

The perception of a brand as nostalgic highlights the tendency that consumers have to “materialize their memories”, and to transform the intangible (memory) into tangible (product or service) (Kessous & Roux, 2008). Moreover, a research made by Wildschut et al. (2006) reported that approximately 80% of the participants felt nostalgic at least once a week, and almost half of the sample (42%) reported feeling nostalgic at least three or four times weekly. These results show that it is not difficult to instigate the feeling of nostalgia in most consumers.

In Brazil, retromarketing has become popular among consumers and influenced many product launch decisions (Portugal, 2013). In 2019, the singers Sandy & Junior, successful among children and teenagers in the '90s and '2000s, announced the tour *Nossa História* [Our Story] to celebrate 30 years of career. The tour took place 12 years after their last official show as a duo and was composed only of their hit songs (Nogueira, 2019a). There were 18 shows between Brazil (16), New York (1) and Lisbon (1), with more than 80% of tickets sold and an audience of approximately 600 thousand people (Oliveira, 2019). Considering average box office gross per city and average ticket price, the tour was the second most profitable tour in the world in 2019 (US\$ 2.2 billion) and the only Brazilian in the Top 20 Global Concert Tours from Pollstar (The Washington Times, 2019) (Figure 2).

The re-edition of popular toys already accounts for a significant portion of the sales of some brands, in a market that generated R\$ 6.8 billion in 2018, according to the *Associação Brasileira de Fabricantes de Brinquedos* [Brazilian Association of Toy Manufacturers] (Abrinq, 2019). Toymaker *Estrela*, for example, has between 15% and 20% of its revenue from old toys and games. Faced with the success of retromarketing, the brand has adopted a strategy of relaunching a classic toy or game every year (Souza, 2018). At the 2019 Brazilian Comic-Con Experience, toys such as Topo Gigio, Falcon, Pogobol and the game Genius were a hit, especially among the adult audience (Nogueira, 2019b) (Figure 2).

In the games and puzzles segment, other classics that are again successful are the games *Perfil* and *War*, as well as *Can Can* (cards) and *Quest* (Q&A), all in *Grow Jogos e Brinquedos*' repertoire since the 1970s. Together, retro games and jigsaw puzzles account for 38% of the company's revenue, which has grown since 2016. This high number shows that traditional toys constitute a means of encouraging coexistence among people, while Internet usage makes interaction more difficult. A consumer trend survey made in 2016 by Euromonitor captured behavioral changes as well as increasing dissatisfaction with the isolation and the excess of the information of the virtual world (Souza, 2018).

In 2018, the Brazilian beer Brahma relaunched five bottle labels corresponding to the years in which Brazil was World Cup champion (Figure 2). The release was accompanied by advertising for television with the same jingle that became popular in the conquest of the 1994 title. Pedro Adamy, Marketing Director of Brahma, declared "the labels carried the memory of the moment when the Brazilian had felt they were number one. We wanted to re-awaken this feeling in the fans" (Beer Art, 2018). The more positive the emotions that are evoked by a nostalgic ad, the more positive is consumers' attitude toward the ad (Bambauer-Sachse & Gierl, 2009).



**Figure 2.** Examples of retromarketing in the Brazilian market.

One of the advantages of brand relaunches is that the investment for the manufacture of the products has already been done, reducing costs (Euromonitor, 2012). Furthermore, although

they require adaptations, their marketing strategies have already been tested in the market (Souza, 2018). Moreover, one of the greatest attractions of retromarketing is the encouragement that older generations voluntarily bring to the younger generation. Parents, uncles and older siblings who have had good experiences in the past influence children, nephews, and younger siblings, increasing the potential audience (Kessous & Roux, 2010; Rosa, 2018). Retromarketing is also stimulated by new digital technologies. Before, those who liked an old band, for example, had a hard time finding and listening to recordings. Today, sites such as YouTube allow new generations to have more contact with the culture of the past than previous generations (Rosa, 2018).

### **2.3 DOES LONELINESS CAUSE NOSTALGIA?**

Remembering the past is a fundamental process of the human being, which separates us from other animals (Neisser, 1988). Nostalgia can be elicited through external triggers, such as social encounters, music, smells, and tastes; or by stimuli that instigate discomfoting internal states, such as loneliness. Adverse stimulus increase nostalgia, which, in turn, works as a homeostatic corrective mechanism: it counteracts the effect of the aversive stimuli on internal states (Bialobrzaska et al., 2019). Therefore, nostalgia serves to neutralize discomfoting states and restore psychological equilibrium (Sedikides et al., 2015; Bialobrzaska et al., 2019).

“Belongingness can be almost as compelling a need as food, and human culture is significantly conditioned by the pressure to provide belongingness. A great deal of human behavior, emotion, and thought is caused by this fundamental interpersonal motive” (Baumeister & Leary, 1995, p.498). The need to belong is high whenever the amount of social contact is low (Loveland, Smeesters, & Mandel, 2010). Weiss (1973) suggested that an insufficient amount of social contact can precipitate feelings of loneliness. “Loneliness, or subjective social isolation, is a situation experienced by the individual as one where there is an unpleasant or inadmissible lack of (the quality of) certain social relationships” (de Jong Gierveld, 1987, p.120).

A high level of loneliness is highly distressing and elicit several compensatory mechanisms geared toward replenishing social connectedness (Maner et al., 2007; Williams, Forgas, & Von Hippel, 2013), such as seeking for social support (Asher & Paquette, 2003). “An alternative strategy for coping with loneliness is to augment subjective perceptions of social support by drawing on nostalgic memories” (Zhou et al., 2008, p.1023).

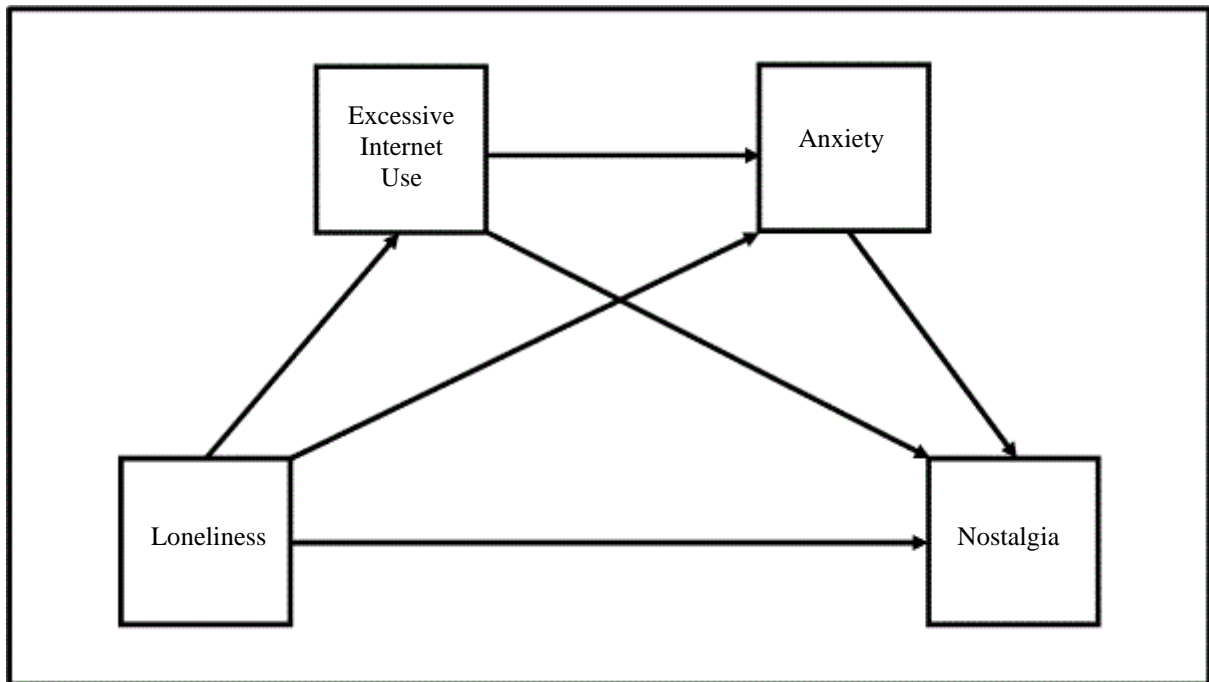
Nostalgia is a powerful mechanism for cooperation in situations of social threat. The past, when properly utilized, can strengthen psychological resistance to the vicissitudes of life. Nostalgic memories may function primarily as a way of dealing with loneliness because they increase subjective perceptions of social connection (Zhou et al., 2008). Qualitative descriptions of nostalgic experiences indicate that such experiences involve interactions with close people, such as friends, family, and partners (Holak & Havlena, 1992). Thus, lonely people, with less propensity to social support, are more inclined to nostalgia. The nostalgic memory reinforces the idea of social bonds, neutralizing negative feelings, and increasing the sense of security and the perceived capacity of people to form, maintain and develop interpersonal relationships (Wildschut et al., 2006).

According to Zhou et al. (2008), loneliness affects the perception of social connection in two different ways: i) first, loneliness reduces the perception of social bonds, but it increases nostalgic feeling; ii) then nostalgia increases the perception of social connectedness. In other words, while the direct effect of loneliness is to reduce the perception of belonging, its indirect effect is to increase that perception through nostalgia. Lonely people, even though they have a low perception of belonging, are more inclined to nostalgic engagement. Such engagement, in turn, increases the perception of social connection (Zhou et al., 2008). “Nostalgia is a prevalent and fundamental human experience, that serves several key psychological functions” (Wildschut et al., 2006, p. 990). Thus, I expect that loneliness increases nostalgia. More formally:

**H1: Loneliness positively affects levels of nostalgia.**

## **2.4 HOW WOULD LONELINESS ELICIT NOSTALGIA? THE ROLE OF INTERNET AND ANXIETY**

What are the mechanisms through which loneliness may elicit nostalgia? Wildschut et al. (2006), as quoted above, speculated that aversive conditions may have the effect of increasing nostalgia since the search for nostalgic memories is a source to neutralize negative feelings. In line with this speculation, I propose that excessive Internet use and anxiety constitute a key mechanism linking loneliness to nostalgia or through which loneliness infuses nostalgia (Figure 3).



**Figure 3.** Proposed model

#### 2.4.1 LONELINESS AND INTERNET

Loneliness is defined as a painful feeling of being isolated (Weiss, 1973; Russell, Peplau, & Cutrona, 1980; Ernst & Cacioppo, 1999; Masi et al., 2011). Nowadays it is considered to be one of the main problems in society. “The negative experience of a discrepancy between the desired and the achieved personal network of relationships is common and affects both younger and older adults” (de Jong Gierveld, Van Tilburg, & Dykstra, 2006, p. 485). In industrialized countries, around a third of people are affected by loneliness, with one person in 12 affected severely, and these proportions are increasing (Cacioppo & Cacioppo, 2018).

According to a survey conducted by Ipsos on behalf of Cigna, 54% of Americans reported feeling as though no one knows them well at least sometimes, if not always. This number is even higher among the so-called *Z Generation* (born between 1990 and 2000) (Ipsos, 2018). In the UK, over 9 million people (almost one-fifth of the population) reported they are always or often lonely, while 52% are at the very least sometimes lonely (Jo Cox Commission on Loneliness, 2018). In 2018, the former Prime Minister Theresa May appointed a “minister of loneliness” to tackle the social and health issues caused by social isolation in the UK (Daley, 2018).



In Brazil, there is no similar research. However, according to the Brazilian Institute of Geography and Statistics (IBGE), between 2005 and 2015, the number of Brazilian living alone increased from 10.4% to 14.6%, especially after the age of 50. In this age group, the proportion of single-person arrangements rose from 57.3% to 63.7% (Pennafort, 2016).

From an evolutionary perspective, the feeling of loneliness increases the chance of survival, because early humans were more likely to survive when they lived together. Thus, evolution shaped human beings to feel bad, and insecure, as in physical threatened when in isolation. When the lonely brain understands its social environment as hostile and unsafe, it remains constantly alert. Excessive alertness exhausts the human body, reduces its protection against viruses and inflammation and increases the risk and severity of viral infections and many other chronic diseases (Cacioppo & Patrick, 2008). It is a condition that makes a person irritable, depressed, and self-centered, and is associated with a 26% increase in the risk of premature death (Cacioppo & Cacioppo, 2018).

As a consequence, the genetic predisposition (Cacioppo & Patrick, 2008) will cause the lonely individual to search compensatory mechanisms geared toward replenishing social connectedness (Maner et al., 2007; Williams, Forgas, & Von Hippel, 2013), such as social support (Asher & Paquette, 2003). The request for support from social networks may be hampered by factors of an individual (shyness, poor social skills) and situational (relocation, immigration) origin (Zhou et al., 2008). The Internet may help to fulfill social needs for someone who has particular difficulty establishing social relationships, thus aiding social connectedness and providing a sense of belongingness (Shepherd & Edelman, 2005). The Internet provides a vastly expanded social network and altered social interaction online patterns that may be particularly attractive to those who are lonely (Morahan-Martin & Schumacher, 2003). “Lonely people express a preference for using the internet for social interaction and are more likely to use the internet in a way that displaces time spent in offline social activities” (Nowland, Necka, & Cacioppo, 2018, p.70).

However, those who attempt to obtain social benefits via the Internet are also likely to experience negative outcomes from such exposure and may be at risk of developing an excessive Internet use behavior (Caplan, 2002). According to Weinstein et al. (2015, p. 4), “excessive Internet use is characterized by excessive or poorly controlled preoccupations, urges, or behaviors regarding computer use, and Internet access that leads to impairment or

distress”. Lonely people appear to be more vulnerable than others to develop problems and disturbances from Internet use (Morahan-Martin & Schumacher, 2003). Thus, I expect that loneliness antecedes excessive Internet use. More formally:

**H2: Loneliness positively affects levels of Internet use.**

## **2.4.2 INTERNET AND ANXIETY**

As digital technologies continue to make communication channels and platforms more ubiquitous and effortless, human beings are more connected to each other than ever before (Pittman & Reich, 2016). In spite of the various benefits, technological advances have caused people to be distracted, overly isolated, stressed and especially anxious (Ravishankar & Ponnammma, 2018). Previous studies on excessive forms of technology usage have shown that excessive Internet use may have negative effects on psychological well-being, such as the increase of anxiety (Bernardi & Pallanti, 2009; Dalbudak et al., 2014; Weinstein et al., 2015; Younes et al., 2016; Romano et al., 2017; Turkle, 2017), defined as an emotional and unpleasant inner state often accompanied by nervous behavior (Memmedova & Selahattin, 2018).

Social media accounts for the greatest share of time spent online (We are Social, 2019). Lonely individuals may be particularly attractive to Internet social media (e.g. Instagram and Facebook) because of the possibilities of belonging, companionship, and communities that they provide (Morahan-Martin & Schumacher, 2003). However, excessive social media use is also associated with elevated anxiety symptoms and more severe recent anxiety-related impairment. One hypothesis is that excessive social media use may serve as a source of stress that contributes to elevated anxiety symptoms (Vannucci, Flannery, & Ohannessian, 2017).

Aspects of excessive social media use that may directly elicit stress and anxiety responses include: (1) receiving negative feedback or cyber-bullying from peers (Pabian & Vandebosch, 2016); (2) becoming more aware of undesirable, major life events in the lives of other (Hampton, Lu, & Shin, 2016); and (3) internalizing the pressure to maintain social media updates (Brzozowski, Sandholm, & Hogg, 2009). Moreover, the Internet and social media use also contributed to the proliferation and ease of access to information and general communication overload (Junco & Cotten, 2012), which has been associated with psychological distress (Chen & Lee, 2013). Finally, excessive exposure to the Internet and social media has been shown to trigger negative social comparisons such as believing that

friends and strangers are happier and have better lives (Chou & Edge, 2012), which may promote anxiety symptoms and cause interference in daily functioning (Vannucci, Flannery, & Ohannessian, 2017). Thus, I expect that excessive Internet use increases anxiety. More formally:

**H3: Excessive Internet use positively affects levels of anxiety.**

### 2.4.3 ANXIETY AND NOSTALGIA

As quoted above, for many centuries, nostalgia was considered a disease or a disorder. Symptoms included melancholia, insomnia, weakness, anxiety, palpitations of the heart, smothering sensations, stupor, and fever (McCann, 1941). In the mid-twentieth century, when nostalgia began to take on its current meaning (Holbrook & Schindler, 2003; Loveland, Smeesters, & Mandel, 2010), scholars concluded that the negative reputation of nostalgia was due to an inferential error (Sedikides & Wildschut, 2016). In other words, researchers were correct in identifying a relationship between sentimental longing and negative inner states such as anxiety, but incorrect as to the direction of this relationship. That is, nostalgia was not causing anxiety but instead, anxiety was triggering nostalgia (Routledge, Wildschut, Sedikides, & Juhl, 2013).

According to Davis (1979, p. 34), nostalgia “occurs in the context of present fears, discontents, anxieties, and uncertainties”. Nostalgia research has suggested that certain affective states, such as anxiety, may be important triggers of nostalgic sentiments (Stern, 1992; Wildschut et al., 2006). When people are dissatisfied with the present situation or insecure about the future, looking at the past, even a past prior to the person’s birth, brings certain tranquility (Kim, 2010). Therefore, the positive perceptions of the past predict indices of psychological adjustment, such as increased well-being and decreased anxiety or depression (Bryant, Smart, & King, 2005; Zimbardo & Boyd, 2015).

Anxious and distress people “try to conjure a future different from the one they see coming by building on a past they never knew. In it, they have time alone, with nature, with each other, and with their families” (Turkle, 2017, p. 265). “Nostalgia circles around attention, commitment, and the aesthetic of doing one thing at a time” (Turkle, 2017, p.270).

According to Euromonitor (2012), the increase of retromarketing may be partly linked with the rapidity of technological change. Consumers believe that new appliances and devices have become unnecessarily complicated and that things are moving too quickly. These consumers seek comfort, quality, and familiarity, a longing for those days when things were slower, simpler and more peaceful. Therefore, I believe that anxieties caused by the current connectivity culture (i.e. anxiety caused by excessive Internet use) may increase nostalgia proneness, giving rise to the following hypothesis.

**H4: Anxiety positively affects levels of nostalgia.**

The next chapter describes the empirical procedures to test the above-mentioned hypotheses.

## CHAPTER 3

### METHODOLOGY

This study adopted a SEM (Structural Equation Modeling) approach to investigate the relationship between loneliness and nostalgia (hypothesis 1) and the multiple mediation effect of excessive Internet use and anxiety (hypotheses 2, 3 and 4). To assist in the understanding of the excessive Internet use, its causes and consequences, I conducted an interview with two psychologists from the Integrated Impulse Control Ambulatory (PRO-AMITI) for the treatment of technological dependencies (abusive Internet or cell phone use, or Internet games). This interview took place simultaneously with both psychologists, on October 10, 2019, and lasted approximately one hour. The insights (confirmed by the literature) that helped develop the proposed model and questionnaire, include: i) In most cases, excessive Internet use is caused by negative symptoms, called comorbidities, such as loneliness, social phobia, anxiety, and family problems, that lead to excessive Internet use. In this case, the Internet is considered an escape from problematic reality; ii) Overuse, instead of meeting the initial needs, ends up creating other negative effects, such as increased anxiety and loneliness, reduced self-esteem, and depression; iii) When excessive Internet use begins to interfere in the individual's daily routine negatively, it is likely that it is becoming an addiction.

#### 3.1 PROCEDURE

I designed a questionnaire on the Qualtrics platform that was pre-tested twice. The purpose of the first pre-test was to check the general understanding of the questions, to evaluate the dynamics and effectiveness of the questionnaire, and to validate the translation of the scales. After completing the questionnaire, 10 respondents (peers from Brazilian universities) described their general perceptions of all questions. The modifications included mainly the correction of ambiguous sentences and words, and the standardization of Likert scales. The second pre-test was distributed to respondents using Toluna, an online recruiting platform. After completing the questionnaire, 36 Brazilian respondents (21 women and 15 men, between the ages of 18 to 62) gave feedback. The content of the questions was not modified after the second pre-test. However, initially, I used a reduced version of the revised UCLA Loneliness Scale (see Russell, 1996), with ten items. This scale consists of three factors (*Isolation*, *Relational Connectedness*, and *Collective Connectedness*), and the pre-test indicated that the analysis of

only 10 items would present an insufficient result. Therefore, I chose to use the full scale, with 20 items. More information on the revised UCLA Loneliness Scale will be given below.

The final version of the questionnaire (Appendix A) was distributed to Brazilian respondents using the Toluna platform. After confirming consent, participants were presented with a set of questions regarding nostalgia proneness, Internet use, loneliness, depression, anxiety, social phobia, demographic characteristics, and an attention check question. The survey took approximately 10 minutes to be completed. For the operationalization of the constructs, I used scales that had been tested and validated in previous research. Ethical Compliance Committee on Research Involving Human Beings (CEPH/FGV) approved the research plan, and in accordance with its guidelines, all participants voluntarily took part in the study and were informed about the researcher's identity.

### 3.2 MEASURES

**Nostalgia:** Before answering the items on the Southampton Nostalgia Scale (Barrett et al., 2010; Routledge et al., 2008), participants read the following statement: "Nostalgia can be defined as a desire to relive moments from the past; it is a predominantly happy and social emotion that comes from good memories, mixed with a longing for important relationships or positive events from the past." Then, the participant responded a six seven-point Likert scale about proneness to nostalgia and personal relevance of nostalgia, from 1 = Not at all/Very rarely, 7 = Very much/Very frequently (example item: How valuable is nostalgia for you?); and one item concerning the frequency of nostalgic experiences, from 1 = Less than once a year, 7 = At least once a day (item: Specifically, how often do you bring to mind nostalgic experiences?) (Sedikides et al., 2015). All items are described in Table 1.

**Excessive Internet use:** To assess excessive Internet use, participants answered the Internet Addiction Test (IAT) (Young, 1998; Widyanto & McMurran, 2004). Originally, the scale was a 20 five-point Likert scale, from 1 = Rarely, 5 = Always, with six factors: salience, excessive use, neglect work, anticipation, lack of control, and neglect social life (Conti et al., 2012). As the objective of this study was not to measure Internet addiction, but the excessive Internet use, I used only the *excessive use* factor, composed of five items (example item: I spend more time online than I planned; seven-point Likert scale, from 1 = Never, 7 = Always). All items are described in Table 1.

**Loneliness:** To assess participants' level of loneliness, I used the revised UCLA Loneliness Scale (Russell, 1996). A majority of loneliness research has been conducted using the UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980; Russell, 1996; Dussault et al., 2009; Shevlin, Murphy, & Murphy, 2015; Kim, 2017). The participant was asked to read 20 statements (11 positive and nine negative) describing how people sometimes feel (example item: I feel alone; seven-point Likert scale, from 1 = never, 7 = always). The revised UCLA Loneliness Scale measures feelings of social isolation and dissatisfaction with one's level of belongingness with three separable factors that are subordinate to a single overarching loneliness construct (Hawkley, Browne, & Cacioppo, 2005). According to Wildschut et al. (2010), there is evidence to indicate that people consider their social relationships (or lack thereof) as multifaceted.

The first factor was labeled *Isolation* and reflected feelings of aloneness, rejection (Dussault et al., 2009; Shevlin, Murphy, & Murphy, 2015), anonymity, and withdrawal (Wildschut et al., 2010); the second factor was labeled *Relational Connectedness* and was associated with feelings of social loneliness (Shevlin, Murphy, & Murphy, 2015), familiarity (Dussault et al., 2009; Wildschut et al., 2010), closeness, support (Hawkley, Browne, & Cacioppo, 2005), and intimacy (Wildschut et al., 2010); and the third factor was labeled *Collective Connectedness* and was related to group affiliation (Shevlin, Murphy, & Murphy, 2015), group identification (Dussault et al., 2009; Hawkley, Browne, & Cacioppo, 2005), group cohesion and similarity (Wildschut et al., 2010). The first factor comprised negatively worded items and the second and third factors comprised positively worded items (Dussault et al., 2009). Following the directions of Wildschut et al., 2010, to gain a more fine-grained understanding of which loneliness factor was associated with nostalgia, I repeated the analyses separately for each dimension. All items are described in Table 1, Table 4, and Table 5.

**Anxiety:** To assess participants' anxiety, I used the Depression Anxiety Stress Scales (DASS) (Lovibond & Lovibond, 1995). This scale consists of 42 negative emotional symptoms, divided into three subscales (Depression, Anxiety, and Stress). The anxiety subscale is divided into four factors (autonomic arousal, skeletal musculature effects, situational anxiety, subjective experience of anxious affect). For the purposes of this study, I used the *situational anxiety* factor, composed of three items (I am worried about situations in which I might panic and make a fool of myself, I find myself in situations which made me so anxious I am most relieved when

they end, I fear that I will be “thrown” by some trivial but unfamiliar task). Participants chose from a seven-point Likert scale, from 1 = Never, 7 = Always. All items are described in Table 1.

**Depression and Social Phobia:** To be sure that the mediator between excessive use of the Internet and nostalgia is anxiety, two alternative models with depression and social phobia as mediators have been proposed, since those variables coexist with anxiety (Lovibond & Lovibond, 1995; Mattick & Clarke, 1998). Literature also states that excessive Internet use coexists with other psychological problems, such as depression (Younes et al., 2016; Hunt et al., 2018), and social phobia (Yayan et al., 2017; Elavarasan et al., 2018). I used the Depression Anxiety Stress Scales (DASS) (Lovibond & Lovibond, 1995), which consists of 42 negative emotional symptoms, divided into three subscales (Depression, Anxiety, and Stress). The depression subscale is divided into seven factors (dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, inertia). For the purposes of this study, I used the *dysphoria* factor, composed of two items (I feel downhearted and blue, I feel sad and depressed). Participants chose from a seven-point Likert scale (1 = Never, 7 = Always) (Lovibond & Lovibond, 1995). Social Phobia Scale (SPS), composed of 20 items (example item: I fear I may blush when I am with others), assesses fears of being scrutinized during routine activities (eating, drinking, writing, etc.; seven-point Likert scale, 1 = Never, 7 = Always) (Mattick & Clarke, 1998). During the first pre-test, two items were considered unusual and difficult to understand by the respondents (I can suddenly become aware of my own voice and of others listening to me; and I worry my head will shake or nod in front of others), and were excluded from the original.

**Attention check:** To validate the respondent participation, the following attention check was displayed: “To validate your participation, select option 4 below. If you do not select option 4, we will assume that you are not paying attention, and we will withdraw your participation”. Participants who did not select option four were excluded from the study.

### Control Variables

I used some variables that could be analyzed as control variables in the model:



**Age:** Although popular belief states that nostalgia is more frequent among older people, researches indicate that age is not a factor that interferes with this emotion (Holbrook, 1993). Among UK undergraduates and adults between the ages of 18 to 91, nostalgia is experienced at least once a week and modally three times a week (Wildschut et al., 2006). Also, Zhou et al., 2008 evidence that nostalgia was experienced among older children and teenagers between the ages of nine to 15.

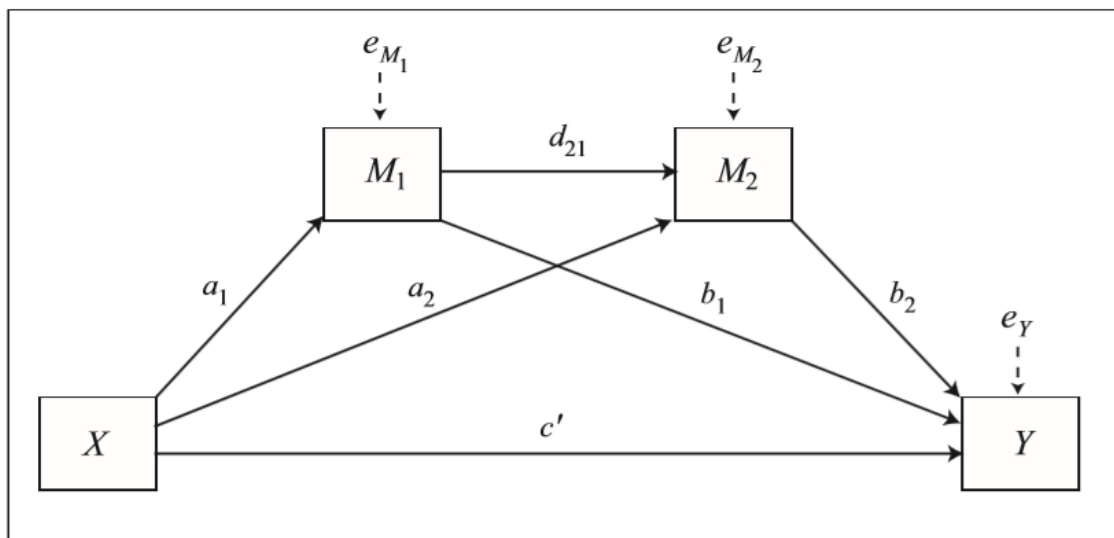
**Gender:** In earlier studies, it was posited that males tended to be more nostalgic than females due to the fact that they faced more discontinuities in their lives (i.e. going off to war, entering the workforce, retiring from the workplace) (Davis, 1979). Stern (1992) proposed that gender and propensity for nostalgia are related to the socially constructed nature of genders, and each group can consider different stimuli as nostalgic and articulate nostalgic responses of different intensities. Nowadays, most research claims that nostalgic emotion does not depend on gender (Sedikides et al., 2015). Baker & Kennedy (1994) said that the objects with which males and females choose to associate memories differ. However, at times when the differences between genders are less noticeable, males and females may associate similar objects with memories.

### 3.3 DATA ANALYSIS

I adopted a Structural Equation Modelling (SEM) approach to include the measurement model and paths among independent, dependent and mediated variables. SEM takes a “confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon” (Byrne, 2001, p. 3), which “can be utilized very effectively to address numerous research problems involving nonexperimental research” (Byrne, 2001, p. 4).

Usually, the researcher postulates a statistical model based on theory and empirical research. He or she believes that variables define the constructs that are hypothesized to be related in a certain way. The point of SEM analysis is to determine the extent to which the theoretical model is supported by sample data (Byrne, 2001; Schumacker & Lomax, 2004). Therefore, strong familiarity with the theoretical and empirical literature in the research area is the single most important thing a researcher could bring to SEM (Kline, 2015). I used Amos Graphics 22, a covariance structure analysis (CSA) software primarily used as a confirmatory technique (Hair et al., 2016).

The proposed model in this study was Hayes' model 6, with two mediators. It is a serial multiple mediator model, with mediators linked together in a causal chain. This particular model depicts  $X$  as affecting  $Y$  through four pathways. One pathway is indirect and runs from  $X$  to  $Y$  through  $M_1$  only, a second indirect path runs through  $M_2$  only, and a third indirect influence passes through both  $M_1$  and  $M_2$  in serial, with  $M_1$  affecting  $M_2$ . The remaining effect of  $X$  is direct from  $X$  to  $Y$  without passing through either  $M_1$  or  $M_2$  (Hayes, 2017) (Figure 4).



**Figure 4.** Hayes' model 6 (2 mediators)

Next, I present the results of the empirical study.

## CHAPTER 4

### RESULTS AND DISCUSSION

In this study, I posit that loneliness raises nostalgia through the underlying mechanisms of excessive Internet use and anxiety. As quoted above, an exploratory and confirmatory analysis of the revised UCLA Loneliness Scale by Hawkley, Browne, & Cacioppo (2005) reported a three-factor solution: *Isolation*, *Relational Connectedness*, and *Collective Connectedness*. These three dimensions illustrate that loneliness can exist at the individual level of analysis (represented by the *Isolation* factor) and at the social level of analysis (represented by *Relational Connectedness* and *Collective Connectedness* factors) (Hawkley, Browne, & Cacioppo, 2005).

Although research on loneliness as an antecedent of nostalgia broadly assess a general experience of loneliness (while the revised UCLA Loneliness Scale is divided into three factors, and two levels), literature shows that theoretically, all factors of the revised UCLA Loneliness Scale should lead to an increase in nostalgia (Wildschut et al., 2006; Zhou et al., 2008; Sedikides et al., 2015; Routledge, 2015). Exploratory factor analysis in this study confirmed three factors, with the same items as the revised UCLA Loneliness Scale (Hawkley, Browne, & Cacioppo, 2005). However, only the factor *Isolation* (the individual level of loneliness) presented a positive relationship with nostalgia. The factors *Relational Connectedness* and *Collective Connectedness* (the social level of loneliness) presented a negative relationship, implying that higher levels of these two factors of loneliness would, in fact, lead to *lower* levels of nostalgia.

In the questionnaire used in this study, nostalgia was defined as “a desire to relive moments from the past; a (...) emotion that comes from good memories, mixed with a longing for important relationships or positive events from the past”. In other words, it was a definition of a *personal nostalgia*, based on direct and individual experiences (in contrast to the other three types of nostalgia developed by Holak and Havlena, 1998). Therefore, in this research, the result shows that the individual level of loneliness (i.e. *Isolation*) has a positive relationship only with personal dimension of nostalgia (i.e. *Personal Nostalgia*). Instead, If I had measured collective dimensions of nostalgia (i.e. *Cultural* and *Virtual Nostalgia*), the social level of loneliness (*Relational Connectedness* and *Collective Connectedness*) might have a positive relationship with nostalgia. Therefore, I decided to follow this analysis with only the *Isolation* factor.

Analyses of the results of the other two factors (*Relational Connectedness* and *Collective Connectedness*) are in Appendix B.

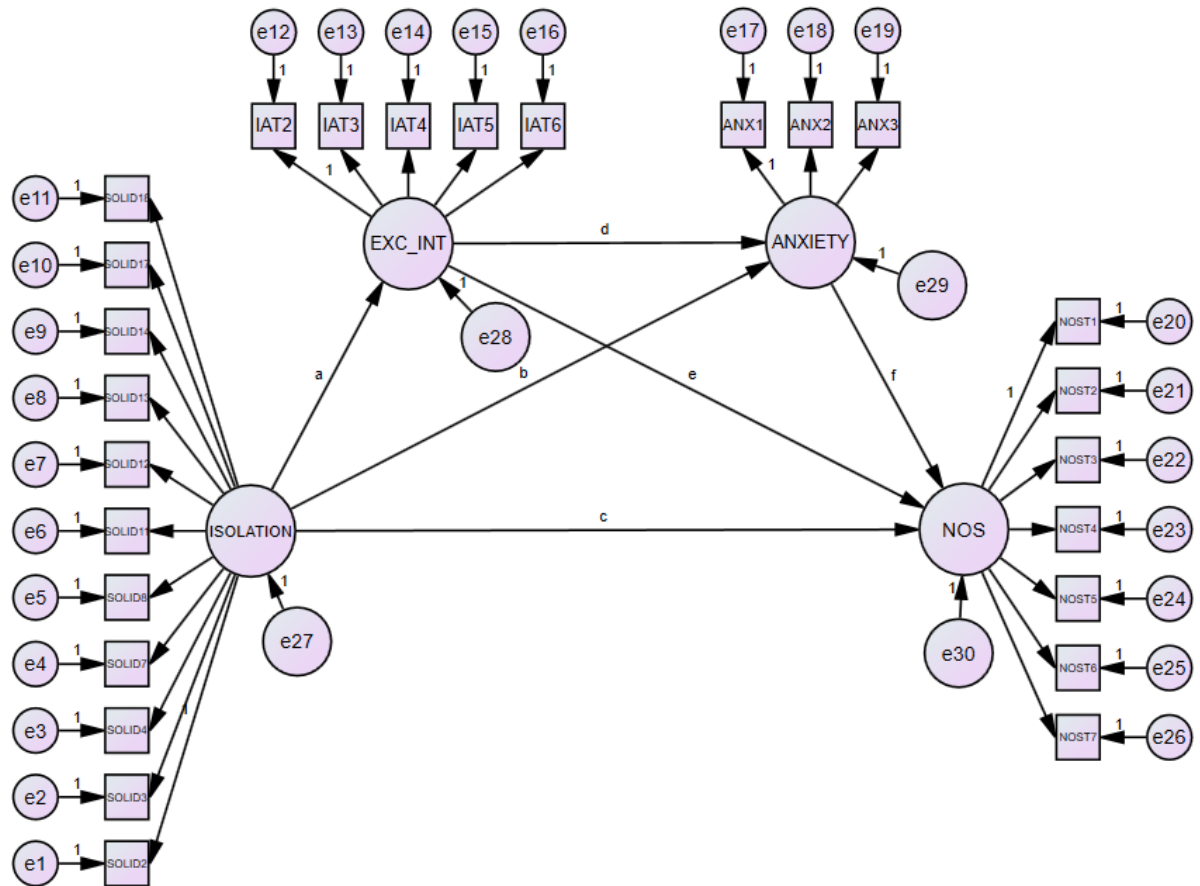
Furthermore, while the first factor of the revised UCLA Loneliness Scale (*Isolation*) comprised negatively worded items, the second and third factors (*Relational Connectedness* and *Collective Connectedness*) comprised positively worded items (Dussault et al., 2009). This wording bias has been a criticism of factor analyses of this scale since it should be noted that subjects tend to respond differently to negatively and positively worded items (Knight et al., 1988; Russell, 1996).

#### **4.1 DESCRIPTIVE STATISTICS**

Four hundred and three participants completed the questionnaire, but 19 respondents were excluded from the sample because they fail the attention check question. The final sample was composed of 384 participants (193 women, 188 men, 3 unidentified;  $M_{age} = 37.78$ ; range = 23-72). Thirty-five percent of the participants had a monthly income ranging from R\$ 2,001 to R\$ 4,000, and 41% had a college/university degree. Gender and age did not influence the outcome of the study, and will not be mentioned in further analysis. Almost 50% of the sample (48.4%) spent at least six hours online each day. The participants scored an average of 5.95 on nostalgia, 3.86 on excessive internet use, 3.69 on loneliness (*Isolation*) and 3.97 on anxiety.

#### **4.2 MEASUREMENT MODEL**

Before analyzing the full structural mediation model, the measurement model (or outer model) was evaluated using Confirmatory Factor Analysis (CFA). Figure 5 shows the proposed model with the *Isolation* dimension of loneliness.

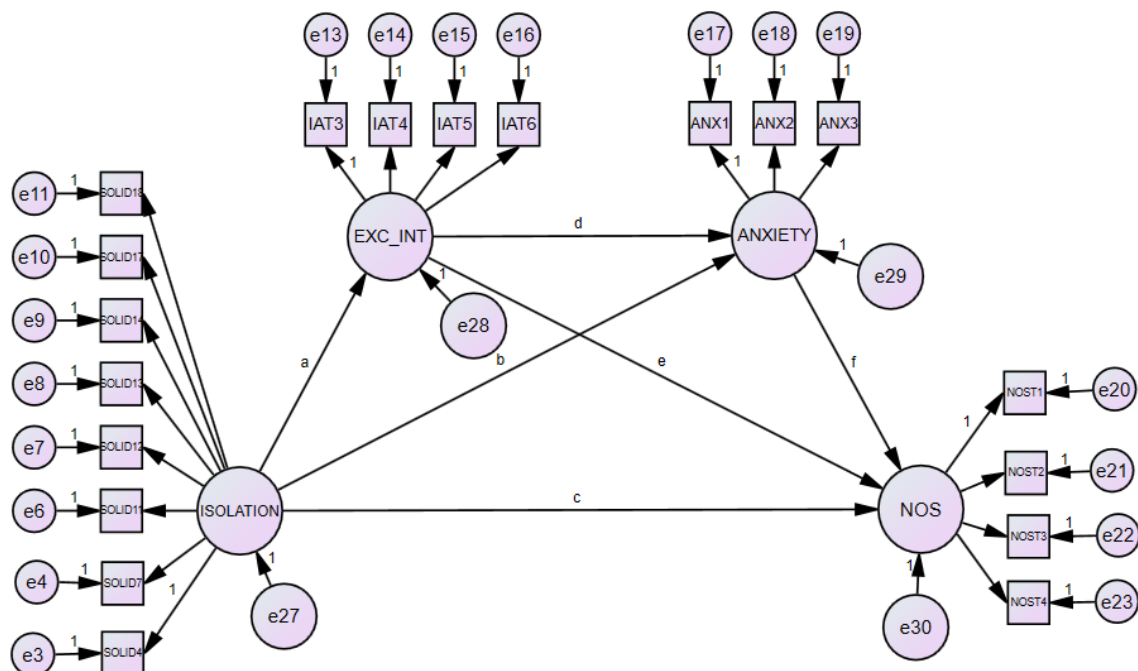


**Figure 5.** Proposed model with *Isolation* dimension of Loneliness

For a model to present good properties, it is expected that all items loadings be greater than 0.70 threshold. After running the proposed model from Figure 5 on Amos Graphics 22, seven items presented a poor loading and were therefore deleted prior to further analysis (NOST5, NOST6, NOST7, SOLID2, SOLID3, SOLID8, and IAT2). Table 1 presents those results, and Figure 6 presents the final model with the *Isolation* dimension of Loneliness.

Scale Items	Factor loading
<b>Nostalgia</b>	
NOST1: Nostalgia is valuable for me.	0.825
NOST2: Nostalgic experiences are important to me.	0.868
NOST3: To feel nostalgic is significant for me.	0.936
NOST4: I am prone to feeling nostalgic.	0.722
NOST5: I often experience nostalgia.	deleted
NOST6: Generally speaking, I often bring to mind nostalgic experiences.	deleted
NOST7: Specifically, how often do you bring to mind nostalgic experiences?	deleted
<b>Excessive Internet Use</b>	
IAT2: I spend more time online than planned.	deleted
IAT3: I neglect my housework chores to spend more time online.	0.801
IAT4: I get little sleep because I stay logged online late at night.	0.772
IAT5: I try to hide how long I have been online.	0.784
IAT6: I feel depressed, in a bad mood or nervous when I am offline and this feelings goes away as I get back online.	0.767
<b>Loneliness (Isolation)</b>	
SOLID2: I lack companionship.	deleted
SOLID3: There is no one I can turn to.	deleted
SOLID4: I feel alone.	0.752
SOLID7: I am no longer close to anyone.	0.708
SOLID8: My interests and ideas are not shared by those around me.	deleted
SOLID11: I feel left out.	0.767
SOLID12: My social relationships are superficial.	0.774
SOLID13: No one really knows me well.	0.708
SOLID14: I feel isolated from others.	0.848
SOLID17: I am unhappy being so withdrawn.	0.786
SOLID18: People are around me but not with me.	0.765
<b>Anxiety</b>	
ANX1: I am worried about situations in which I might panic and make a fool of myself.	0.851
ANX2: I find myself in situations which make me so anxious I am most relieved when they end.	0.799
ANX3: I fear that I will be “thrown” by some trivial but unfamiliar task.	0.823

**Table 1.** Factor loadings (modified model)



**Figure 6.** Final model with *Isolation* dimension of Loneliness

Next, I analyzed the model's convergent validity, discriminant validity, and reliability.

**Convergent validity:** All items loading lower than 0.70 were excluded (Table 1). Moreover, the average variance extracted (AVE) was calculated manually, as the average of the squared standardized pattern coefficients of the indicators (Kline, 2015). The results were higher than 0.50, indicating that the constructs predict more than half of its indicator's variance (Table 2).

**Discriminant validity:** Discriminant validity was assessed using the Fornell-Larcker criterion, as suggested by Hair et al. (2016). The square root of each construct's AVE should be greater than its highest correlation. As can be seen in Table 2, the four constructs presented satisfactory discriminant validity.

**Reliability:** The composite reliability (CR) was calculated through the following equation:

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + (\sum \epsilon_i)}$$

Whereby,  $\lambda$  is the standardized factor loading for item  $i$  and  $\epsilon$  is the respective error variance for item  $i$  (Raykov, 1997). The convergent validity was achieved as the CR of each latent variable was higher than 0.70 (Table 2).

Construct	Items/Constructs	Factor loadings (K)	CR	AVE (K <sup>2</sup> /n)	√ AVE	Highest correlation
Nostalgia (NOS)	NOST1	0.825	0.906	0.708	0.841	0.204
	NOST2	0.868				
	NOST3	0.936				
	NOST4	0.722				
Excessive Internet Use (EXC_INT)	IAT3	0.801	0.862	0.610	0.781	0.609
	IAT4	0.772				
	IAT5	0.784				
	IAT6	0.767				
Loneliness (ISOLATION)	SOLID4	0.752	0.918	0.585	0.765	0.609
	SOLID7	0.708				
	SOLID11	0.767				
	SOLID12	0.774				
	SOLID13	0.708				
	SOLID14	0.848				
	SOLID17	0.786				
	SOLID18	0.765				
Anxiety (ANXIETY)	ANX1	0.851	0.864	0.680	0.825	0.569
	ANX2	0.799				
	ANX3	0.823				

**Table 2.** Factor loadings, constructs' composite reliability (CR) and average variance extracted (AVE), square root of AVE, and the highest correlation between constructs

The calculations of convergent validity, discriminant validity, and reliability using SmartPLS 3.2.9 can be found in Appendix C.

#### 4.3 MEDIATIONAL ANALYSIS

Using Amos Graphics 22, I calculated bias-corrected 95% bootstrap confidence intervals (CIs) and bootstrap standard errors for direct and indirect effects (10,000 bootstrap samples). Table 3 presents tests of direct and indirect effects.

Effect	Figure 6 path	Coeff.	SE	95% CI
Direct effects				
ISOLATION --> EXC_INT	a	0.634**	0.062	[0.519; 0.764]
ISOLATION --> ANXIETY	b	0.471**	0.077	[0.518; 0.764]
ISOLATION --> NOS	c	-0.06	0.038	[-0.012; 0.080]
EXC_INT --> ANXIETY	d	0.267**	0.073	[0.103; 0.450]
EXC_INT --> NOS	e	0.059	0.036	[0.020; 0.160]
ANXIETY --> NOS	f	0.089*	0.031	[0.034; 0.157]
Indirect effect: ISOLATION --> ANXIETY				
Via EXC_INT	a x d	0.169*	0.059	[0.068; 0.300]
Indirect effect: ISOLATION --> NOS				
Total		0.095*	0.029	[0.043; 0.158]
Via EXC_INT	a x e	0.037		
Via ANXIETY		0.058*		
Independent of EXC_INT	b x f	0.042*		
Mediated by EXC_INT	a x d x f	0.015**		

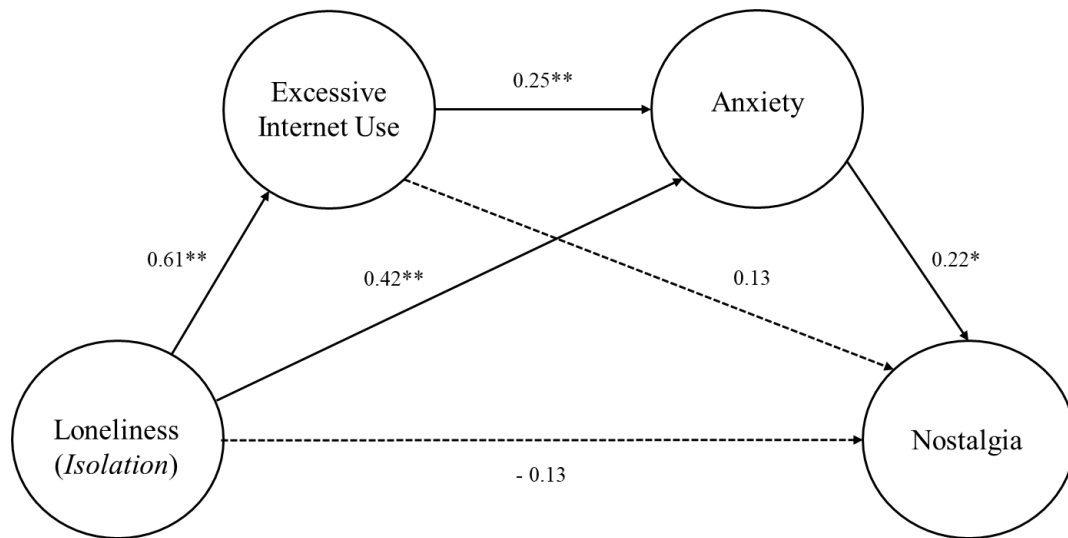
Note. Coeff. = unstandardized path coefficient; 95% CI = 95% bootstrap confidence interval; N = 384.

\*p < .05. \*\*p < .001

**Table 3.** Tests of direct and indirect effects in the mediational model

All but two direct effects (i.e., paths in Figure 6) were significant. Loneliness (*Isolation*) increased excessive Internet use (path a) and anxiety (path b), but it did not directly increase nostalgia (path c). Excessive Internet use predicted increased anxiety (path d), but it did not directly predict increased nostalgia (path e). Finally, anxiety predicted increased nostalgia (path f) (Figure 7).





Note. Coeff. = standardized path coefficient.  
 \* $p < .05$ . \*\* $p < .001$

**Figure 7.** Result of the mediational model

In addition to these direct effects, all but one indirect effects in Figure 7 were significant. Consistent with the possibility that loneliness (*Isolation*)-induced excessive Internet use constitutes a basis for anxiety, the link between loneliness (*Isolation*) and anxiety was mediated by excessive Internet use (Path  $a \times$  Path  $d$ ). There was a significant total indirect effect of loneliness (*Isolation*) on nostalgia via excessive Internet use and anxiety. I partitioned this total indirect effect into a nonsignificant indirect effect via excessive Internet use ( $a \times e$ ) and a significant indirect effect via anxiety. In turn, I partitioned the indirect effect via anxiety into a significant indirect effect that was independent of excessive Internet use ( $b \times f$ ) and a significant indirect effect that was mediated by excessive Internet use ( $a \times d \times f$ ). The latter indirect effect ( $a \times d \times f$ ) provides evidence for an extended causal sequence leading from loneliness (*Isolation*) to excessive Internet use to anxiety to nostalgia.

I repeated the mediational analysis using PROCESS Procedure for SPSS Version 3.4.1, model 6. The calculations of total, direct and indirect effects of *Isolation* on Nostalgia can be found in Appendix D.

#### 4.4 MODEL FIT

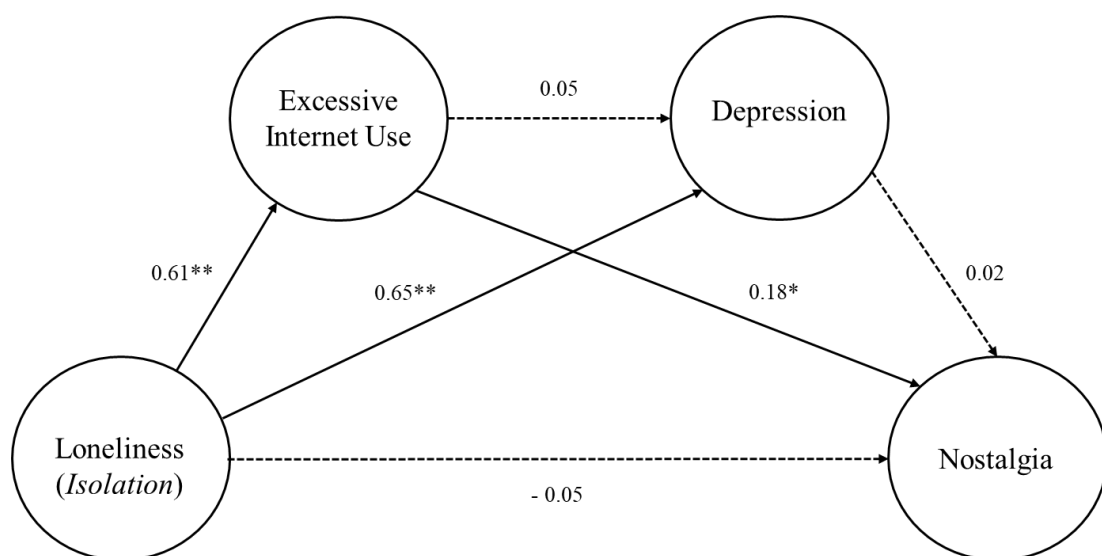
The next step was to analyze the model fit. The chi-square ( $\chi^2 = 307.010$ ) p-value of the model was lower than 0.05, which indicates that the observable matrix is different from the theoretical matrix. Moreover, I analyzed if the model has a good fit. To achieve that, the p-value of the  $\chi^2$

must be higher than 0.05, the standardized RMR must be lower than 0.05, the TLI, GFI, and NFI must be close to 1, the CFI must be higher than 0.95 and the RMSEA must be lower than 0.05. The results obtained were the following:  $\chi^2/df = 2.103$ ,  $p < 0.001$ , standardized RMR = 0.051, TLI = 0.957, GFI = 0.921, NFI = 0.933, CFI = 0.963, RMSEA = 0.054. Except for the p-value, the results presented above indicate that the model fit presents a good fit.

#### 4.5 ALTERNATIVE MODELS

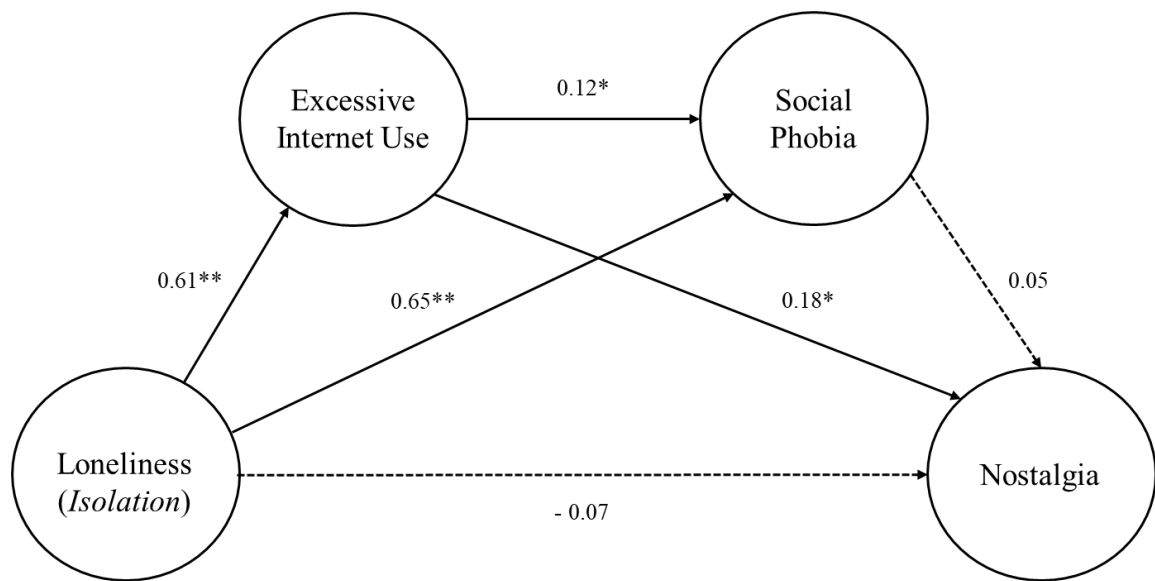
I also tested alternative models, exploring (a) the substitution of the mediator anxiety in the postulated causal sequence, and (b) the order of loneliness (*Isolation*) and anxiety. First, I tested an alternative model where depression and social phobia replaced anxiety. As previously stated, excessive Internet use may also coexist with other psychological problems, such as depression (Younes et al., 2016; Hunt et al., 2018), and social phobia (Yayan et al., 2017; Elavarasan et al., 2018). Moreover, depression and social phobia also coexist with anxiety (Lovibond & Lovibond, 1995; Mattick & Clarke, 1998).

When I replace anxiety with depression, the model fit was similar to the original model ( $\chi^2/df = 2.378$ ,  $p < 0.001$ , standardized RMR = 0.051, TLI = 0.953, GFI = 0.916, NFI = 0.934, CFI = 0.960, RMSEA = 0.060). However, excessive Internet use did not predict depression (p-value = 0,412), and depression did not predict nostalgia (p-value = 0,803) (Figure 8).



**Figure 8.** Alternative model 1

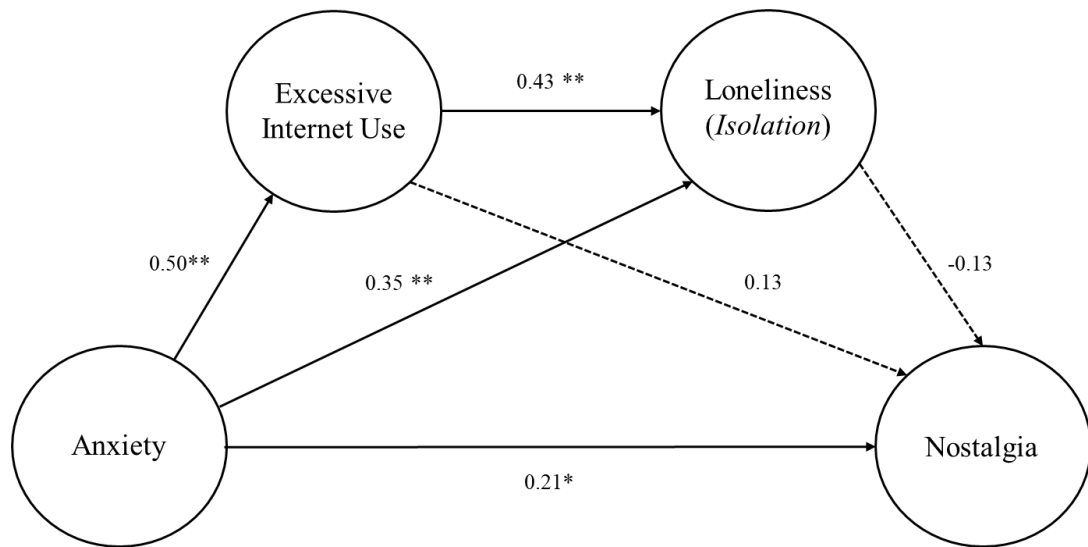
When I replace anxiety with social phobia, the model fit was once again similar to the original model ( $\chi^2/df = 2.335$ ,  $p < 0.001$ , standardized RMR = 0.048, TLI = 0.926, GFI = 0.833, NFI = 0.886, CFI = 0.931, RMSEA = 0.059). However, social phobia did not predict nostalgia (p-value = 0,506) (Figure 9).



Note. Coeff. = standardized path coefficient.  
 \* $p < .05$ . \*\* $p < .001$

**Figure 9.** Alternative model 2

When social technologies are used to escape the social world and withdraw from the “social pain” of interaction, feelings of loneliness are increased (Nowland, Necka, & Cacioppo, 2018). Therefore, I also tested an alternative model in which anxiety antecedes Internet excessive use, which subsequently is associated with loneliness (*Isolation*), and finally to nostalgia. The model fit was similar to the ones analyzed previously ( $\chi^2/df = 2.103$ ,  $p < 0.001$ , standardized RMR = 0.0513, TLI = 0.957, GFI = 0.921, NFI = 0.933, CFI = 0.963, RMSEA = 0.054). However, loneliness (*Isolation*) did not predict nostalgia (p-value = 0,112) (Figure 10). Results indicate that the original model is preferable to alternative models in which loneliness increases nostalgia mediated by excessive Internet use and anxiety.



Note. Coeff. = standardized path coefficient.  
\* $p < .05$ . \*\* $p < .001$

**Figure 10.** Alternative model 3

## CHAPTER 5

### FINAL REMARKS

#### 5.1 GENERAL DISCUSSION AND CONTRIBUTIONS

Literature on nostalgia's antecedents states that lonely individuals seek refuge in nostalgic experiences (Wildschut et al., 2006, 2010; Wildschut, Sedikides, & Cordaro, 2011; Sedikides et al., 2015; Kim, 2017). In line with this speculation, this study analyzed the underlying mechanism on the association between loneliness and nostalgia. In other words, I proposed that excessive Internet use and anxiety constituted a key mechanism linking loneliness to nostalgia or through which loneliness infused nostalgia.

Lonely people express a preference for using the Internet in search of social interaction (Nowland, Necka, & Cacioppo, 2018), thus increasing social connectedness and the sense of belongingness (Shepherd & Edelman, 2005). However, those who attempt to obtain social benefits via the Internet may be at risk of developing an excessive Internet use behavior (Caplan, 2002). This excessive behavior can lead to negative outcomes, such as the increase of anxiety (Turkle, 2017; Vannucci, Flannery, & Ohannessian, 2017). The anxiety caused by the excessive Internet use, on the other hand, increases nostalgia (Davis, 1979). As a consequence, the nostalgic memory neutralizes negative feelings (Wildschut et al., 2006), and enhances psychological health and well-being (Routledge et al., 2011, 2013).

This study adopted a SEM (Structural Equation Modeling) approach to investigate the relationship between the constructs quoted above. The results showed an association between variables: The *Isolation* dimension of loneliness presented a positive relationship with personal nostalgia, and this positive relationship was mediated by excessive Internet use and anxiety. Put otherwise, loneliness was an antecedent to the excessive Internet use, which subsequently was an antecedent to anxiety, which then increased personal nostalgia. Alternative models did not produce the same result.

##### 5.1.1 THEORETICAL CONTRIBUTIONS

This research differs significantly from prior research that has studied the antecedents of nostalgia (see Wildschut et al. 2006, 2010; Routledge et al, 2008, 2011; Zhou et al., 2008). In contrast, this study suggests that excessive Internet use are an antecedent to nostalgic memories. Given that human beings are more connected to each other than ever before (Pittman & Reich, 2016), the positive relationship excessive Internet use and nostalgia constitutes an important contribution to the literature, since the use of nostalgia to enhance psychological health and well-being (Routledge et al., 2011, 2013), may help to reduce some of the negative effects of excess Internet use. Moreover, prior research has already studied the relationship between loneliness and nostalgia (Wildschut et al., 2006; Zhou et al., 2008; Loveland, Smeesters, & Mandel, 2010). To my knowledge, however, my research is among the first to study to examine excessive Internet use and anxiety as underlying mechanisms that connects loneliness to nostalgia through the multiple mediation model proposed by Hayes (2017).

### **5.1.2 PRACTICAL CONTRIBUTIONS**

This study might also offer some practical applications to marketing managers. After establishing a positive relationship between excessive internet use and nostalgia, how can marketers most effectively market nostalgic products and brands? Previous researches have shown that nostalgic consumers seek nostalgic products (Holbrook, 1993; Loveland, Smeesters, & Mandel, 2010). One possibility is to use online channels, especially social networks such as Facebook and Instagram, to advertise and sell nostalgic products. Another option is for marketers to create online brand communities, in which consumers can interact with each other, and bond over brands they consume, as well as buy additional products and accessories from the online store. Moreover, campaigns for nostalgic brands that compare the stresses of modern life with slower and cozier moments of the good old times may also be a marketing tactic able to draw consumer's attention.

### **5.2 LIMITATIONS AND FUTURE RESEARCH**

While this study proposes relevant implications from both theoretical and practical standpoints, it has a few limitations. Firstly, the results cannot be generalized to the whole population, since it relied on a convenience sample. Secondly, although it would be recommended to manipulate the independent variable in order to establish a causal relationship, the manipulation of excessive Internet use in an experimental context is still debatable in the literature. This raises

concerns about the possibility to make causal attributions, because the variables may be confounded with other factors.

This study presented a positive relationship between the *Isolation* dimension of loneliness and *Personal Nostalgia*. A suggestion for future research is to measure different types of nostalgia (i.e. interpersonal nostalgia, cultural nostalgia, virtual nostalgia) and analyze the association between these variables and the dimensions of the revised UCLA Loneliness Scale. Furthermore, I accessed excessive Internet use through the *excessive use* factor of the Internet Addiction Test (IAT) (Young, 1998; Widyanto & McMurrin, 2004). Since “lonely people express a preference for using the internet for social interaction” (Nowland, Necka, & Cacioppo, 2018, p.70), I also suggest for future research to measure participant’s activity on social networks to see if results are similar to those found in this study.

Moreover, this research analyzed the participant’s behavior until the moment of nostalgia. People might view nostalgia as a happy experience, but this does not necessarily mean that nostalgia actually makes people happy (Routledge, 2015). Another research suggestion includes analyzing if the increase in nostalgia reduces discomfort caused by excessive use of the Internet. Additionally, even though I have tested alternative models to see if they also lead to an increase in nostalgia, I also suggest looking for new stimuli in the literature that can help find new explanations for the increase in nostalgia among the population.

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## APPENDIX A - QUESTIONNAIRE



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POR FAVOR, LEIA COM ATENÇÃO O TEXTO ABAIXO.

Bem-vindo(a)!

Muito obrigada por participar deste estudo. Suas respostas serão mantidas em sigilo, anônimas e não serão divulgadas de forma individual. Para obter os melhores resultados, forneça sua opinião honesta sobre cada afirmação. Não há resposta certa ou errada, o interesse é apenas em sua opinião pessoal.

Esse estudo levará aproximadamente 10 minutos para ser concluído. Sua participação é voluntária e você é livre para se retirar a qualquer momento. Sua recusa ou retirada não causará nenhum dano a você. O consentimento está implícito na submissão da pesquisa. Clique na seta abaixo para começar, se você concordar em participar.

*Caso esteja respondendo em um smartphone, para melhor visualização deixe a tela do celular na posição horizontal.*

Se você tiver alguma dúvida sobre o projeto e sua participação, envie um e-mail para a pesquisadora responsável, Marília Ayres (ma.ayres24@gmail.com).





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Marcas nostálgicas são marcas que consumíamos quando éramos mais jovens (por exemplo: alguma marca de comida, roupa, carro, brinquedo, calçado, etc), e nos lembram de algum período específico de nossa vida. Podemos encontrá-las ainda à venda, ou não.  
Por favor, pense com cuidado e escreva o nome de uma marca que seja nostálgica para você.

Descreva em algumas palavras porque essa marca é nostálgica para você.







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Sobre essa marca nostálgica:							
	Discordo totalmente	2	3	4	5	6	Concordo totalmente
É uma marca de boa qualidade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu gosto dessa marca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tenho uma opinião positiva sobre essa marca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
É uma marca importante para mim	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Você gostaria de comprar essa marca novamente?							
Não gostaria	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Gostaria muito
Improvável	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Provável
Impossível	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Possível





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"Nostalgia" pode ser definida como "um desejo de reviver momentos do passado." A nostalgia é uma emoção predominantemente feliz e social. Surge de boas lembranças, misturadas com saudades de relacionamentos importantes ou de eventos positivos do passado.

	Nem um pouco	2	3	4	5	6	Bastante
A lembrança nostálgica é valiosa para mim	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
É importante que eu me lembre de experiências nostálgicas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sentir-me nostálgico(a) é significativo para mim	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tenho propensão a me sentir nostálgico(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





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Para cada afirmação, por favor indique com que frequência você se sente da maneira descrita.							
	Nunca	2	3	4	5	6	Sempre
Eu me sinto nostálgico(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
De um modo geral, eu me lembro de experiências nostálgicas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





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Com que frequência você se lembra de experiências nostálgicas?

- ☐ Pelo menos uma vez por dia  
☐ Três a quatro vezes por semana  
☐ Cerca de duas vezes por semana  
☐ Cerca de uma vez por semana  
☐ Uma ou duas vezes por mês  
☐ Uma vez a cada dois meses  
☐ Uma ou duas vezes por ano





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Quantas horas por dia você passa navegando na internet?

- ☐ Menos de 1 hora  
☐ Entre 1 hora e 3 horas  
☐ Entre 3 e 6 horas  
☐ Entre 6 e 9 horas  
☐ Mais de 9 horas  
☐ Não me lembro/ Não quero dizer





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Para cada afirmação, por favor indique com que frequência você se sente da maneira descrita.	Nunca	2	3	4	5	6	Sempre
Passo mais tempo na internet do que pretendia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Abandono as tarefas domésticas para passar mais tempo na internet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Durmo pouco por ficar conectado(a) até tarde da noite	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tento esconder das pessoas a quantidade de tempo que passo na internet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto deprimido(a), mal-humorado(a) ou nervoso(a) quando desconectado(a), mas esse sentimento vai embora assim que volto a me conectar à internet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





Para validar a sua participação, selecione a opção 4 abaixo. Se você não selecionar opção 4, assumiremos que não está prestando atenção, e retiraremos a sua participação.

- ☐ Opção 1  
☐ Opção 2  
☐ Opção 3  
☐ Opção 4  
☐ Opção 5



Para cada afirmação, por favor indique com que frequência você se sente da maneira descrita.

	Nunca	2	3	4	5	6	Sempre
Eu me sinto em sintonia com as pessoas ao meu redor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sinto falta da companhia de outras pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Não há ninguém a quem recorrer em momentos difíceis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto sozinho(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto parte de um grupo de amigos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tenho muito em comum com as pessoas ao meu redor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deixei de ser próximo(a) das outras pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meus interesses e ideias não são compartilhados por aqueles que estão ao meu redor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sou uma pessoa extrovertida	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existem pessoas das quais eu me sinto próximo(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto excluído(a) dos meus grupos de convívio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meus relacionamentos sociais são superficiais	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ninguém realmente me conhece bem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto isolado(a) dos outros	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Posso ter companhia quando quiser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existem pessoas que realmente me entendem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sou infeliz por ser tão fechado(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As pessoas estão ao meu redor, mas não são próximas de mim	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Há pessoas com quem posso conversar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existem pessoas a quem posso recorrer em qualquer situação	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





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Para cada afirmação, por favor indique com que frequência você se sente da maneira descrita.

	Nunca	2	3	4	5	6	Sempre
Eu me sinto desanimado(a) e infeliz	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto triste e deprimido(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me preocupo com situações em que posso entrar em pânico e me fazer de bobo(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Há situações que me deixam tão ansioso(a) que fico aliviado(a) quando terminam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tenho medo de que alguma tarefa simples mas que não faço com frequência me deixe estressado(a)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





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Por favor, indique sua idade em números:

Qual seu gênero?

☐ Feminino  
☐ Masculino  
☐ Prefiro não dizer  
☐ Outro

Qual é o seu grau de escolaridade?

☐ Ensino médio / técnico incompleto  
☐ Ensino médio / técnico completo  
☐ Ensino superior incompleto  
☐ Ensino superior completo  
☐ Pós-graduação incompleta  
☐ Pós-graduação completa

Por favor, indique sua renda mensal:

☐ Menos de R\$ 2.000  
☐ Entre R\$ 2.001 e R\$4.000  
☐ Entre R\$ 4.001 e R\$8.000  
☐ Entre R\$ 8.001 e R\$16.000  
☐ Mais que R\$16.000  
☐ Não me lembro / Não quero dizer





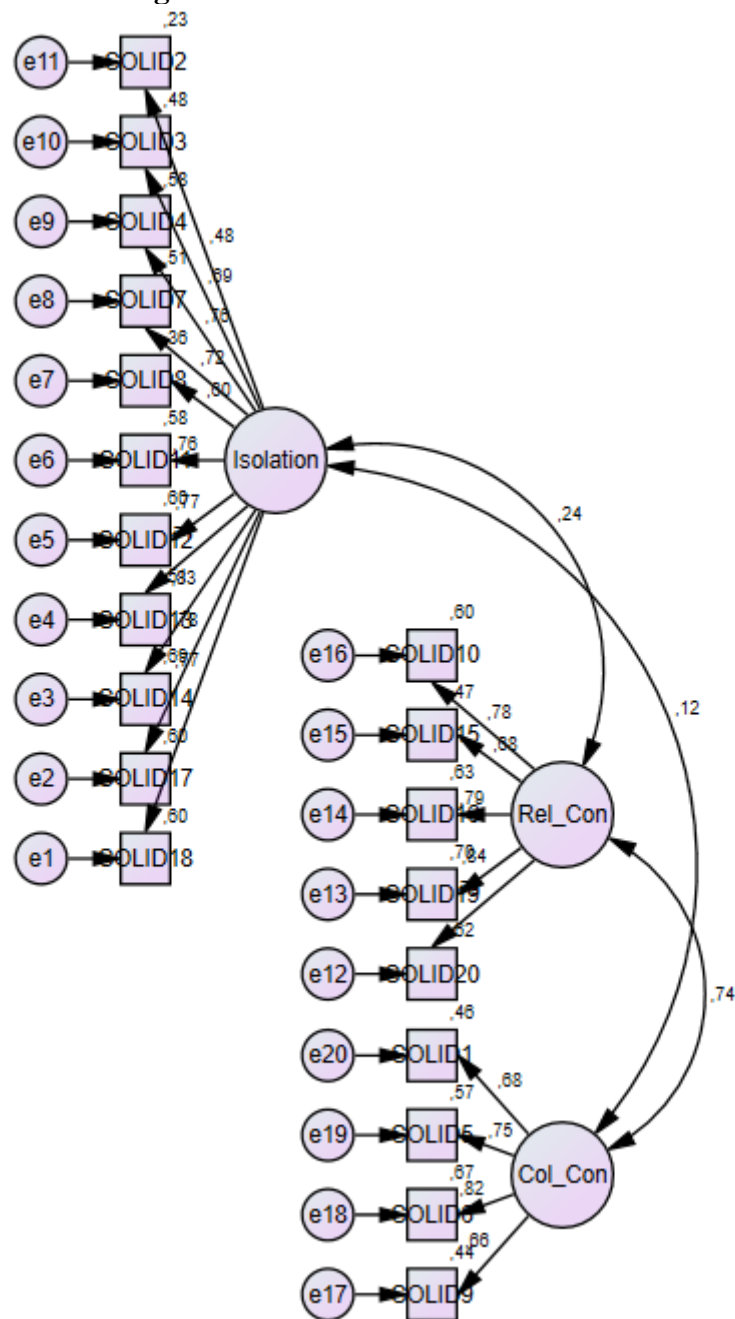
Finalmente, para cada afirmação, por favor indique com que frequência você se sente da maneira descrita.

	Nunca	2	3	4	5	6	Sempre
Fico ansioso(a) se tenho que escrever na frente de outras pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fico envergonhado(a) ao usar banheiros públicos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fico nervoso(a) de que as pessoas estejam me encarando enquanto eu ando pela rua	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tenho medo de corar quando estou com outras pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto envergonhado(a) se tenho que entrar em uma sala onde outras pessoas já estão sentadas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me preocupo em começar a tremer quando sou observado(a) por outras pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ficaria tenso(a) se tivesse que me sentar de frente para outras pessoas em um transporte público	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fico em pânico de que outras pessoas me vejam desmaiar ou passar mal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acharia difícil beber algo se estivesse em um grupo de pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ficaria envergonhado(a) ao comer na frente de um estranho em um restaurante	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fico preocupado(a) de que as pessoas achem meu comportamento estranho	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ficaria tenso(a) se tivesse que carregar uma bandeja através de uma lanchonete lotada	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me preocupo em perder o controle na frente de outras pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me preocupo em fazer algo que acabe atraindo a atenção de outros	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quando estou num elevador, fico tenso(a) se as pessoas olham para mim	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sinto que posso chamar atenção quando estou em pé numa fila	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fico tenso(a) quando falo na frente de outras pessoas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto estranho(a) e tenso(a) se eu sei que pessoas estão me observando	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

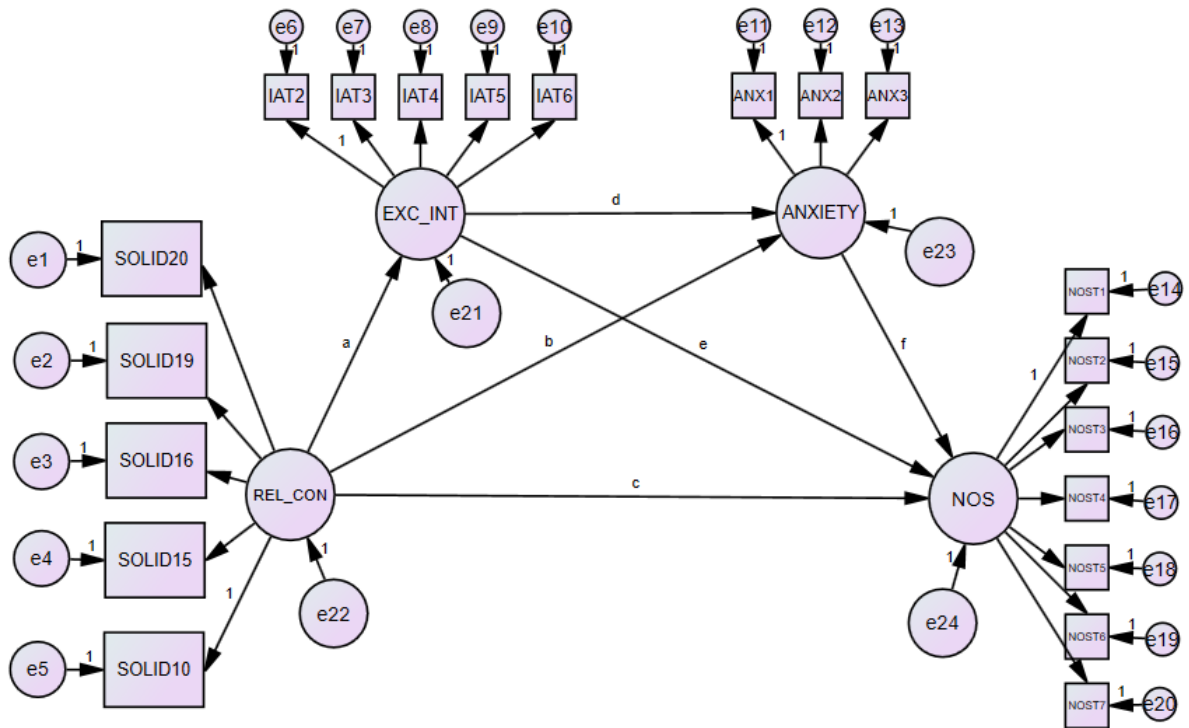


## APPENDIX B - RELATIONAL CONNECTEDNESS AND COLLECTIVE CONNECTEDNESS ANALYSIS

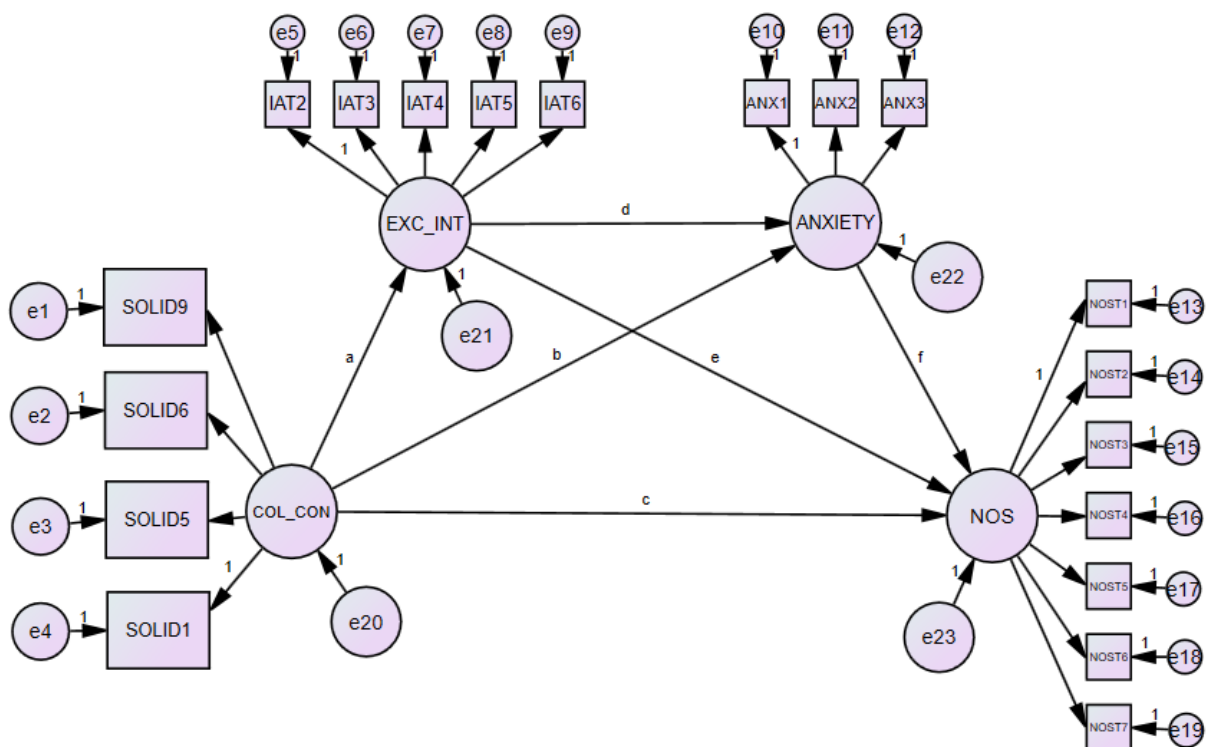
**Figure 11.** Correlation between dimensions



**Figure 12.** Proposed model with *Relational Connectedness* dimension of Loneliness



**Figure 13.** Proposed model with *Collective Connectedness* dimension of Loneliness



**Table 4.** Factor loadings *Relational Connectedness* (modified model)

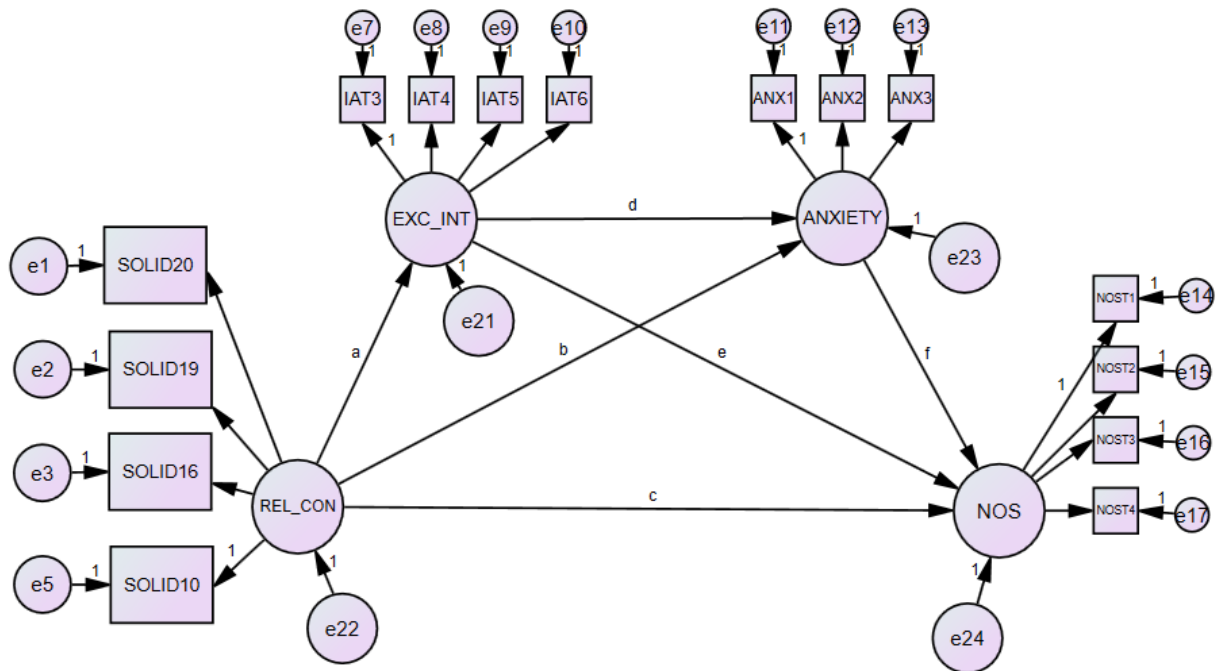
Scale Items	Factor loading
<b>Nostalgia</b>	
NOST1: Nostalgia is valuable for me.	0.825
NOST2: Nostalgic experiences are important to me.	0.868
NOST3: To feel nostalgic is significant for me.	0.936
NOST4: I am prone to feeling nostalgic.	0.723
NOST5: I often experience nostalgia.	deleted
NOST6: Generally speaking, I often bring to mind nostalgic experiences.	deleted
NOST7: Specifically, how often do you bring to mind nostalgic experiences?	deleted
<b>Excessive Internet Use</b>	
IAT2: I spend more time online than planned.	deleted
IAT3: I neglect my housework chores to spend more time online.	0.806
IAT4: I get little sleep because I stay logged online late at night.	0.777
IAT5: I try to hide how long I have been online.	0.770
IAT6: I feel depressed, in a bad mood or nervous when I am offline and this feelings goes away as I get back online.	0.771
<b>Loneliness (Relational Connectedness)</b>	
SOLID10: There are people I feel close to.	0.764
SOLID15: I can find companionship when I want it.	deleted
SOLID16: There are people who really understand me.	0.752
SOLID19: There are people I can talk to.	0.875
SOLID20: There are people I can turn to.	0.817
<b>Anxiety</b>	
ANX1: I am worried about situations in which I might panic and make a fool of myself.	0.851
ANX2: I find myself in situations which make me so anxious I am most relieved when they end.	0.806
ANX3: I fear that I will be “thrown” by some trivial but unfamiliar task.	0.816

**Table 5.** Factor loadings *Collective Connectedness* (modified model)

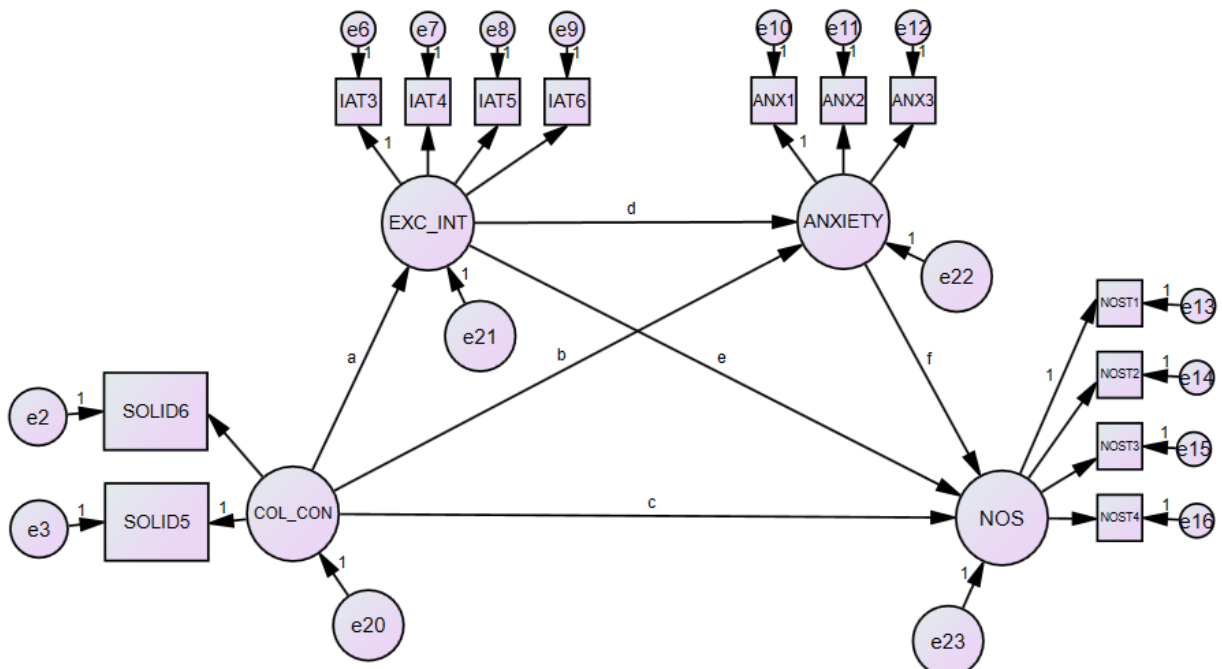
Scale Items	Factor loading
<b>Nostalgia</b>	
NOST1: Nostalgia is valuable for me.	0.824
NOST2: Nostalgic experiences are important to me.	0.864
NOST3: To feel nostalgic is significant for me.	0.938
NOST4: I am prone to feeling nostalgic.	0.724
NOST5: I often experience nostalgia.	deleted
NOST6: Generally speaking, I often bring to mind nostalgic experiences.	deleted
NOST7: Specifically, how often do you bring to mind nostalgic experiences?	deleted
<b>Excessive Internet Use</b>	
IAT2: I spend more time online than planned.	deleted
IAT3: I neglect my housework chores to spend more time online.	0.807
IAT4: I get little sleep because I stay logged online late at night.	0.774
IAT5: I try to hide how long I have been online.	0.770
IAT6: I feel depressed, in a bad mood or nervous when I am offline and this feelings goes away as I get back online.	0.773
<b>Loneliness (Collective Connectedness)</b>	
SOLID1: I feel in tune with the people around me.	deleted
SOLID5: I feel part of a group of friends.	0.774
SOLID6: I have a lot in common with the people around me.	0.825
SOLID9: I am an outgoing person.	deleted
<b>Anxiety</b>	
ANX1: I am worried about situations in which I might panic and make a fool of myself.	0.850
ANX2: I find myself in situations which make me so anxious I am most relieved when they end.	0.809
ANX3: I fear that I will be “thrown” by some trivial but unfamiliar task.	0.815



**Figure 14.** Final model with *Relational Connectedness* dimension of Loneliness



**Figure 15.** Final model with *Collective Connectedness* dimension of Loneliness



**Table 6.** Factor loadings, constructs' composite reliability (CR) and average variance extracted (AVE), square root of AVE, and the highest correlation between constructs (with *Relational Connectedness*)

Construct	Items/Constructs	Factor loadings (K)	CR	AVE ( $K^2/n$ )	$\sqrt{AVE}$	Highest correlation
Nostalgia (NOS)	NOST1	0.825	0.906	0.708	0.842	0.205
	NOST2	0.868				
	NOST3	0.936				
	NOST4	0.723				
Excessive Internet Use (EXC_INT)	IAT3	0.806	0.862	0.610	0.781	0.501
	IAT4	0.777				
	IAT5	0.770				
	IAT6	0.771				
Loneliness (REL_CON)	SOLID10	0.764	0.879	0.646	0.803	-0.199
	SOLID16	0.752				
	SOLID19	0.875				
	SOLID20	0.817				
Anxiety (ANXIETY)	ANX1	0.851	0.864	0.680	0.825	0.501
	ANX2	0.806				
	ANX3	0.816				

**Table 7.** Factor loadings, constructs' composite reliability (CR) and average variance extracted (AVE), square root of AVE, and the highest correlation between constructs (with *Collective Connectedness*)

Construct	Items/Constructs	Factor loadings (K)	CR	AVE ( $K^2/n$ )	$\sqrt{AVE}$	Highest correlation
Nostalgia (NOS)	NOST1	0.824	0.906	0.708	0.842	-0.256
	NOST2	0.866				
	NOST3	0.938				
	NOST4	0.724				
Excessive Internet Use (EXC_INT)	IAT3	0.807	0.862	0.610	0.781	0.501
	IAT4	0.774				
	IAT5	0.770				
	IAT6	0.773				
Loneliness (COL_CON)	SOLID10	0.774	0.780	0.640	0.800	-0.264
	SOLID16	0.825				
Anxiety (ANXIETY)	ANX1	0.850	0.864	0.680	0.825	0.501
	ANX2	0.809				
	ANX3	0.815				

**Table 8.** Tests of direct and indirect effects in the mediational model (with *Relational Connectedness*)

Effect	Figure 6 path	Coeff.	SE	95% CI
Direct effects				
REL_CON --> EXC_INT	a	-0.031	0.091	[-0.213; 0.157]
REL_CON --> ANXIETY	b	0.151	0.089	[-0.046; 0.341]
REL_CON --> NOS	c	-0.151**	0.040	[-0.227; -0.080]
EXC_INT --> ANXIETY	d	0.540**	0.063	[0.381; 0.699]
EXC_INT --> NOS	e	0.027	0.030	[-0.030; 0.082]
ANXIETY --> NOS	f	0.081*	0.028	[0.032; 0.133]
Indirect effect: REL_CON --> ANXIETY				
Via EXC_INT	a x d	-0,017	0.051	[-0.112; 0.076]
Indirect effect: REL_CON --> NOS				
Total		0.010	0.012	[-0.010; 0.038]
Via EXC_INT	a x e	-0,001		
Via ANXIETY		0,011		
Independent of EXC_INT	b x f	0,012		
Mediated by EXC_INT	a x d x f	-0,001		

Note. Coeff. = unstandardized path coefficient; 95% CI = 95% bootstrap confidence interval; N = 384.

\*p < .05. \*\*p < .001

**Table 9.** Tests of direct and indirect effects in the mediational model (with *Collective Connectedness*)

Effect	Figure 6 path	Coeff.	SE	95% CI
Direct effects				
COL_CON --> EXC_INT	a	-0.314**	0.076	[-0.495; -0.151]
COL_CON --> ANXIETY	b	0.311**	0.078	[0.157; 0.482]
COL_CON --> NOS	c	-0.157**	0.037	[-0.246; -0.078]
EXC_INT --> ANXIETY	d	0.606**	0.067	[0.444; 0.763]
EXC_INT --> NOS	e	-0.020	0.033	[-0.095; 0.036]
ANXIETY --> NOS	f	0.108**	0.030	[0.056; 0.169]
Indirect effect: COL_CON --> ANXIETY				
Via EXC_INT	a x d	-0.190*	0.057	[-0.323; -0.098]
Indirect effect: COL_CON --> NOS				
Total		-0.138	0.016	[-0.007; 0.056]
Via EXC_INT	a x e	0.006		
Via ANXIETY		-0.144		
Independent of EXC_INT	b x f	0.034*		
Mediated by EXC_INT	a x d x f	-0.021*		

Note. Coeff. = unstandardized path coefficient; 95% CI = 95% bootstrap confidence interval; N = 384.

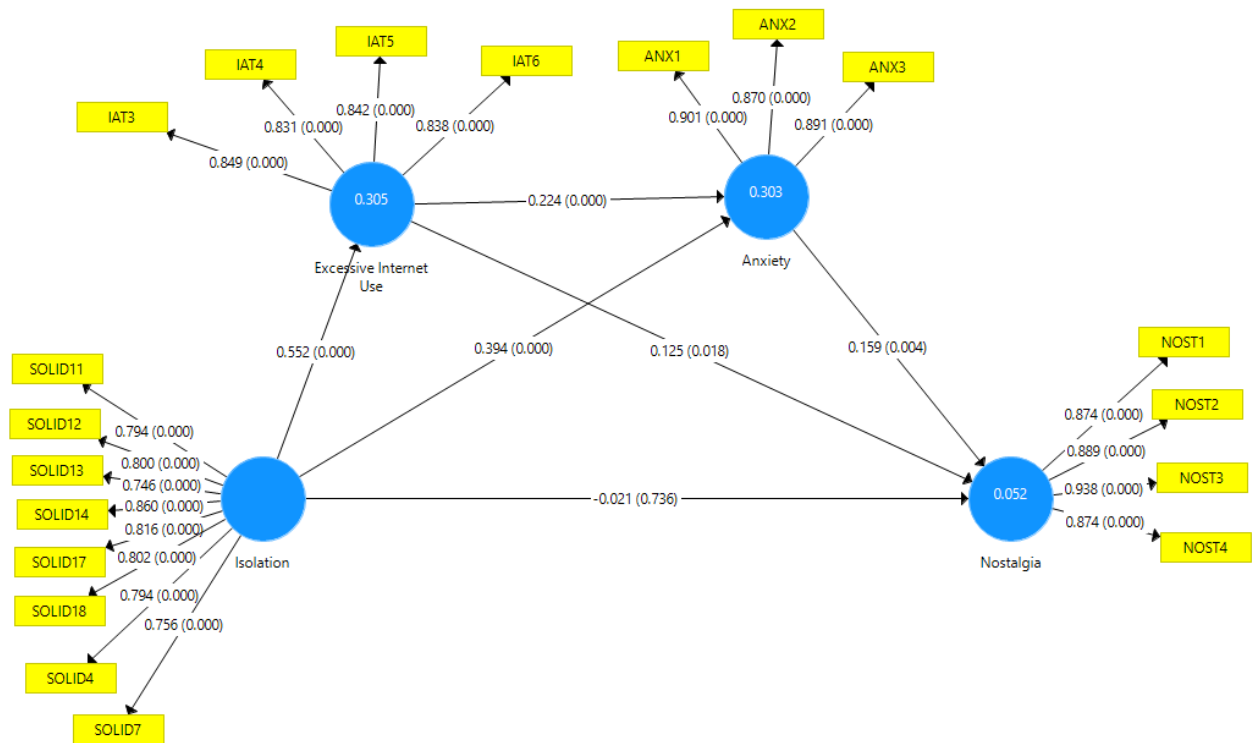
\*p < .05. \*\*p < .001

**Table 10.** Model fit

	Model with REL_CON	Model with COL_CON
p-value	0.000	0.000
CMIN/DF	2.094	2.070
CMIN	175.873	122.126
Standardized RMR	0.045	0.041
GFI	0.943	0.953
NFI	0.947	0.955
TLI	0.964	0.968
CFI	0.971	0.976
RMSEA	0.054	0.053

## APPENDIX C - SMARTPLS 3.2.9 ANALYSIS

**Figure 16.** Final model with *Isolation* dimension of Loneliness using SmartPLS



**Table 11.** Correlation matrix between latent variables (n = 384)

	1	2	3	4
1. Anxiety	<b>0,887</b>			
2. Excessive Internet Use	0,442	<b>0,840</b>		
3. Isolation	0,518	0,552	<b>0,797</b>	
4. Nostalgia	0,203	0,183	0,130	<b>0,894</b>
Composite Reliability	0,917	0,906	0,933	0,941
Average Variance Extracted (AVE)	0,787	0,706	0,635	0,799

Note 1: Diagonal values are the square root of AVE, as they are greater than correlations between latent variables, there is discriminant validity

Note 2: All correlations are significant at 1%

**Table 12.** Crossloadings Matrix (n = 384)

	Anxiety	Excessive Nostalgia	Isolation
ANX1	<b>0,901</b>	0,440	0,181
ANX2	<b>0,870</b>	0,328	0,198
ANX3	<b>0,891</b>	0,396	0,165
IAT3	0,325	<b>0,849</b>	0,194
IAT4	0,346	<b>0,831</b>	0,154
IAT5	0,346	<b>0,842</b>	0,128
IAT6	0,458	<b>0,838</b>	0,145
NOST1	0,145	0,118	<b>0,874</b>
NOST2	0,153	0,110	<b>0,889</b>
NOST3	0,181	0,144	<b>0,938</b>
NOST4	0,221	0,239	<b>0,874</b>
SOLID11	0,351	0,446	0,142
SOLID12	0,369	0,400	0,049
SOLID13	0,389	0,416	0,071
SOLID14	0,454	0,455	0,096
SOLID17	0,380	0,516	0,078
SOLID18	0,418	0,397	0,112
SOLID4	0,530	0,456	0,136
SOLID7	0,382	0,421	0,137

Note 1: All factor loads are significant at 1%

**Table 13.** Results of the structural model (n = 384)

	Hipótese	VIF	f <sup>2</sup>	Coeficiente Estrutural	Erro Padrão	Valor T	Valor P	R <sup>2</sup> Ajustado
Anxiety -> Nostalgia	H4 (+)	1,435	0,019	0,159	0,055	2,892	0,004	0,045
Isolation -> Nostalgia	H1 (+)	1,661	0,000	-0,021	0,062	0,336	<b>0,737</b>	
Excessive Internet Use -> Anxiety	H3 (+)	1,439	0,050	0,224	0,057	3,951	0,000	0,299
Isolation -> Excessive Internet Use	H2 (+)	1,000	0,439	0,552	0,041	13,359	0,000	0,303

Note 1: p-values estimated by bootstrapping with 5000 repetitions

Note 2: f<sup>2</sup> = Cohen's effect size (1988), VIF = variance inflation factor

## APPENDIX D - SPSS VERSION 3.4.1 ANALYSIS

### SPSS - Double Mediation using PROCESS (Model 6)

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.4.1 \*\*\*\*\*

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

\*\*\*\*\*

Model : 6  
Y : Nostalgia  
X : Isolation  
M1 : Internet Excessive Use  
M2 : Anxiety

Sample  
Size: 384

\*\*\*\*\*

OUTCOME VARIABLE:  
Internet Excessive Use

Model Summary

R	R-sq	MSE	F	df1	df2	p
0,5481	0,3004	0,7014	164,022	1,000	382,000	0,000

Model

	coeff	se	t	p	LLCI	ULCI
constant	0,0000	0,0427	0,0000	1,0000	-0,0840	0,0840
Isolation	0,5481	0,0428	12,8071	0,000	0,4639	0,6322

Standardized coefficients  
coeff  
Isolation 0,5481

\*\*\*\*\*

OUTCOME VARIABLE:  
Anxiety

## Model Summary

R	R-sq	MSE	F	df1	df2	p
0,5403	0,2919	0,7118	78,5335	2,0000	381,0000	0,0000

## Model

	coeff	se	t	p	LLCI	ULCI
constant	0,0000	0,0431	0,0000	1,0000	-0,0847	0,0847
Isolation	0,3858	0,0515	7,4856	0,0000	0,2845	0,4872
Internet	0,2219	0,0515	4,3046	0,0000	0,1205	0,3232

## Standardized coefficients

	coeff
Isolation	0,3858
Internet	0,2219

\*\*\*\*\*

## OUTCOME VARIABLE:

Nostalgia

## Model Summary

R	R-sq	MSE	F	df1	df2	p
0,2187	0,0478	0,9597	6,3611	3,0000	380,0000	0,0003

## Model

	coeff	se	t	p	LLCI	ULCI
constant	0,0000	0,0500	0,0000	1,0000	-0,0983	0,0983
Isolation	-0,0393	0,0641	-0,6137	0,5398	-0,1654	0,0867
Internet	0,1202	0,0613	1,9607	0,0506	-0,0003	0,2407
Anxiety	0,1629	0,0595	2,7391	0,0065	0,046	0,2799

## Standardized coefficients

	coeff
Isolation	- 0,0393
Internet	0,1202
Anxiety	0,1629

\*\*\*\*\* TOTAL EFFECT MODEL \*\*\*\*\*

## OUTCOME VARIABLE:

Nostalgia

## Model Summary

R	R-sq	MSE	F	df1	df2	p
0,1092	0,0119	0,9907	4,6100	1,0000	382,0000	0,0324



Model						
	coeff	se	t	p	LLCI	ULCI
constant	0,0000	0,0508	0,0000	1,0000	-0,0999	0,0999
Isolation	0,1092	0,0509	2,1471	0,0324	0,0092	0,2092

## Standardized coefficients

	coeff
Isolation	0,1092

## \*\*\*\*\* TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y \*\*\*\*\*

## Total effect of X on Y

Effect	se	t	p	LLCI	ULCI
0,1092	0,0509	2,1471	0,0324	0,0092	0,2092

## Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
-0,0393	0,0641	-0,6137	0,5398	-0,1654	0,0867

## Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	0,1485	0,0392	0,074	0,2291
Ind1	0,0659	0,0301	0,0088	0,1272
Ind2	0,0629	0,0234	0,0203	0,1131
Ind3	0,0198	0,0093	0,0052	0,0408

## Partially standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	0,1485	0,0367	0,0765	0,2228
Ind1	0,0659	0,0295	0,0090	0,1241
Ind2	0,0629	0,0228	0,0209	0,1120
Ind3	0,0198	0,0090	0,0053	0,0400

## Completely standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	0,1485	0,0370	0,0757	0,2245
Ind1	0,0659	0,0296	0,0090	0,1250
Ind2	0,0629	0,0228	0,0208	0,1117
Ind3	0,0198	0,0090	0,0053	0,0401

## Indirect effect key:

Ind1 Isolation → Excessive Internet Use → Nostalgia

Ind2 Isolation → Anxiety → Nostalgia

Ind3 Isolation → Excessive Internet Use → Anxiety → Nostalgia

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

Level of confidence for all confidence intervals in output:

95

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

NOTE: Variables names longer than eight characters can produce incorrect output.

Shorter variable names are recommended.

----- END MATRIX -----