

BEING ALONE WITH OTHERS: A UNIQUE FORM OF SOCIAL CONTACT AND ITS
IMPACT ON MOMENTARY POSITIVE AFFECT

by

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Abstract

Social relationships are essential to human well-being. Although people receive the most benefit from interactions with others who are close to them (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), the need for human contact can also be satisfied through minimal interactions with others (Sandstrom & Dunn, 2014a, 2014b). This dissertation extended the research regarding the benefits of contact with acquaintances by proposing that being alone with others, i.e. being around others without verbally interacting with them, could be an alternative way of satisfying the need for social contact and improving positive affect. In an experience sampling study ($N = 453$), being alone with others was associated with similar positive (PA) and negative affect (NA), and lower sense of belonging, than being completely alone. Additional results supported existing research associating the best affective outcomes with interactions with close others, and higher positive affect after talking to acquaintances than not talking to them (Sandstrom & Dunn, 2014a). A second study was designed to test: whether merely sharing a space with others produces a higher sense of belonging; whether this belongingness could explain better outcomes of being alone with others compared to being alone; whether effects depend on performing the same task as others. Participants ($N = 265$) were randomly assigned to watch a pleasant video: alone, together with a confederate, or alone when a confederate was doing something else. I found no differences in the amplification of PA and sense of belonging, or in reduction of NA between the social conditions; however, these outcomes were also not different in the alone condition. Sharing a space with others, regardless of simultaneously performing a task together, did not lead to better outcomes than being alone. Trait introversion-extraversion was also explored, and two main trends were found in both studies: extraverts reported higher PA and sense of belonging than introverts in all situations, and introverts and extraverts reported similar

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amplifications of affective states in different social and experimental conditions. Overall, both studies revealed that being alone with others was worse for people's affective outcomes and sense of belonging than being completely alone, contrary to hypotheses.

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Dedication

This thesis is dedicated to my grandfather Eugeniusz Pacek vel Paczek – the best man I have even known; always encouraging and never doubting!

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Being Alone with Others: A Unique Form of Social Contact and Its
Impact on Momentary Positive Affect

From an evolutionary perspective, it makes sense for humans to favour prosocial behaviours, since species whose members are engaged in cooperation with each other have a better chance of survival (Aronson, 2004). For centuries, economic, political, and social forces led to breaking of familiar and social ties as people relocated for employment and the chance of a better life. Nowadays, leading an independent, career-oriented, and often solitary life has become an ordinary, and often expected, occurrence. The rapid technological changes of the last century further lowered the amount of real-world human contact. Yet, the need for such real-life social connections remains, as engaging in them has been shown to have positive implications for physical (Cacioppo et al., 2003; Hawkley, Masi, Berry, & Cacioppo, 2006; Uchino, Cacioppo, & Kiecolt-Glaser, 1996) as well as psychological health (Clark & Watson, 1988; Diener & Seligman, 2002; Heine, Proulx, & Vohs, 2002; Vittengl & Holt, 1998).

Not surprisingly, humans receive the most benefit from interactions with others who are familiar to them, such as family members or close friends (Mehl et al., 2010; Reis et al., 2000; Vittengl & Holt, 1998; Wheeler et al., 1983). Recent studies by Sandstrom and Dunn (2014a, 2014b) indicated that engaging in weak-tie interactions, i.e. interactions with people with whom we do not share a close or intimate connection, can lead to positive outcomes. In one of their studies, people at a coffee shop were asked to engage in small talk, smiling, and eye contact with the barista, while others were asked to make their visit as efficient as possible by talking only if necessary. As predicted, the more interactive group showed significantly larger improvements in their momentary positive affect and sense of belonging than the efficient group (Sandstrom & Dunn, 2014a). This finding is especially significant for contemporary ultra-individualistic

societies, since it shows that people can satisfy their need for human contact and increase their momentary positive affect through even minimal interactions with others who are weakly connected to them, i.e. with people they do not know well.

Irrespective of the above findings, and whether due to personality traits, psychological disorders, or the worry of breaking unwritten social rules, some people choose to be around others less frequently. For example, introverts report, on average, spending less time in social situations (Asendorph & Wilpers, 1998; Lucas, Le, & Dyrenforth, 2008), speaking less (Mehl, Gosling, & Pennebaker, 2006), and overall enjoying solitude more than extraverted people (Burger, 1995; Long, Seburn, Averill, & More, 2003). However, recent research has shown that when introverts were asked to act extraverted, i.e. act bold, assertive, or talkative, they experienced an increase in their momentary positive affect without any short-term negative effects of this counterdispositional behaviour (Fleeson, Malanos, & Achille, 2002; McNiel & Fleeson, 2006; McNiel, Lowman, & Fleeson, 2010; Sandstrom & Dunn, 2014a; Smillie, 2013; Wilt, Nofle, Fleeson, & Spain, 2012; Zelenski, Santoro, & Whelan, 2012; Zelenski et al., 2013). Overall, acting in more extraverted ways seem to be enjoyable to all people, regardless of their levels of extraversion-introversion trait, but introverts tend to underpredict how well they would feel acting extraverted, which leads to them avoiding social situations more often (Zelenski et al., 2013).

As seen so far, although in general people benefit from social contact, such contact can be hindered for various reasons (e.g., fatigue, personality), which could prevent people from experiencing the boost in positive affect associated with being around others. Hence, the purpose of this dissertation is to test a minimal form of social contact, which may be less bothersome to some people, yet it could still improve their positive affect and sense of

belonging. Specifically, being alone with others, i.e. being around people weakly tied to us, who we do not know well, or being around total strangers, without verbally interacting with them, could provide enough social contact to increase our momentary positive affect. Studying the alone with others social situation is unique because the scarce existing research regarding minimal social contact and the resulting affective outcomes is predominantly characterized by an inclusion of an element of verbal interaction (e.g., Sandstrom & Dunn, 2014a, 2014b). It is important to acknowledge that the amplification of momentary positive affect resulting from being alone with others was not expected to surpass positive affect stemming from verbally interacting with others, especially others we love, trust, and who offer us their support.

However, I wanted to test whether people, who did not verbally interact with each other, would still be able to experience belongingness simply by sharing a physical space and being close to others, and whether this alternative way of satisfying the need for social contact would also improve their positive affect. Said another way, does being physically near others feel better than being alone?

There were a few speculative ideas about why being alone with others would produce desirable effects. First, engaging in self-presentational behaviours, which include any actions used to convey information or an image of oneself to others (Baumeister & Hutton, 1987), and which are rooted in people's need to be liked and accepted, could explain an increase in one's momentary positive affect when being alone with others.

Such self-presentational behaviours do not need to involve talking in order to be effective (Baumeister, 1998; Jones & Wortman, 1973). People mirror others' behaviours and emotions, often unconsciously (Chartrand, Maddux, & Lakin, 2005), in order to gain social acceptance by appearing more credible, trustworthy, persuasive, and likeable to others (Kendon, 1979). Hence,

even when people are alone with others, they are prone to trying to appear likable, or at least trying to act according to social conventions (e.g., responding with a smile to someone smiling at them; Saami, 1984), which could result in a temporary boost of their positive affect.

Second, an improvement in people's well-being when being around others, even when not talking to them, could be due to fulfillment of their informational needs. Proposed by Stephen and Rachel Kaplan (2009), the reasonable person model was based on the notion that it is important for people to find environments providing opportunities to explore and learn new things gradually, through layering new information on top of already understood phenomena. Being alone with others could then produce an amplification of people's positive affect through creation of an environment that supports people's reasonableness by fulfilling their need for gaining a deeper understanding of social behaviours, motivations, and reactions, through simply observing others and their interactions.

Notwithstanding the plausibility of the above two explanations, in this dissertation, I concentrated on two other, mutually interwoven, reasons for an amplification of positive affect while alone with others: fulfillment of the need to belong and sharing attention or simply sharing a physical space with others. The third possible explanation, the need to belong, is motivated by survival and reproductive advantages (Ainsworth, 1989; Bowlby, 1969), and being included in a group is associated with higher levels of positive affect (Baumeister & Leary, 1995; Clark & Watson, 1988; Berry & Handsen, 1996; Ryan, 1995). Baumeister and Leary (1995) proposed, that in order to experience an increase in positive affect through belongingness, people need to frequently interact with the same others, and create a bond with them based on mutual caring and support. They acknowledged that a fulfillment of only one of those conditions should result in a partial satisfaction of one's need to belong. I expect that people experience at least some degree

of belongingness without frequent interactions with others, and only as a consequence of being connected to them through mutual caring and support (Baumeister & Leary, 1995).

Research revealed that creating a bond between people can happen relatively fast. In their minimal group paradigm studies, Tajfel and colleagues (Billig & Tajfel, 1973; Tajfel, 1970; Tajfel & Billig, 1974) showed that social bonds can start evolving even during lab experiments. A. Aron, Melinat, E. N. Aron, Vallone, and Bator (1997) showed that people are able to develop feelings of closeness to previously unknown to them others after only an hour-long conversation about topics involving self-disclosure. In addition, Sandstrom and Dunn (2014a) illustrated that just having a casual talk with others in the same environment, such as with a Starbucks' barista, increased participants' momentary sense of belonging.

Taking things further, I expect that people are able to achieve a momentary bond with others even when they are around others they do not know well, and even when nobody is verbally interacting. Although research in this area is limited, casual reports of university students or fans attending conventions, concerts, and sport events indicate that simply being a part of some event, even without knowing anybody there, creates an in-group mentality and favouritism. Similarly, in his qualitative research of electronic music venues in Berlin, Paris, and Chicago, Luis-Manuel Garcia (2013) found that a unique togetherness emerged among strangers attending electronic music nightclubs. Garcia (2003) speculated, that the momentary belongingness people experience in social situations happens because their attention is turned towards the same object, e.g. music or religious worship.

Hence, the fourth explanation for amplification of emotions stems from the idea that when people are together, they experience not only higher sense of belonging, but also amplification of experienced emotions. Recent research has shown that when people were

placed in a room with others, who performed the same tasks as them, they experienced improvements in their recall memory (Eskenazi, Doerrfeld, Logan, Knoblich, & Sebanz, 2013; He, Lever, & Humphreys, 2011; Shteynberg, 2010), greater goal pursuit (Walton, Cohen, Cwir, & Spencer, 2012), greater cognitive efforts (Desender, Beurms, & Van den Bussche, 2016), and an amplification of sensory sensations (Boothby, Clark, & Bargh, 2014) and heightened experienced emotions (Shteynberg et al., 2014), compared to performing those tasks while alone. Shteynberg and collaborators (2014) claimed that the outcomes obtained by all the shared task studies were results of the shared attention emerging during the performance of those tasks. The idea that shared attention resulting from performing a task together would intensify people's feelings is relatively new and it has not been adequately verified by objective empirical investigations as of yet.

Nonetheless, it seems plausible that such shared attention evolves when people are together, even if they are not involved in performing exactly the same tasks as others. I propose that the amplification of positive affect occurs as a result of people simply being together and sharing the same physical space, and not only when their attention is occupied by the same entity. Therefore, sharing a space with weakly tied to us others or total strangers even when not talking to anybody, i.e. being alone with others, would be a sufficient condition for improving one's mood. Being alone with others could result in higher positive affect also because most social situations are moderately pleasant in valence and being alone with others in social situations would be equivalent to experiencing, and being affected by, a moderately positive social atmosphere. Hence, in everyday situations, the most pronounced difference in positive affect would be seen by comparing people who are completely alone and do not communicate with others, to those who share social situations with others.

Out of the four reasons discussed above, the idea of simply sharing a physical space with others, regardless of performing the same task as them, as well as an enhancement of a sense of belonging seemed as the most interesting and promising ways explaining an amplification of positive affect while alone with others, and they were examined in this dissertation. In order to test these ideas, I first conducted an experience sampling study aimed at checking whether participating in different social situations resulted in different levels of positive affect. I was especially interested in the impact of being alone with others on momentary positive and negative affects and sense of belonging, as compared to being completely alone. During a one-week period of this study, participants were prompted by their smartphones, multiple times a day, to answer questions about their social interactions and well-being. The use of the experience sampling method (ESM) allowed for the assessment of participants' emotional responses to different types of social contacts very soon after they have been experienced in the participants' daily lives, thus minimizing memory bias and improving ecological validity (Scollon, Kim-Prieto, & Diener, 2003).

The second study of this dissertation used experimental manipulations to test whether higher sense of belonging resulting from being alone with others led to higher positive affect, and whether such amplification of positive affect could be obtained by sharing a physical space with others, regardless of having one's attention occupied by the same thing as them. In Study 2, participants were asked to watch a video inducing positive affect, either when they were alone in a room (alone condition), with a confederate watching the same video in the same room as them (shared task condition), or with a confederate, who was in the same room, but who was viewing a book (nonshared task condition). This design allowed me to test differences in a momentary sense of belonging and positive and negative affects between people who were alone, who

shared attention by watching the same video, and people whose attention was not occupied by the same thing.

While assessing how different social situations affect people, it is also important to take into consideration that different people are affected by various social situations differently, and that all people have different baseline, or average, level of positive/negative affect balance, to which their mood gravitates. One of the best predictors of differences in people's average levels of positive and negative affects is the personality dimension of introversion/extraversion, with extraverts reporting higher average level of positive affect than introverts (Diener, Suh, Lucas, & Smith, 1999). Specifically, previous research showed three important differences between extraverts and introverts. Firstly, on average, introverts have a stronger preference for less social or even solitary situations than extraverts (Argyle & Lu, 1990; Asendorph & Wilpers, 1998; Lucas et al., 2008; Srivastava, Angelo, & Vallereux, 2008). Secondly, more introverted people experience lower levels of positive affect than more extraverted people, on average (Hemenover, 2003; Larsen & Ketelaar, 1991; Lucas & Baird, 2004). Thirdly, more introverted people often act extraverted in their daily lives (Fleeson & Gallagher, 2009), which results in them reporting higher momentary positive affect and lower negative affect (Fleeson et al., 2002; Zelenski et al., 2013). Hence, in order to assess the impact of personality differences on the amplification of positive affect while people are alone with others, I included an introversion/extraversion dimension measure in both studies. Although introverts' positive affect level should always be lower than that of extraverts, it was unknown to me if and how these personality differences would influence positive affect in situations of being alone with others, a question which was evaluated in both studies.

In the remaining parts of the introduction, I provide a deeper review to support these ideas. I demonstrate that the notion of obtaining positive affect from being alone with others is based on an extension of already existing findings, which not only indicate that engaging in social relationships leads to experiencing higher levels of positive affect, but which show that even engaging in a contact with people weakly connected to us, or strangers, can boost people's state positive affect. In the next part of the introduction, I show that regardless of all of the benefits resulting from contact with others and the universal human need for social contact, there are people who opt to engage in such relations less frequently than others. I do not only aim to uncover the reasons that some people may have for staying alone more often, but I also introduce the idea of being alone with others, which could constitute a possible incentive for engaging in social situations more frequently. Specifically, I argue that it is possible to obtain an amplification of positive affect even through a minimal form of social contact as being around others. At this stage of the introduction, I discuss possible reasons which often inhibit people from being alone in social situations, and which could explain why being alone with others is not practiced more often. I further address these reasons by reviewing the research findings discrediting people's assumptions about the affective consequences of being alone in public. Next, I define the type of state positive affect, which is likely to be obtained when being alone with others, and its connection to people's overall well-being. Finally, I discuss in more depth the two explanations tested in the second study, for why being alone with others could lead to an amplification of positive affect: satisfying people's need to belong, and having people's attention occupied by the same things as others who share the same physical space.

Social Relationships and Well-Being

Social relationships and their impact on positive affect. The need for being accepted by others, for avoiding social rejection or isolation, and for creation of social relationships are the most basic fundamental human needs (Baumeister & Leary, 1995; Ryan & Deci, 2000). In fact, social needs have been classified as secondary only to satisfying physiological and self-protection requirements in the Maslow's (1943) hierarchy of needs, and they still occupy an important place in the hierarchy reflecting the modern evolutionary theory (Kenrick, Griskevicius, Neuberg, & Schaller, 2010).

The research addressing social exclusion and isolation has been especially valuable in showing the importance of social relationships for physical health. Studies show that people with fewer social ties are characterized by higher morbidity and mortality rates, due to an increased probability of experiencing physical problems (Uchino et al., 1996), such as: elevated blood pressure (Hawkley et al., 2006), compromised immune system (Cacioppo et al., 2003), or an increase in the levels of stress hormones (Adam, Hawkley, Kudielka, & Cacioppo, 2006). Those physical problems are often accompanied by similarly debilitating psychological outcomes. In a laboratory study manipulating participants' social exclusion, Baumeister and DeWall (2006) observed that when people were excluded from a group, their immediate reaction was physical and psychological numbness. Participants not only showed lower sensitivity to physical pain, as their pain thresholds and pain tolerance increased, but they also experienced an increase in their emotional insensitivity. During the experiment, participants were not aware of their emotional numbness after their rejection, which then further lowered their ability to perceive and understand the emotional experiences and responses of others in subsequent interactions. This, in turn, resulted in lowering the empathy the rejected participants were

feeling for others (Baumeister, Brewer, Tice, & Twenge, 2007; Baumeister & DeWall, 2006). The cyclic effects of social rejection on psychological well-being are more easily noticeable if we emphasize, that with an inability to feel sympathy or empathy for others, people are less likely to engage in pro-social or helpful behaviours (Coke, Batson, & McDavis, 1978; Eisenberg & Miller, 1987). This lower possibility of engaging in helping behaviours renders such people less likely to be included into social groups (Baumeister, Brewer, Tice, & Twenge, 2007).

The social rejection studies have also shown that being excluded by a group causes a sharp drop in intelligent thought (Baumeister, Twenge, & Nuss, 2002), as well as problems with self-control when eating or trying to complete a variety of challenging tasks (Baumeister et al., 2007). Since people who lose control are not easily accepted by others (Baumeister et al., 2007), social rejection could again be seen as both a source and a consequence of negative psychological outcomes. Being rejected by others has also been shown to have much more serious consequences, as it is linked to experiencing clinical depression and having suicidal thoughts (Heinrich & Gullone, 2006).

It is not surprising then, that experiencing social connectedness is associated with more favourable outcomes, such as increase in self-esteem (Leary & Baumeister, 2000) or experiencing more meaning in life (Heine, Proulx, & Vohs, 2002). In fact, a review by Lyubomirsky, King, and Diener (2005) revealed that the positive associations between social relationships and happiness, trait positive affect, and life satisfaction are one of the strongest in the literature on well-being. People reporting higher levels of happiness tend to be involved in more social activities, such as volunteering for community service groups (Krueger, Hicks, & McGue, 2001; Thoits & Hewitt, 2001), have more friends and companions they can rely on (Baldassare, Rosenfield, & Rook, 1984; Lee & Ishii-Kuntz, 1987; Mishra, 1992; Phillips, 1967;

Requena, 1995), have more satisfying relationships with their friends, and engage in more satisfying social activities (Cooper, Okamura, & Gurka, 1992; Diener & Seligman, 2002; Gladow & Ray, 1986), as well as they report being more satisfied with their marriages and family lives (Headey, Veenhoven, & Wearing, 1991; Myers, 1992, 2000). Furthermore, research showed that people report more positive affect while partaking in social, as compared to non-social activities (Pavot, Diener, & Fujita, 1990). More positive affect is also experienced on days when people participate in social events (Clark & Watson, 1988; Clark, McIntyre, & Hamaker, 1992; Vittengl & Holt, 1998; Watson, Clark, McIntyre, & Hamaker, 1992), have more social interactions (Berry & Handsen, 1996), and feel more connected to others (Reis et al., 2000). Using a phone survey, Krueger, Kahneman, Schkade, Schwarz, and Stone (2009) asked participants about their feelings during three randomly chosen activities they engaged in the previous day and found that socializing was one of the most enjoyable activities reported, after engaging in exercising and religious practices.

Types of Social Interactions and Their Impact on Positive Affect

The aforementioned research findings regarding the link between social relationships and well-being are based on two problematic generalizations, which I will discuss in this section. First, I will show that the majority of research regarding the positive aspects that result from social contact does not differentiate between different types of social relationships (Sandstrom & Dunn, 2014b), and such research pertains predominately to relationships with close others, such as family members or close friends (e.g., Lyubomirsky et al., 2005). Secondly, I will discuss the fact that many research reviews use the terms social relationships and social interactions interchangeably. It is important, however, to understand the distinction between the two terms

since it is possible to have a limited number of close social relationships, and still engage in a substantial amount of social interactions.

A substantial amount of the studies assessing the association between people's happiness and their social networks is focused on people or, significant others, from whom one obtains or for whom one provides support (Allan, 2006). Sandstrom (2013) indicated that in the meta-analysis of Lyubomirsky and colleagues (2005), more than half of the effect sizes showing association between social relationships and happiness were related to marital or romantic relationships, or close friendships. It is not surprising that contact with people with whom one shares close relationships has a stronger impact on one's well-being than interacting with unknown others, since close others are more likely to provide different types of support (Allan, 2006). For example, in the study of Reis, Sheldon, Gable, Roscoe, and Ryan (2000), participants were asked to report their well-being, degree of satisfying their basic needs, and social activity over a period of 14 days. The authors found that the more participants talked about meaningful matters and felt understood and appreciated, the more they felt relation to their social partners, which then translated into them experiencing heightened levels of positive affect (Reis, Sheldon et al., 2000). In yet another experience sampling study, Wheeler, Reis, and Neslek (1989) asked participants to answer questions about any social interactions lasting more than 10 minutes. Monitoring participants for a period between 7-18 days revealed that social interactions characterized by a greater amount of mutual disclosure and intimacy led to participants feeling less lonely than when they engaged in less intimate and meaningful conversations (Wheeler et al., 1983). Correspondingly, a substantial amount of research has shown that the quality of connections one has with close others, rather than quantity of connections with not well-known

people, is essential to one's positive well-being (Coan, Schaefer, & Darison, 2006; Cohen, 2004; King & Reis, 2012; Pinquart & Sorensen, 2003).

Although talking to close others can indeed be more meaningful than talking to strangers, and is likely to be a source of advice and support, Dunn and colleagues (2007) have shown that concentrating predominantly on the impact that close relationships have on well-being could also stem from people not being aware of the benefits that result from interacting with less well-known people or complete strangers. Dunn and colleagues (2007) showed that their participants, who talked to a stranger, experienced higher levels of low arousal positive affect than participants, who talked to their romantic partners, even though the participants predicted opposite effects (Dunn et al., 2007). Hence, the participants relied on a common belief that interacting with close others improves people's positive affect, for example due to providing social support. Yet, they failed to recognize that contact with strangers could also provide a temporary increase in their positive affect, especially since people tend to engage in self-presentational behaviours in order to be liked and accepted by others.

Another possible reason for why the majority of research concentrates on relationships with close others and their impact on well-being, is due to an interchangeable use of the *social relationships* and the *social interactions* terms. Equating those terms leads to perceiving social interactions as only contacts, which involve close relationships with others or engaging in verbal interactions. This interchangeable use of the above terms is rooted in the definition of social interactions as behaviours forming a center of social relationships (Reis, Collins, & Berscheid, 2000). Although it is true that getting to know others, which is instrumental for developing close social relationships, would be difficult without the ability to verbally interact with them, the above definition does not include all social situations. There are variety of everyday

experiences, in which people systematically encounter different others, with whom they share verbal interactions, yet with whom they do not form any close social relationships. For example, people interact with various shopkeepers, yet they would not necessarily classify those one-time encounters as social relationships, or even precursors thereof. Sociologist Mark Granovetter (1973) referred to such encounters as connections with weak-ties, i.e. connections with people who are in one's social network, but with whom one does not have frequent, emotionally intense, and intimate relations. Sandstrom (2013) transplanted this sociological idea of weak-ties into psychology to show the benefits resulting from interactions with not well-known others. According to her, the most pronounced distinction between people with whom one has strong-ties vs. weak-ties should only be based on the amount of intimacy one shares with others (Sandstrom, 2013). Contrary to Granovetter's (1973) notion, Sandstrom (2013) posited that weak-ties did not have to involve lower emotional intensity or less frequent contact between people. Instead, it is possible to have a weak-tie relationship with someone who is seen frequently, but only if this relationship is limited to a specific context, e.g. work, school, or the neighbourhood (Fingerman, 2004; Sandstrom, 2013). Similarly, it is possible to have a weak-tie relationship with people whose presence creates strong emotions, such as with a co-worker, who is seen every day and who creates a feeling of frustration or anger in people with whom he or she interacts (Sandstrom, 2013).

Based on this new definition of weak-tie relationships, Sandstrom and Dunn (2014a, 2014b) have shown that communications with people located on the peripheries of one's social networks are also valuable in terms of achieving higher momentary positive affect and sense of belonging. In one of their studies, the authors approached 60 people about to enter a Starbucks café and randomly assigned them to two experimental groups. Participants in the efficient group

were asked to make their visit as efficient as possible, e.g. by avoiding any unnecessary conversation with a barista, while participants in the social group were asked to make their visit social by engaging with a barista in conversation, eye contact, and smiling. This naturalistic investigation showed that participants in the social condition, compared to those in the efficient condition, reported a higher state positive affect, lower state negative affect, and a greater momentary sense of belonging (Sandstrom & Dunn, 2014a). These findings are further accentuated by Sandstrom and Dunn's (2014b) experience sampling investigations, which showed that engaging in more weak-tie interactions than usually was associated with reporting higher positive affect and sense of well-being. In two subsequent investigations, the same authors gave two types of tally counters, first to students, and then to community members. Both groups were then asked to use one type of counter to track their daily interactions with weak-ties and the other one to count interactions with strong-ties. The students were required to count their daily social interactions for three consecutive days in September and another three days in a row in November, while the community sample was asked to use the counters for six days during a two-week period. Sandstrom and Dunn (2014b) found that, among the student sample, those students who had on average more daily interactions with weak-ties than other participants reported feeling happier and experiencing a greater sense of belonging. Additionally, on days in which students reported more weak-tie interactions, they felt happier than on days during which they had lower number of such encounters. However, in the community sample, there was no difference in the happiness levels experienced by participants who engaged in more weak-tie interactions than participants who engaged in less weak-tie interactions during the time of the study. There was also no difference in the happiness levels for participants who reported that during the study they engaged in more weak-tie interactions than they usually do in their

everyday lives. The authors of the study speculated that the results of the community sample reflected only changes in people's sense of belonging, and lack of changes in participants' happiness, because among older community sample, the weak-ties had probably less entertaining and a more formal nature than among younger, student sample (Sandstrom & Dunn, 2014b). Regardless of Sandstrom and Dunn's (2014b) inability to perfectly replicate the findings of the student sample in the community setting, their research shows that even limited interaction with weak-ties can directly enhance people's well-being by improving their sense of belonging, and in some cases, their positive affect.

Preference for Aloneness

Given that engaging in social activities is associated with the abovementioned positive effects, the question arises why some people opt to spend their time alone more frequently than others. In this section, I will discuss three possible reasons for the preference for more frequent aloneness, such as being more introverted, experiencing difficulties in maintaining relationships with close others, as well as not engaging in verbal interactions due to an affective forecasting error or fear of breaking social rules.

Personality differences: The introversion-extraversion dimension. The preference of some people for attending social situations less frequently than others could result from their personality traits. I concentrated on the trait introversion/extraversion because it is one of the five major personality dimensions, which shows a strong relation to sociability and positive affect (Diener et al., 1999; Lucas & Fujita, 2000).¹ It is also associated with a variety of other

¹ The trait introversion/extraversion is regarded as a single, continuous trait, i.e. people scoring high on the scale are considered more extraverted (or 'extraverts') than people scoring lower on the same scale (or 'introverts').

personal differences, such as high sensory-processing sensitivity (E. N. Aron & A. Aron, 1997) and shyness (Briggs, 1988; Ebeling-Witte, Frank, & Lester, 2007), which are characterized by a preference for lower frequency of social contact.

Overall, personality can be defined as a unique, person-specific concentration of emotions, behaviours, and thoughts shaped by one's biological make-up, as well as by the adaptation to one's social environment, and the physical locations a person experiences (Larsen & Buss, 2014). The trait approach to studying personality assesses the individual differences between people and aims to establish which personality traits would be the best in order to compare people (Matthews, Deary, & Whiteman, 2003). After a lengthy, and still ongoing, debate regarding the suitability of traits as the most appropriate units assessing personality differences, as well as the discussion regarding the number of traits which should be included in the final personality model, the most agreement and popularity has been gained by the Five-Factor model (Goldberg, 1990). The model postulates the existence of five broad and independent personality traits, which capture majority of personality variations between people: extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness (Goldberg, 1990). It is accepted that these five main traits contain narrower sub-traits, but consensus has not been reached, as of yet, regarding their final details or names. Among the five traits, the introversion-extraversion dimension is closely associated with variations in the amount of sociability people prefer (Wilt & Revelle, 2009).

The dimension of introversion-extraversion is a basic, yet broad, dimension of personality, which is moderately heritable and has been observed in many cultures. People who score high on this dimension have a tendency to be talkative, sociable, and outgoing. They also have a tendency to excel in leadership roles, be assertive, yet cheerful, and have a high activity

level. On the other hand, people who score low on the dimension are labelled as introverts and are characterized by being quieter and more reserved. Introverts also tend to keep in a background during social situations, enjoy solitary activities more, and have smaller, but closely-knit groups of friends (see Wilt & Revelle, 2009, for a full review). It seems understandable, then that people who choose to be around others less frequently, especially around others who are unknown to them, are usually more introverted. It has been shown that introverts indeed have a tendency to speak less than extraverts (Mehl et al., 2006), spend less time in social situations (Asendorph & Wilpers, 1998; Lucas et al., 2008) and more time alone (Argyle & Lu, 1990; Leary, Herbst, & McCrary, 2003; Srivastava et al., 2008), and show a preference for solitude (Burger, 1995; Long et al., 2003).

There have been few theories proposed which attempt to explain the mechanisms responsible for the differences between introverts and extraverts' sociability preferences. Eysenck (1982) explained variations in people's extraversion levels as a consequence of a differing activity of the ascending reticular activation system (ARAS), which is a structure in the brain stem that was thought to control cortical arousal by monitoring the amount of nervous stimulation that entered the cortex. Someone who scores low on extraversion has a more active ARAS, making him easily over-aroused and resulting in his preference for less arousing situations. Correspondingly, scoring high on extraversion results from a less active ARAS and being under-aroused, which makes people more inclined to seek stimulation. The variations in the ARAS functioning could then explain different preferences for engaging in social situations, since more introverted people would opt for less social activities, due to such events evoking less arousing feelings, while more extraverted people would crave more arousal, and they would be more likely to seek it in social situations (Rusting & Larsen, 1995).

The influence of Eysenck's theory has declined in favour of the reinforcement sensitivity theory proposed by Jeffrey Gray (1973; 1991). Gray's model (1991) includes two new dimensions of anxiety and impulsivity, which are the most closely related to Eysenck's traits of neuroticism and extraversion, respectively. The main difference between Eysenck's and Gray's models results from Gray's (1991) assumption that the personality differences are partially due to variations in the sensitivity of the neural systems involved in processing responses to rewarding stimuli. Specifically, the behavioural activation system (BAS), which consists of the cortico-striatopallido-thalamic loops and pathways, is sensitive to catecholaminergic action, especially to dopamine action (De Pascalis, Fiore, & Sparita, 1996). The BAS is a source of positive feelings, goal-oriented behaviour, as well as of responses to conditioned and unconditioned cues of rewards (Corr, 2002). This enhanced reward sensitivity is then responsible for motivating more impulsive people to engage in more social activities more often, since being around others is arousing and rewarding (Lucas & Baird, 2004). Since impulsivity is associated with extraversion (Gray, 1991), it follows that more extraverted people would also be more likely to participate in social situations than less extraverted people. Contrastingly, the behavioural inhibition system (BIS) consists of septohippocampal system, its monoaminergic afferents from the brain stem, and its neocortical projection in the frontal lobe (Gray, 1991). The BIS is associated with negative feelings, and avoidance motivation, as it responds to cues of punishment and non-reward (Carver & White, 1994). Since more anxious people are said to have a more active BIS, and since Gray's (1991) trait of anxiety is associated with the traits of neuroticism and introversion, it follows that people who have more active BIS and are more anxious would also be characterized as more neurotic and more likely to be introverted. In accordance with Gray's model then, more anxious, neurotic, and introverted people should have

less motivation to be in social situations, since they are less motivated by rewards brought by social interactions, yet they are more sensitive to the possible threats resulting from social situations, such as being socially rejected or criticized (Gray, 1991).

Another perspective, the density distribution of states theory, describes the differences between introverts and extraverts as the result of variations in the average behaviours exhibited by these two groups over time (Fleeson, 2001, 2004). Through an experience sampling methodology, Fleeson (2001, 2004) showed that most people express a wide range of behaviours in relatively short periods of time; however, the central tendency of expressed behaviours (averaged over time) differs between people. Hence, a person can be considered extraverted even if she or he sometimes acts introverted, as long as the frequency of extraverted behaviour is, on average, higher compared to that exhibited by less extraverted people. Since acting in extraverted ways, i.e. acting talkative, bold, assertive, or outgoing, is associated with experiencing positive affect, and provided that more extraverted people act in extraverted ways more often, they are more likely to experience higher state positive affect more often, which leads to them reporting higher global positive affect (Wilt et al., 2012). The positive consequences of extraverted behaviours are not limited to highly extraverted people only (Fleeson et al., 2002; Gillen, 2009; McNiel & Fleeson, 2006; McNiel et al., 2010; Smillie, 2013; Whelan & Zelenski, 2012; Zelenski et al., 2012; Zelenski et al., 2013). When instructed to act more extraverted, introverts were perceived by others as happier (Fleeson et al., 2002; Zelenski et al., 2012), and they themselves reported feeling higher levels of positive affect and arousal, without experiencing negative affect or depletion of cognitive resources during a short time of this counterdispositional behaviour (McNiel & Fleeson, 2006; McNiel et al., 2010; Whelan & Zelenski, 2012; Zelenski et al., 2012). Acting in an extraverted way is closely associated with

behaviours promoting social contact, and since such behaviours are shown to increase one's positive affect (Wilt et al., 2012), dispositional extraverts seem to be predisposed to engaging in more frequent social contact and to experiencing more positive affect. This, however, does not exclude more introverted people from the ability to increase their positive affect when they decide to act more extraverted. It is difficult, however, to prescribe such behaviour as a definitive remedy for introverts' lower positive affect, as the debate regarding its costs is still ongoing. Anecdotal reports show that introverts need to relax and revitalize in solitude after acting counterdispositionally (e.g., Brian Little's restorative niches idea, 2008). Research also showed that acting extraverted was associated with higher positive mood, but also with increased fatigue appearing after a 3-hour delay for all participants, regardless of their personality traits (Leikas & Ilmarinen, 2016). Similarly, Jacques-Hamilton, Sun, and Smillie (2018) showed that more introverted participants, who were instructed to act extraverted for a week as they lived their normal, everyday lives, reported higher retrospective tiredness and negative affect than less introverted participants. However, there were no differences between introverts and extraverts in the reported momentary tiredness and NA. Hence, the inconsistent findings emerging from various studies do not allow, as of yet, to make definite conclusions about possible costs introverts pay when acting extraverted.

Difficulties in maintaining close relationships. Another possible reason explaining the less frequent contact with others stems from the unsuccessful relationships people have experienced when interacting with others, especially with individuals close to them. Although relationships with close others are usually associated with positive outcomes enhancing one's well-being (Baldassare et al., 1984; Headey et al., 1991; Myers, 1992, 2000; Mishra, 1992; Requena, 1995), there are times when the high level of intimacy shared between close others

makes such relationships a source of conflict and intense unpleasant emotions. Relationships with strong-ties often become more problematic than relationships with less-known others because people are more likely to express their true feelings and their true convictions around others they trust.

Another reason for preferring to be alone rather than with close others stems from the idea that, since people are more likely to share intimate details of their lives with strong-ties, they have pre-set expectations about how others who are close to them should behave towards them (Simpson, Collins, Tran, & Haydon, 2007). However, close others do not always share the same general beliefs or opinions about everyday issues and being among familiar people, everybody is more likely to speak freely about their own convictions. It is not surprising then, that confiding in close others results in both sides voicing their negative feelings more often than it happens among unknown others (Reis, Collins et al., 2000).

Similarly, when people know others well, they tend to compare themselves to them, which sometimes leads to negative outcomes (Rook, 1984). Rook (1984) was one of the first investigators interested in the negative outcomes resulting from relations with close others. She interviewed nearly 160 elderly widows about the social support they received from different types of strong-ties and assessed the impact of those interactions on the widows' well-being. Her study, and other similar ones, showed that the influence of close others who are well-wishing, yet express a lot of negativity, can have at least as potent detrimental effects on one's well-being as positive relationships (Horwitz, McLaughlin, & White, 1998; Manne, Taylor, Dougherty, & Kemeny, 1997; Rook, 1984).

It is possible that people who experience problems resulting from relationships with close others could satisfy their need for social contact, and enhance their positive affect, through

interacting with weak-ties, or complete strangers. Although contact with weak-ties, in all likelihood, will not provide a long-lasting trust and connection, similar to those resulting from having close relationships with family and colleagues, it could provide a momentary enhancement in people's positive affect and a sense of belonging (Sandstrom & Dunn, 2014b).

Concerns about breaking social norms. The final reasons for a lower frequency of engaging in social situations are worries about breaking social conventions and being rejected by others. In Western cultures, many people engage in friendly chit-chat with strangers, but such behaviour is not natural in all situations. For example, Epley and Schroeder (2014) approached people before they boarded their trains or buses and asked them to participate in their studies. Those people who agreed to participate were then randomly assigned to one of the three conditions. Participants in the connection condition were asked to connect with a stranger during their commute by initiating small talk; those in the solitude condition were asked to remain silent and disconnected from others; while people in the control condition were told to do what they normally do during their commute. Epley and Schroeder (2014) found that participants who connected with others reported their commute as a more positive experience than the participants who did not connect with strangers. When other participants were asked to predict how they would feel if they were asked to act according to the directions of all three above conditions, Epley and Schroeder (2014) found their participants expected to feel the worst in the connection scenario. Although the participants admitted to being interested in engaging in friendly chat with a stranger, they also thought they should be polite, and that they should not interrupt others by talking to them (Epley & Schroeder, 2014). It seems that in such situations, people who choose not to engage in social contact tend to participate in a pluralistic ignorance (Prentice & Miller, 1993). They are privately interested in talking to strangers, yet they incorrectly assume that

others would be less interested in such contact, hence abstaining from initiating such interactions themselves (Epley & Schroeder, 2014). These erroneous assumptions about others' preferences often arise from people's internal fears about being rejected, not being interesting enough, or not having anything to talk about with others (Epley & Schroeder, 2014). They can also arise from people being inexperienced at social interactions and not knowing what to expect, as well as from expectations created based on negative past experiences (Wirtz, Kruger, Scollon, & Diener, 2003). Specifically, it has been shown that negative past experiences involving social interactions are remembered better than neutral or positive ones (Hastie & Kumar, 1979; Morewedge, Gilbert, & Wilson, 2005), and that stress resulting from difficult social interactions creates higher levels of distress (Bolger, DeLongis, Kessler, & Schilling, 1989; Zautra, Burleson, Matt, Roth, & Burrows, 1994) and more persistent aversive effects than any other types of stressors (Bolger et al., 1989).

It is also plausible that people make erroneous assumptions about others' preferences for engaging in social interactions, because they expect negative outcomes of initiating such interactions, and such negative expectations shape their actual memories (Klaaren, Hodges, & Wilson, 1994). People have a tendency to imagine negative outcomes much more easily than positive ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rook, 1984), and their retrospective expectations are often better predictors of their future choices than their evaluations of situations as they are happening. Research indicates that people tend to ignore their actual affective experiences (Novemsky & Ratner, 2003; Wilson, Meyers, & Gilbert, 2001) and tend to adjust their memories of those experiences in accordance to their initial expectations or the intuitive theories they believe in (Klaaren et al., 1994). Hence, even if we enjoy being around strangers and want to initiate a conversation, we are often unsure of whether strangers would

want to talk to us, and that could make us uncomfortable. This feeling of uneasiness would then affect our memories about this specific social event even if we had fun at the end. The memories of that uneasiness and actual enjoyment of social interactions would both affect the decision about future participation in such events (Writz et al., 2003).

Being Alone with Others

Although social interactions require that people are aware of each other's actions, interacting with others does not have to involve enactment of direct behaviour towards others, or even being present in the same physical space as them, for example when talking on the phone (Rummel, 1991).² The question then arises, what happens in instances where people are alone with others, i.e. when people share the same physical space with total strangers or people they do not know well, yet they do not verbally interact with each other, such as during school lectures, music concerts, or sitting in a café. The purpose of this dissertation was to assess whether removing verbal interactions from a social space had a differing effect on people's ability to gain positive affect while they shared a space with others. I wanted to find out whether the simple physical presence of others was sufficient to develop unique, yet possibly temporary enhancement in positive affect of people. If people were aware that verbal interactions are not always required to feel better emotionally, they would perhaps decide to venture out more often and spend more time among others. It is also possible that once people start spending more time around others, it could lead to them feeling more and more comfortable in social situations,

² In this dissertation the term *interaction* is used interchangeably with the *social interaction* term. Both of these phrases refer to people talking to others either verbally (face-to-face, using phone, or Internet connections) or communicating with others nonverbally using technology (texting, Internet-based chats, etc.).

which would further lead them to experiencing more positive affect. This, in a cyclical way, could then help people engage in social situations more often.

Contrary to the abundance of research showing the effects of loneliness (see S. Cacioppo, Grippo, London, Goossens, & J. T. Cacioppo, 2015 for a review), solitude (see Coplan & Bowker, 2014 for review), or being ostracized by others (see Williams, 2001 for review), there is limited research addressing the effects of being alone around others without verbally interacting with them, yet not experiencing any of the abovementioned social exclusions. Thanks to the business field's research, it has been shown that one reason for people's avoidance of being in public alone is due to a belief that if people go out because of hedonistic reasons, they should not do it alone (Sellier & Morwitz, 2011). For instance, the survey published by the U.S. National Endowment of the Arts (2015), indicated that around 12 percent of the American population wanted to attend art events but were held back, mostly because they did not have someone with whom they could go. The belief that in order to enjoy themselves, people need to be around others seem to be rooted in people's concern about being judged as someone who is unable to find friends or a partner (Ajzen, 1991; Dahl, Manchanda, & Argo, 2001; Ratner & Hamilton, 2015; Sellier & Morwitz, 2011). This worry leads to further concerns about others making wrongful assumptions about solitary people's inferior social status (Bourdieu, 1986; McFerran & Argo, 2013; Putnam, 2000) or negative personal characteristics. On the other hand, being alone while performing utilitarian activities in public spaces, such as working or studying in a café or grocery shopping, seem to be more acceptable, since such activities are not seen as social events (Sellier & Morwitz, 2011).

Similarly to the consequences of believing that people judge others who are alone in social spaces, and similarly to making erroneous assumptions about their own future affect

resulting from interacting with strangers (e.g., Dunn, Biesanz, Human, & Finn, 2007; Epley & Schroeder, 2014), people also create inaccurate assumptions about negative emotions they could experience when going out alone. For example, 86 people were asked how much they thought being alone or with someone would influence their enjoyment of going to a campus art gallery. The authors found that although people who were with others expected to enjoy the gallery more than people who were alone, the actual enjoyment and interest of the gallery did not differ between the two groups (Ratner & Hamilton, 2015).

It is also possible that people make erroneous assumptions about being alone in public because they are not fully aware of the impact of these situations on their positive affect. Being alone with others, involves not only being around acquaintances, but it often encompasses being around unknown people, which could make such situations less impactful. Considering that experiences shape people's memories, and that memories have an impact on people's experiences (Writz et al., 2003), it is possible that the inability to remember all the positive feelings people get from being around unknown others prevents them from making correct predictions about how these interactions would make them feel in the future. This, in turn, could lead them to making an inaccurate decision to abstain from being alone with others.

The Rationale for an Amplification of Momentary Positive Affect due to Being Alone with Others

In this dissertation, I proposed that being alone with others leads to an increase of people's momentary positive affect and sense of belonging, and I speculated that a few reasons exist which could explain these amplifications. Below, I discuss the type of positive affect that likely results from being alone with others. Then, I briefly examine how engaging in self-presentational behaviours, could lead to the amplification of positive affect when alone with

others. Afterwards, I consider the reasonable person model of Stephen Kaplan and Rachel Kaplan (2009) and I show that being alone with others could support new social knowledge acquisition, which then would result in increased positive affect. Lastly, I present two ideas, which were tested in the second study of this dissertation as reasons for amplification of positive affect when alone with others, i.e. an increase in sense of belonging and having one's attention occupied by the same things as other people sharing the same physical space as us. Specifically, I argue that it is possible that the shared attention should not be seen as attention to a specific task performed simultaneously with others, but as attention to the situation as a whole, i.e. to everything that is going on around people when they are together. Hence, it is possible that being alone with others would result in higher positive affect, because most social situations are moderately pleasant in valence, and being alone with others in social situations would then be equivalent to experiencing and being affected by a moderately positive social atmosphere.

State positive affect and being alone with others. The main interest of this dissertation lies in an increase of state positive affect, i.e. improvement in emotions felt in a moment, which are a response to, and a direct consequence of, experienced situations. In order to understand, describe, and differentiate between different types of emotions, researchers use the affect circumplex model, which contains two dimensions: valence and arousal. The valence dimension, representing differences in the pleasantness of emotions, is located on the horizontal axis, while the arousal dimension, distinguishing variations in activation of feelings, is located on the vertical axis (see Figure 1; Larsen & Diener, 1992; Russell, 1980). The valence and arousal are positioned orthogonally to each other, which indicates that those dimensions are experienced independently of each other. It is typical to experience emotions either high or low in arousal, and which are either pleasant or unpleasant. Emotions located 180 degrees from each other

indicate that those emotions are bipolar or inversely related (e.g., dull vs. excited), while emotions positioned closer to each other on the circumplex are more likely to be experienced simultaneously, compared to those lying further away from each other (Russell, 1980).

The affect circumplex model operationalizes positive and negative affect, as reflecting both valence and activation, i.e. the term positive affect is typically equivalent to activated pleasant emotions, while negative affect is defined as high arousal unpleasant emotions (Larsen & Diener, 1992). Hence, a low score on positive affect could occur with someone experiencing any of: low arousal and pleasant emotions, low arousal and unpleasant emotions, or high arousal and unpleasant emotions. Also, a decrease in the level of one's positive affect would not lead to an increase in experienced negative affect (Russell & Carroll, 1999; Watson, Clark, & Tellegen, 1988). The popular affect measure, the Positive and Negative Affect Scale (PANAS; Watson et al., 1988) does not accommodate this full range of positive and negative affects' meanings, containing terms with both high valence and activation levels only. When moods are measured by PANAS, they represent activated, positively and negatively valenced affects, rather than endorsement of any low arousal states (Watson, Wiese, Vaidya, & Tellegen, 1999).

For most people, going out and being alone with others without interacting with anybody would likely result in experiencing more pleasant emotions, and only minimal feelings of arousal. Being alone with others would not be equivalent to a complete lack of arousal, since being outside and around people is associated with at least some degree of uncertainty, a potential for social interactions, or the necessity of making decisions. However, it would be unlikely to experience a positive affect characterized not only by valence but also by a strong arousal when alone with others, characterized by words, such as enthusiastic, euphoric, or peppy. Considering this low arousal, I assessed participants' state positive affect predominately by

measuring their valence, rather than by measuring their activated pleasantness. Similarly to Sandstrom and Dunn (2014b), in both of my studies I used the Scale of Positive and Negative Emotions (SPANE; Diener et al., 2009), which concentrates mainly on assessing how people felt by asking them to make judgments about eight valence adjectives (*positive, negative, good, bad, pleasant, unpleasant, happy, sad*), with only four adjectives assessing what would be considered by the circumplex model as more/less arousing positive and negative feelings (*joy, contented, angry, afraid*). Using the SPANE also allowed me to assess positive affect as more dependent on levels of negative affect than the more independent activated pleasant and activated unpleasant dimensions (like the PANAS). An increase of people's positive affect resulting from being alone with others was then indicative of a simultaneous decrease in their levels of negative affect.

It is important to acknowledge that the amplification of positive affect obtained from being alone with others may constitute only a small fraction of the elements needed to enhance one's overall positive well-being. Nonetheless, as proposed by the broaden-and-build theory (Fredrickson, 2004), this enhancement of even momentary positive emotions could then lead to a broadening of people's mindsets, because feeling more positive, people would be more likely to engage in actions which would help them learn new ideas, promote their creativity, and encourage them to develop new social bonds. In turn, engagement in such actions could then help people further develop their psychological, social, or intellectual strengths, which would result in improving the ways in which people perceive themselves and their lives, hence leading to improving their overall well-being (Fredrickson, 2004).

On the other hand, a more direct link between momentary positive affect and the overall happiness could be explained by Fleeson's density distribution model (2001). Fleeson and Gallagher (2009) showed that an aggregation of people's average behaviours across situations

was consistent with their dominant personality trait, e.g. extraverts act, on average, in more extraverted ways than introverts, across different situations. Thus, if people could experience enhanced positive mood more often, on average, their overall positive affect would increase. Therefore, although I was focused on short-term positive affect in the studies presented in this dissertation, such momentary boosts of better mood could be determinantal to more general well-being.

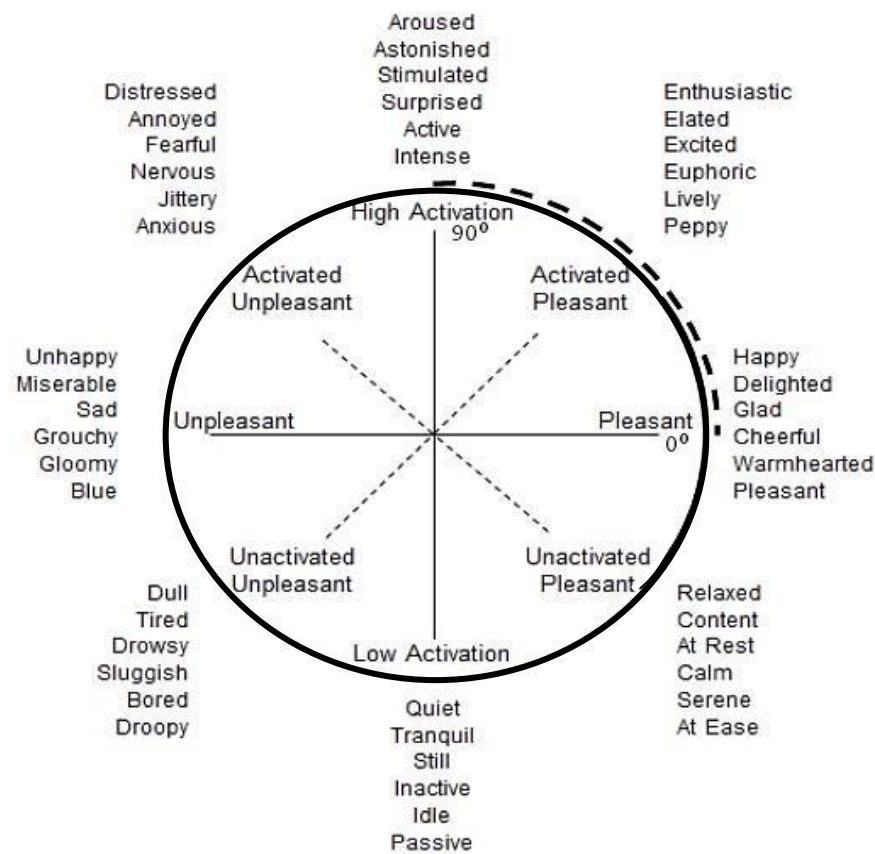


Figure 1. Affect circumplex model (positive affect marked with dotted line; Larsen & Diener, 1992)

Engaging in self-presentational techniques. People tend to engage in self-presentational behaviours because they lead to being liked, which then gives them a higher chance of being accepted by a group. I propose three general ways in which self-presentational

techniques could explain an amplification of positive affect when people are alone with others: engaging in specific behavioural techniques, adjusting one's exhibited emotions to those exhibited by others, and actually mimicking other's speech and body movements.

According to researchers in the area of self-presentation, also called impression management, the ultimate goal of people when around others is to regulate the impressions that others held of them, which is accomplished by using various behavioural techniques (Gibson & Sachau, 2000; Goffman, 1959; Jones & Pittman, 1982; Lee, Quigley, Nesler, Corbett, & Tedeschi, 1999). Researchers claim that at the very center of self-presentational goals lies an ancient human need for people to be liked and accepted by others, which impacts social rewards people achieve, as well as their self-esteem (Baumeister, 1982; Jonas & Pittman, 1982; Leary & Kowalski, 1990; Schlenker, 1980). The ingratiation tactics (i.e., doing something for others, in order to be seen as likeable) and the self-promotional behaviours (i.e., doing more than is expected, in order to be seen as capable and dependable), as well as following social norms are types of impression management techniques that could be used when people are alone with others (Baumeister, 1998; Jones, 1964; Jones & Pittman, 1982; Jones & Wortman, 1973). When people are alone with others, for example in a classroom or a café, they use socially normative self-presentational behaviours when they pick someone's pen up from the floor, or offer someone a napkin, even without being asked to do so, and regardless of those actions being explicitly acknowledged by others. These self-presentational behaviours are often involuntary, unconscious, and they promote the achievement of self-presentational goals (Jones & Pittman, 1982). Similarly, people often unconsciously adjust their mood in order to fit into social situations because of the tacit influence of social demands on engaging in an impression management. People are often unaware they have gained emotional benefits from such

adjustments (Dunn et al., 2007). Furthermore, being in an actual social situation, people not only regulate their emotions internally (Erber, Wegner, & Theriault; 1996), but they also unconsciously display appropriate affective states in accordance to social norms. In Western cultures, where expressing emotions related to happiness is highly valued (Lyubomirsky et al., 2005; M. Erber & R. Erber, 2001; Saami, 1984), and happy-looking people are more liked (Lyubomirsky et al., 2005; Krys et al., 2016), even young children unconsciously smile due to learning that smiling in the presence of others is expected and rewarded (Saami, 1984). It is then plausible that the process by which people's behaviours are transformed into their positive affect is similar to that proposed by the facial feedback hypothesis. Specifically, when people are smiling, the muscles they use send a signal to the brain, which then interprets those signals as an indication that a person must be in a positive mood, resulting in the reactions within a brain that actually produce positive affect (Buck, 1980). The debate regarding accuracy of the facial feedback hypothesis is still ongoing. For example, Lewis and Bowler (2009) supported this hypothesis by finding that participants whose forehead's frown lines were injected with the botulinum toxin A, making them unable to frown, scored significantly lower on measures of anxiety, depression, and irritability than participants, who did not have any injections. Yet, a recent multi-laboratory replication effort by Wagenmakers and collaborators (2016) of one of the most staple studies supporting the facial feedback hypothesis, i.e. a study, in which participants in the induced smile condition rated the same cartoons as funnier than the participants who were imitating the pouting expression (Strack, Martin, & Steppe, 1988), was unsuccessful. Noah, Schul, and Mayo (2018) explained the discrepancies between the original facial feedback hypothesis' studies and their unsuccessful replications as an effect of participants being video recorded in the latter studies. In fact, those authors demonstrated, in their own studies, that the

effects of facial feedback were present when camera was absent and participants were not recorded (Noah et al., 2018). However, the debate about the validity of the facial feedback hypothesis continues, since even these latest supportive studies have been criticized for using only half of planned sample size and as a result, having low statistical power.

Regardless of the problems supporting the facial feedback hypothesis, there is some evidence that self-presentational behaviours indeed generate affective states (e.g., Laird, 1974; Zajonc, Murphy, & Inglehart, 1989), and it would clearly be premature to conclude these processes never occur. Specifically, in the previously mentioned study by Dunn and colleagues (2007), the authors told participants that they would have to talk either to strangers or to their romantic partners. Results revealed that participants unconsciously engaged in positive self-presentational behaviours when talking to unknown others, which then improved their positive affect over and above the positive affect generated while talking to their romantic partners.

Although the above study involved verbal interactions, it is likely that similar results could be obtained through nonverbal impression management behaviours, as seen in case of people smiling to strangers in accordance with cultural norms in North America. Simply the presence of others, without any interaction with them, makes people unconsciously engage in behaviours supporting culturally appropriate norms, which then leads to an emotional response. Research shows that people start to mimic others' behaviours very soon after being born, since even one-month-old infants imitate the facial expressions of others (Field et al., 1982; Meltzoff & Moore, 1977, 1983). Furthermore, such mimicry, similarly to many other self-presentational behaviours, happens unconsciously, effortlessly, and involuntary. For example, seeing someone yawn elicits yawning in others (Provine, 1986), while seeing someone getting injured creates a

wince in the audience similar to that exhibited by the injured person (Bavelas, Black, Lemery, & Mullett, 1986).

Early on, the tendency for mimicry has been explained by Carpenter's (1874) principle of ideomotor action, which states that simply thinking of doing something automatically increases one's chances of actually accomplishing the task. Later, this explanation was supported by empirical findings which indicated that thinking about performing a task, imagining others engaging in a task, or actually seeing others performing a task, indeed activate brain regions that are normally active during the performance of that task (Chartrand et al., 2005; Decety, Jeannerod, Germain, & Pastene, 1991; Jeannerod, 1994).

It is easily understandable why humans developed the mimicry tendencies, if one images whether it would be better to start running when seeing someone running away from a moose or whether it would be more beneficial to first stop and consider the hypothetical or statistical dangers resulting from encountering the said moose (Chartrand et al., 2005). However, people also engage in mimicry for more nuanced reasons, of which they themselves are often not aware, but all of which lead to presenting oneself in a favourable way. For example, research has shown that people tend to mimic others' posture or bodily movements in order to make themselves more similar to others, and as a result, to be more liked by others (Bernieri, 1988; Dabbs, 1969; LaFrance, 1982; Maurer & Tindall, 1983; Schefflen, 1964).

In order to be seen as empathic and more likeable, people not only mimic others' body movements and expressions, but they use so-called emotional contagion (see Hatfield, Cacioppo, & Rapson, 1994), which consists of detecting others' emotions, even if those emotions are very subtle, and then matching those moods within themselves (Chartrand et al., 2005; Friedman & Riggio, 1981). For example, Schacter and Singer (1962) injected their participants with a

substance without telling them that the substance was adrenaline causing physical arousal. The participants turned to others sharing the same space for clues regarding the source of their internal arousal. If they noticed that others were acting giddy or angry, they also reported feeling giddy or angry, respectively (Schacter & Singer, 1962).

The most interesting aspect for the idea of being alone with others is the fact that people engage in mimicry even when they do not need to communicate anything to others, when there is an absence of any social verbal interaction, or even when the other people are not physically present. Hsee and colleagues (1990) rated viewers' expressions and showed that people mimic the facial expressions of others they see on a television. Dimberg (1982) went further and measured facial muscles' micro-movements of his participants with an electromyograph (EMG) while they were looking at pictures of happy or angry faces. The results indicated that, even when people seemed not to express any emotions, their involuntary micro-movements of facial muscles were synchronized with the expressions they saw, often in the expressions of people not even physically present.

Based on the above research, it is likely that being around others, without interacting with them, leads to similar behavioural mimicry. For example, if a person decided to go out and work in a coffee shop instead of working at home, the presence of others could lead that person to engaging in impression management, since he would unconsciously want to act appropriately and be accepted as a hardworking and valuable member of a society. Hence, the presence of others could actually energize him into performing his work, which could result in a confirmation of the meaningfulness of his actions, which in turn, would lead to increasing his positive affect.

This unconscious mimicry of facial expressions and an emotional contagion do not discriminate against negative emotions. Being around others who are experiencing and exhibiting sombreness, sadness, or anger, e.g. as during a funeral, elicits similar feelings and expressions in people observing them. Yet, since most everyday situations are rather moderately pleasant, and since being alone with others does not involve verbal interactions that could be a source of stress, engaging in the majority of everyday situations should result in people experiencing more positive emotions than negative ones (Gross, 1998). Even when people are annoyed or angry, yet they have to encounter others, they more often than not adjust their behaviours to better fit into the present situation, for example, by smiling back at a child or, at least, by not displaying their anger. Finally, being in a public place is often a distraction, since the environment of being alone with others, i.e. being in public, hearing conversation, seeing movement, leads our attention away from the source of our negative emotions (Nix, Watson, Pyszczynski, & Greenberg, 1995).

Supporting people's informational needs. An amplification of positive affect due to being alone with others could also result from the fact that being alone with others has the potential to improve people's overall well-being by supporting their informational needs. Proposed by Stephen Kaplan and Rachel Kaplan (2009), the reasonable person model is a psychological framework, which was created in an attempt to define environments and actions fostering reasonable behaviours (e.g., cooperativeness, respectfulness of other people's beliefs and the natural environment's resources, being engaged in constructive and helpful activities).

According to this model, people function optimally when they satisfy their three informational needs: the need to build and expend mental models, the need of being effective, and the need to engage in a meaningful action. The need for model building is accomplished by

learning new tasks and trying to make sense of new information people have gathered (Basu, R. Kaplan, & S. Kaplan, 2014). The need for being effective depends on previously acquired knowledge and reflects a necessity for being able to find information, learn it, share it, as well as knowing how to put this information to proper use. While, the need to take meaningful action reflects people's necessity to use their skills and knowledge in order to make a greater difference in the world around them (Basu, R. Kaplan, & S. Kaplan, 2014).

The effects of being alone with others are especially relevant in satisfying the first of those needs, i.e. the need to build and expend mental models. There is no one universal definition of an environment, which would be supportive of all the domains in which people acquire knowledge (S. Kaplan, & R. Kaplan, 2009). In order for an environment to foster reasonableness, it has to allow people to acquire their knowledge gradually, enabling the understanding of one layer of information and its position towards other layers of already known facts, before the entire mental model of the larger landscape of knowledge is created (S. Kaplan, & R. Kaplan, 2009). Every time people are with others, regardless of whether they talk to others or just observe them, they acquire small amounts of new knowledge about human motivations, behaviour, and interpersonal relations. The majority of people nowadays live around others and have some understanding of them, but the degree of this understanding varies greatly. Hence, being alone with others facilitates people's learning about others through simply observing them and their interactions, without the necessity of implementing any of the newly acquired knowledge, i.e. without interacting with others. That way, people are able to build specific mental blocks of knowledge about others and test such knowledge blocks gradually in their everyday lives. This process is exemplified by a cross-cultural, cross-generational popularity of

“people watching”, simply observing others while sitting in a public venue, or by a popularity of various reality TV programs and YouTube’s Vlogs.

Since repeatedly being alone with others helps facilitate gradual learning about people’s personal and interpersonal motives and behaviours, then it also fulfills the need for taking part in a meaningful action by using acquired social knowledge to successfully participate in social interactions and passing this social knowledge to others. Therefore, all the gradual improvements in people’s knowledge about others would optimally lead to the development of reasonable and well-rounded people, as well as to improvements in their chances of building meaningful and successful bonds with other, thus positively influencing people’s sense of belonging.

Momentary sense of belonging and being alone with others. Another explanation for an increase in momentary positive affect, as well as one of the direct results of being alone with others (vs. being completely alone), includes an intensification of the momentary belongingness experienced by people. Belongingness, or a sense of belonging, refers to the emotional state which people experience when they have satisfied, at least to some degree, their need to belong, i.e. the need to form and maintain relationships with others (Ainsworth, 1989; Axelrod & Hamilton, 1981; Baumeister & Leary, 1995; Bowlby, 1969; Buss, 1990, 1991; Hogan, Jones, & Cheek, 1985). Although it is unlikely that being alone with others could produce long lasting close relationships with others, I suspected that being alone with others could help people experience a temporary feeling of belonging to a specific group of people, as a result of sharing a specific environment.

Regardless of which society or country they belong to, people in all cultures are predisposed to forming groups, even if those groups vary in their type, number, or permanence

(Coon, 1948). The desire to create social bonds with other group members originates from humans' ancestral survival and reproductive necessities (Ainsworth, 1989; Axelrod & Hamilton, 1981; Bowlby, 1969; Buss, 1991). In the past, it was easier to survive when living in groups, since hunting and protection were accomplished much more easily when people worked alongside others than when they were alone (Baumeister & Leary, 1995). The protective value of group membership can be found even among modern people. In his utility affiliation theory, Rofe (1984) claimed that in some dangerous or stressful situations, people have a need to affiliate with others, especially if others share the same events, in order to gather the information necessary for an evaluation of the situation, or because the presence of others is comforting or distracting from stressful events (Rofe & Lewin, 1983; Zimbardo & Formica, 1963). For example, when participants believed that they would undergo painful electric shocks as a part of an experiment, and that they have to wait 10-15 minutes for the experiment to start, they were more likely to choose to wait with someone instead of alone, as compared to low-stress, not involving an anticipation of electric shocks, condition (Schachter, 1959). The evolutionary basis of a need to belong can also be seen in its association with many of the strongest emotions people experience. As previously discussed, being welcomed, included, or accepted by others are associated with a variety of positive emotions, such as happiness, elation, contentment, or calmness (Baumeister & Leary, 1995).

The ease with which people tend to form social connections, even in the absence of eliciting circumstances or ulterior motives, is especially pertinent to the idea of being alone with others, as it illustrates that people do not have to know each other beforehand, or spend a long time together before they feel connected to others (Brewer & Silver, 1979). Experimental investigations involving the minimal intergroup situation demonstrated that even if participants

were assigned to a group on an arbitrary basis, and even if this assignment took place only a short time prior, the participants treated their in-group members preferentially by allocating greater rewards to them (Billig & Tajfel, 1973; Tajfel, 1970; Tajfel, Flament, Billig, & Bundy, 1971). Similarly, the findings of Sandstrom and Dunn (2014a) demonstrated that having even a brief and casual talk with unknown others occupying the same environment, such as a chat with a Starbucks' barista, led to an increase in a momentary sense of belonging to that particular group of people residing in that particular space.

Although the abovementioned studies included an element of verbal interaction, they show that people are able to develop a temporary sense of belonging or closeness with unknown others relatively easily. Hence, it is possible that a person, who decided to be alone with others in a public place, would develop an in-group mentality towards the others with whom he shared the same space. For example, even if a person did not know anybody in his class, he would be likely to feel a temporary sense of belonging while attending a lecture, due to perceiving all students in that class as "us", compared to those in other classes. Similarly, a person would be likely to consider all patrons attending the same café as a unique entity, connected through a love of coffee, public computer use, or a need to support local businesses, compared to people observed outside of the window.

Baumeister and Leary (1995) attempted to consolidate knowledge about people's need for a social connection by proposing the need to belong hypothesis. They claimed that in order for people to satisfy their need to belong, they need to engage in regular positive or neutral social contact, as well as being part of a stable, ongoing relationship based on a mutual concern for each other. The authors further claimed that if a person experienced only one of these two elements, this person's need to belong would be only partially satisfied (Baumeister & Leary,

1995). For example, Weiss' (1973) study showed that even housewives with strong marital ties, who recently moved to Boston and who were deprived of social contact during the time their husbands were at work, reported feeling lonely and unhappy. Similarly, research about prostitution showed that, even though prostitutes meet people daily and have intimate contact with them, they report being lonely, since such relationships are unable to support their need for experiencing a mutual human concern (Adler, 1980; Symanski, 1980).

Although the aforementioned studies refer to a more long-lasting state of loneliness, resulting from an enduring low sense of belonging, it is possible that being alone with others could be a partial solution to such loneliness problems. Being alone with others could partially satisfy one's need to belong, and ease, for some time, people's loneliness, because it could allow for neutral and regular social contact with others. For example, in his book describing the culture of third places, i.e. places that are frequented by people most often after their homes and workspaces, such as cafés, pubs, or taverns, Oldenburg (1999) noted that people's need to belong can be satisfied by simply being among other people on a regular basis. Although Oldenburg's (1999) work is of a purely observational character, and his assumptions need to be empirically verified, his observations point to the fact that there could be places that would allow people to be around others, where people would not need to talk to anybody or become anybody's friend, and where they could still experience familiarity and belongingness.

This idea is further supported by the qualitative investigation of the emotions shared by electronic music club goers. Luis-Manuel Garcia (2013) found that even though the majority of people in nightclubs do not know each other, unique feelings of togetherness tend to emerge between them. Although the club goers are fully aware of these emotions, they are never explicitly articulated, and when asked, people had difficulties pinpointing the reasons for their

emergence (Garcia, 2013). The author opted for the explanation, which equates music with other animate, inanimate, or spiritual agents creating social cohesion. Similar to people gathering around a totem pole or an altar, music could also be seen as a central anchor for people's shared experience and the point of convergence of the energy generated during social events (Garcia, 2013).

Since people usually do not interact with each other while attending a religious mass or a music concert, yet they do experience belongingness (Garcia, 2013), it is likely that people experience a similar momentary belongingness when being alone with others. The feelings of togetherness and belongingness in situations in which people do not verbally interact with each other would arise from the fact that their attention is turned towards the same object, task, entity (Garcia, 2013), or from simply sharing the same physical space as others – possibilities, which will be assessed in one of the studies of this dissertation.

Amplification of intensity of experienced emotions due to shared physical environment. An amplification of positive affect when alone with others could also arise due to simply sharing the same physical space with others. It could happen either because people's attention is turned towards the same task or object, hence if the task is enjoyable all involved would experience some of that joy, or it could be that simply being around others creates a unique shared atmosphere regardless of doing the same thing as them. The recent studies addressing simultaneously engaging in the same experiences as others are of a special significance to this dissertation, as they are predominately of an experimental character and they often share the common ingredient of participants being around unknown others, often without verbally interacting with them.

The research addressing the ways in which the presence of others influences a person's enactment of a task was initiated in 1898 by Norman Triplett. Triplett (1898) showed that when competitive cyclists were paired with other cyclists, they obtained faster racing times than if they raced alone against a clock. In 1960s, Zajonc addressed the reasons for variations in the results of co-acting studies by proposing social facilitation theory. Zajonc (1965) claimed that when a person was performing a well-learned or easy task, the presence of others would improve that person's performance. Yet, when a person was performing a novel, not well-learned task, the presence of observers or co-actors would impede the execution of the task. He further presupposed that the social facilitation could be explained by the drive, because the presence of others makes people aroused and predisposes them to using their most likely response for a specific situation (Zajonc, 1965). While engaging in the well-learned or easy tasks, people would use their dominant response, which would be the correct one for those tasks. However, in case of novel, difficult, or not well-learned tasks, the dominant response likely would not constitute a correct one, resulting in people's subpar performance (Botvinick, Braver, Barch, Carter, & Cohen, 2001; Zajonc, Heingartner, & Herman, 1969). Indeed, after reviewing 241 studies, Bond and Titus (1983) concluded that in the majority of them, the presence of others inhibited the accuracy and speed of performing complex tasks. On the other hand, the presence of others enhanced performance of easy tasks, but there was less evidence supporting an increase in accuracy of such tasks.

Although the social facilitation theory explains the influence of the presence of others on people's performance of a specific task, until recently there was not much research which would also assess the impact that performing the same task at the same time as others would have on people's memories, behaviours, or emotions. A study by Desender, Beurms, and Van den

Bussche (2016) addressed this shortcoming by asking two participants to perform computer tasks simultaneously, while sitting next to each other. The results indicated that participants exerted more effort when their partners were performing a hard task, compared to when their partners were performing an easy task. This finding suggested that the cognitive efforts exerted by someone performing a task could influence the cognitive efforts of others present in the same physical space and performing similar tasks (Desender et al., 2016). Further studies have shown that across a variety of tasks studied, when participants performed a task at the same time as others, their performance was superior compared to when they performed the same task alone. For example, Eskenazi, Doerrfeld, Logan, Knoblich, & Sebanz (2013) showed that even when participants were instructed to memorize only half of the presented words, they were able to recall words not only assigned to them but also those assigned to their co-partners. A simultaneous task performance was also shown to increase participants' speed and accuracy during a memory recall experiment (Shteynberg, 2010), as well as lead to an increase in participants' goal pursuit (Walton et al., 2012), as compared to when they performed the experimental tasks alone in a laboratory. Additionally, Boothby and colleagues (2014) showed that performing the same task as others not only affects people's cognitive abilities, but it can also lead to an amplification of experienced sensory stimuli. The authors found that participants reported liking a piece of chocolate more when they ate it at the same time as a confederate ate it than when they ate the same chocolate alone (Boothby et al., 2014).

Such amplification of intensity of sensory stimuli, when experiencing them at the same time as others, was shown to extend further to emotional experiences. Shteynberg and colleagues (2014) proposed that people not only mimic others' emotions, as in the case of emotional contagion, but that emotions experienced together with others become stronger or

more pronounced. The results of several online studies suggested that those participants who were made to believe that similar others were watching the same videos at the same time as them, i.e. people, who chose the same avatars as them and watched the same videos at the same time as them, judged scary advertisements as scarier, felt greater sadness, and had a higher percentage of positive (or negative) thoughts after watching a positive (or negative) video, which led to their greater happiness (or sadness; Shteynberg et al., 2014). The authors were able to replicate the online results in their lab study, where they asked participants to rate 30 images appearing on a screen. The participants completed the study either alone in a room or with another participant, who was sitting behind a divider, and who was also rating the same pictures. Shteynberg and colleagues (2014) found that those participants who rated the pictures with others performing the same task at the same time reported being slightly unhappier when viewing negative images and slightly happier viewing positive images, compared to participants completing the ratings alone. However, the results in both cases are at most suggestive than conclusive, since they became statistically significant only after the authors controlled for gender, as well as baseline arousal and mood (Shteynberg et al., 2014).

The abovementioned research regarding amplification of cognitive and emotional outputs when engaging in simultaneous task performance arouse few possible explanations, e.g., mentalizing, social facilitation, imitation, or shared attention. Mentalizing involves people thinking about and concentrating on the contents of others' minds, which happens more often when they are engaged in the same activity (Boothby et al., 2014; Shteynberg et al., 2014). Boothby and colleagues (2014) proposed that when people perform a task simultaneously, they concentrate on their own experiences and also, often involuntary, they think about how others feel about the same experiences. The authors proposed that, especially when experiencing

something new, people would be watching for others' reaction in order to find clues about how they should react to it, or in order to justify their own judgements (Boothby et al., 2014).

However, mentalizing could not explain the results of the shared-task research involving superior cognitive outcomes (recalling objects assigns to others better when those others were present, e.g. Eskenazi et al., 2013) because the participants did not know each other, had no way of knowing each other's thoughts about the arbitrary objects, and often could not see each other's reactions (e.g., online studies, e.g. Shteynberg, 2010; Shteynberg & Galinsky, 2011; Walton et al., 2012). The online character of the studies also discounted the social facilitation theory (Zajonc, 1965) or participants imitating others' actions as potential explanations for superior simultaneous task performance.

In an attempt to explain the findings of all shared-task studies, Shteynberg (2015) proposed the shared attention theory, which states that people's attention is naturally drawn to the emotional states of others, as well as to the focus of other's attention, possibly due to evolutionary mechanisms. For example, when someone suddenly looks at the sky, others are likely to look in that same direction, since ignoring this clue could have a negative consequence for their survival (Friesen & Kingstone, 1998; Friesen, Moor, & Kingstone, 2005; Langton & Bruce, 1999). Similarly, people are naturally predisposed to noticing changes in others' physical states, especially (Desender et al., 2016; Howells, Stein, & Russell, 2010; Smit, Eling, Hopman, & Coenen, 2005), since it could be decisive to their well-being. Shteynberg (2015) proposed that monitoring one's own actions, and actions and emotional states of others, leads to increased arousal and an activation of more cognitive resources, which are manifested in better performance on a task.

Similarly, Shteynberg and his co-authors (2014) claimed that people experience amplification of emotions when they perform even an online task and know that similar others are doing the same thing, because from the evolutionary survival perspective, it is pertinent for people to belong to a group, hence it is important to align one's emotions with the emotions of similar others. Based on that reasoning, participants watching a happy video in an online study, who believed that similar others were viewing it too, would assume that those others must have been happy at that particular moment, which would justified them in their beliefs that what they felt was correct, and it would lead to an intensification of their own positive affect. Shteynberg and colleagues (2014) also claimed that people are predisposed to engaging in so-called group attention, where they are more likely to pay attention to, and be affected by, something that affects others in their group, in order to ensure group's success. Hence, participants of Eskenazi and collaborator's (2013) study memorized and recalled the objects assigned even to others because they unconsciously prepared themselves for the eventuality of performing others' tasks to ensure the well-being of the whole group (Shteynberg et al., 2014).

The research regarding shared experiences shows that being around unknown others, without verbally interacting with them could lead to an amplification of experienced stimuli or emotional states (e.g., Boothby et al., 2014; Shteynberg et al., 2014). However, in order to definitely answer a question whether any existing cognitive, emotional, or sensory differences are due to shared attention, all alternative explanations have to be tested and disputed. The debate regarding results of shared experiences and shared attention is still ongoing, because it was unknown whether obtained outcomes were a result of simply sharing a physical place with others, performing a task and having one's attention occupied by the same thing as others, or whether they originated from both of those aspects occurring at the same time. Specifically, the

laboratory experiments of Shteynberg and collaborators (2014) contained only two conditions: performing the same task as someone while sitting in the same room with the other person vs. being completely alone while performing the task. Hence, it is unknown whether their findings were due to the impact of a simultaneous task performance or simply due to people being together in the same place. Similarly, it is unknown whether enhancement of experienced flavour of chocolate when tasting it together with others, found by Boothby and collaborators (2014), was any different than what normally occurs when people taste chocolate even when they are alone, since the authors did not include the control condition (being alone and eating chocolate).

The shared-task studies indicate that being around others can affect people in a variety of ways, even if there is no direct communication between them. As discussed above, Shteynberg's (2015) idea of shared attention resulting from performing a task together has not been adequately verified, but it is possible that the research resulting from it could explain the amplification of positive affect when alone with others. I suspect that simply being in a physical space with others leads to involuntarily and unconsciously sharing attention to activities that are going on in that space at that time; thus, people would not need to perform the same physical tasks in order to benefit from being around others. Also, since most social situations are moderately pleasant in valence, it would follow that sharing a social situation with others, without interacting with them, would be equivalent to sharing a moderately positive situation with them, which then would translate into the amplified positive affect of those present. The second study of this dissertation, then was designed to test whether people are able to benefit from simply being around others vs. being alone, even when not talking to anybody, or whether higher positive

affect could be achieved only through the shared attention of engaging in the same tasks as others.

The Present Research

I propose that being alone with others could be an alternative way of satisfying the need for social contact and improving one's positive affect by minimally engaging in social situations. Based on the previous research, it is likely that being alone with others, i.e. being with others without verbally interacting with anybody, would not necessarily surpass the positivity and belongingness resulting from actual social interactions, since I presumed that more social situations would result in higher PA and sense of belonging (Reis et al., 2000; Sandstrom & Dunn, 2014a, 2014b; Vittengl & Holt, 1998; Wheeler et al., 1983). Being alone with others is not an ideal social situation. It lacks the benefits of peace and quiet of being completely alone and it leads to only a minimal social contact without providing benefits of interacting with others. It is also possible that for some people being alone with others could be more difficult than for others because it would make them more aware of their aloneness when faced with others enjoying time with friends. Similarly, being around people and not talking to them, e.g. when standing in line at a store, could feel unnatural, uncomfortable, or anxiety provoking for some people. However, since people need to engage in being alone with others on a daily basis, it is likely that we all became more or less accustomed to such situations and majority of us consider them as a normal part of everyday life. Being alone with others, then will not provide benefits of interacting with others, but compared to spending time alone, it could be a valuable method of improving people's momentary sense of belonging and positive affect, not requiring anything more from people than being in a social place and sharing that space with others.

The experience sampling studies of Sandstrom and Dunn (2014a), in which the number of weak-ties interactions in a day was associated with more positive affect and higher subjective happiness experienced that day, showed that small social interactions can boost people's positive affect. In Study 1 of this dissertation, I went further in reducing the intensity of those interactions by assessing whether being alone with others could lead to similar momentary amplification of positive affect. Specifically, during a seven-day period, participants were prompted by their smartphones to report types of social contact and any social interactions they experienced since the last time they were contacted. The use of an experience sampling method in this study allowed for the testing of multiple types of social interactions in different everyday settings, with a very small delay between the occurrences of those interactions and gathering information about the resulting momentary sense of belonging, as well as positive and negative affects. Hence, this study had a good degree of ecological validity and it allowed for a more accurate recall of events and experienced emotions (Scollon et al., 2003).

In Study 2, I tested two potential explanations of amplification of PA due to being alone with others. First, I tested whether an increase in a momentary sense of belonging mediated relationship between experimental conditions and state PA. I predicted that participants in more social situations would report higher momentary sense of belonging than participants in the alone condition, and this increase in sense of belonging would then be translated into an increase in PA. Second, I tested whether people whose attention was occupied by performing the same task as others experienced a greater amplification of positive affect than people who performed different tasks as others, or who were alone while performing a task. Study 2 involved randomly assigning participants to three experimental conditions and asked them to watch a video inducing positive affect. Since I expected that being alone with others would increase people's state

positive affect, and since, on average, the valence of everyday social situations is more positive than negative, I tested empirically whether an amplification obtained from being alone with others was noticeable over and above the positive affect that people already felt in their everyday lives. During the laboratory experiment, participants were either alone in a room (alone condition), with a confederate watching the same video in the same room as them (shared task condition), or they were with a confederate in the same room, but the confederate was viewing a book (nonshared task condition). Participants in shared and nonshared task conditions were instructed not to talk to each other, and it was expected that they would still report higher momentary sense of belonging and positive affect, but lower level of negative affect, as compared to participants in the alone condition. I also expected that participants in the shared task condition would report a similar increase in their positive affect as that reported by participants in the nonshared task condition, contrary to the shared attention theory, stating that people's attention needs to be occupied by the same task or object for them to achieve greater intensity of emotions than people, whose attention is not occupied by the same experience (Shtynberg, 2015). Similarly to attending a big, multiday music festival and encountering an omnipresent happy and care-free atmosphere of the place, even between concerts, I do not believe that people need to concentrate their attention on the same thing in order to feel amplification of sense of belonging and positive affect. Instead, I believe that such amplification of emotions is more of a result of the presence of other people in the same physical space, and it depends less on sharing an attentional anchor.

I have chosen to simultaneously test only two out of the four discussed possible explanations of an amplification of state positive affect due to being alone with others. This decision was made for pragmatic reasons in order to simplify understanding of the outcomes of

the study. I also tried to make the experimental situation as natural as it was possible in the laboratory environment. I did not block participants from seeing the confederate in order to control for the effects of nonverbal behaviours. Instead, such nonverbal cues control was obtained more naturally by the confederate's behaviour (i.e., being quiet, keeping neutral facial expression) and by her position in the room (i.e., not facing and not looking at participants).

State and trait introversion/extroversion and being alone with others situations.

Since people respond differently to different social situations, it is important to assess how people with different personality traits could benefit from being alone with others. Some of the most robust findings in personality psychology show a strong association between extraversion and positive affect as well as between extraversion and a preference for sociability (Diener et al., 1999; Lucas & Fujita, 2000; Pavot et al., 1990). It is, therefore, reasonable to assess whether being alone around others has a more pronounced impact on the state positive affect of introverts than extraverts.

The different sensitivity to rewards and punishments among more introverted and more extraverted people (Gray, 1991), and their different preferences for socializing justify the robust research findings showing that, on average, extraverts exhibit higher level of positive affect than introverts (Diener, Sandvik, Pavot, & Fujita, 1992; Diener et al., 1999; Lucas & Fujita, 2000; Pavot, Diener, & Fujita, 1990). In the two studies of this dissertation, more extraverted participants should then experience higher positive affect in all social situations and all experimental conditions. This hierarchy would not change even when taking under consideration that introverts are able to act extraverted when required, which results in them reporting higher state positive affect, as compared to their baseline PA level (Fleeson et al., 2002; McNiel & Fleeson, 2006; McNiel et al., 2010; Smillie, 2013; Whelan & Zelenski, 2012;

Zelenski et al., 2012; Zelenski et al., 2013). Since introverts' baseline positive affect level is lower than that of extraverts, putting both introverts and extraverts into a pleasant, social situation would result in them all getting a boost in PA, but introverts would still experience lower momentary PA than extraverts. Also, since there are variations in expressed extraverted behaviours between people, it was possible that acting less extraverted would lead to a lower state positive affect than acting more extraverted. Hence, it was important to control for extraverted behaviour during data analysis of Study 1. Finally, since introverts have a higher preference for more solitary environments and activities than extraverts (Asendorph & Wilpers, 1998; Long et al., 2003; Lucas et al., 2008; Mehl et al., 2006), it was essential to check whether the difference between the boost of PA of introverts and extraverts in the alone situation (Study 1) and in the alone condition (Study 2) was the smallest.

In this dissertation, I also assessed the differences between extraverts and introverts in gaining a momentary sense of belonging in the social situations of Study 1 and the three conditions of Study 2. Extraversion is not only associated with a tendency to be around others more often (Costa & McCrae, 1992; Depue & Collins, 1999; Eaton & Funder, 2003; Eysenck & Eysenck, 1985), but it has also been linked to experiencing a greater sense of belonging overall (Malone, Pillow, Osman, 2011; Swickert, Rosentreter, Hittner, & Mushrush, 2002).

Although, on average, extraverts experience higher sense of belonging than introverts, the association between extraversion and a need to belong has been shown to be positive, but only weak to moderate in strength (Leary, Kelly, Cottrell, & Schreindorfer, 2013; Winter, Neubaum, Eimler, & Krämer, 2014). These associations become more understandable when one remembers that according to Baumeister and Leary (1995), in order to satisfy the need to belong a person needs to engage frequently in positive interactions with the same people, as well as

experience long-term care and concern for those individuals. Although both extraverts and introverts repeatedly engage in interactions with the same groups of people, and they do care and are concerned for some of them, extraverts are more likely than introverts to have a larger circle of acquaintances (Asendorpf & Wilpers, 1998; Bolger & Eckenrode, 1991; Swickert et al., 2002), with whom they interact but, with whom they share weak interpersonal connections (Ashton, Jackson, Helmes, & Paunonen, 1998; Swickert et al., 2002). Hence, just because someone is around people more often than others, it does not mean that this person's need to belong is fully satisfied. Also, it is possible that extraverts, having only a low to moderate need to belong, are able to fulfill their need to belong easier than introverts, which could explain their higher sense of belonging and higher average positive affect (Oishi, 2010; Reis & Sprecher, 2009; Weinberg, 1961).

There is not much research assessing the differences in a state level sense of belonging among introverts and extraverts. If extraverts are able to satisfy their need to belong faster, they should also experience a higher momentary sense of belonging than introverts, especially in social situations. I expected that in Study 1, regardless of the situation participants were in, extraverted people would always report slightly higher momentary sense of belonging than introverts. I did not expect participants in alone situations to report lower sense of belonging than when they were in other situations because those conditions were based on being alone only for the "majority of the time" (i.e., I cannot be sure participants were completely alone) and participants could have used technology to communicate with others even when alone. In Study 2, I expected extraverts to report a slightly higher sense of belonging than introverts in all three conditions, but since participants were alone in the alone condition and not communicating with

anybody, I expected that momentary sense of belonging of these participants would be lower than the one of participants in the remaining two more social conditions.

Study 1

The main goal of Study 1 was to test the associations of different forms of social contact with an experienced positive affect and sense of belonging. Specifically, this study assessed the differences in people's momentary positive affect, and momentary sense of belonging, while people were completely alone, alone with others, and while they interacted with weak- and strong-ties, through the implementation of an experience sampling method. Hence, for seven days, participants were prompted six times a day by the smartphone application to answer questions about their social interactions and momentary positive affect levels. In order to differentiate between the two possible sources of participants' amplification of positive affect, i.e. feeling more positive affect due to being in different social situations or experiencing higher positive affect due to acting in a more extraverted way during social interactions (Zelenski et al., 2012), each set of questions also included a measure of extraverted behaviour. Finally, by asking all participants to answer questions at the beginning of the study to assess their personality traits, I was able to probe differences between introverts and extraverts in their experienced positive affect and sense of belonging due to the above social conditions.

Rationale for Use of the Experience Sampling Method (ESM)

The daily sampling methods allow assessing people's responses to their everyday life occurrences while avoiding biases resulting from retrospection-based approaches (Bolger, Davis, & Rafaeli, 2003). For example, the Daily Diary Method and the Day Reconstruction Method rely on remembering one's actions and corresponding feelings and assessing them at the end of a specific time chunk or at the end of a day (Clark & Watson, 1988; Kahneman, Krueger, Schkade,

Schwarz, & Stone, 2004). These designs, compared to traditional data collecting methods, are less biased by problems resulting from memory recall, availability heuristics, or people's mental states at the moment of the recall (Bolger & Laurenceau, 2013). However, since people are more likely to remember more emotionally intense interactions (Sandstrom, 2013), the abovementioned methods are more useful in assessing the link between socializing with strong-ties and positive affect (Sandstrom & Dunn, 2014a), and are less accurate in assessing affective states resulting from being alone, or from weak-ties interactions. Furthermore, since people tend to use their episodic memory more when answering questions about their immediate mood and they use more of their semantic memories when asked to assess their past emotions, the affective state assessment would be more accurate if it occurs as close in time to the life experiences as possible (Robinson & Clore, 2002). Such data collecting can be achieved by the method used in the Study 1 – the Experience Sampling Method, also called the Ecological Momentary Assessment (EMA; Kahneman, 1999; Stone, Shiffman, & DeVries, 1999). The ESM does not rely as heavily on memorized information, because it requires participants to answer questions about their experiences and feelings at that moment in random intervals, multiple times a day. This method has been successfully used for an assessment of people's positive affect while they engaged in social and non-social activities (Pavot et al., 1990), as well as for an assessment of positive affect and sense of belonging resulting from interaction with weak-ties (Sandstrom & Dunn, 2014a, 2014b).

Hypotheses

Hypothesis one. Being around others who are strangers, or who one does not know well (weak-ties), and not verbally interacting with them, will be associated with a higher momentary

positive affect, a higher momentary sense of belonging, and a lower negative affect than being completely alone.

Hypothesis two. Since students who had, on average, more daily weak-tie interactions than other students reported greater happiness (Sandstrom & Dunn, 2014a), I expect that being alone with others will be associated with lower state positive affect and momentary sense of belonging, and a higher state negative affect than verbally interacting with people with whom one has weak ties, e.g. strangers or casual acquaintances.

Hypothesis three. Verbally interacting with people with whom one has weak-ties will be associated with lower momentary positive affect and higher state negative affect than talking to one's strong-ties, e.g. family members or close friends.

Hypothesis four. Since even minimal cues signaling sense of belonging, e.g. when interacting with people with whom we share weak-ties, have been shown to increase people's momentary sense of belonging (Sandstrom & Dunn, 2014), it is possible that a similar effect can be achieved while being around others without interacting with them. Hence, I expect that there will be significant differences in the momentary sense of belonging between participants in different social situations in the proposed investigation. Specifically, after interacting with people with whom they have strong ties, participants should report the highest momentary sense of belonging, followed by the amount of sense of belonging of participants who will interact with weak-ties. Participants who will be alone with others should report lower momentary sense of belonging than participants who will be talking to weak-ties, but higher sense of belonging than participants who will be alone.

Hence, being alone with others will result in better outcomes in terms of momentary sense of belonging than being completely alone, but it will result in worse outcomes in terms a

momentary sense of belonging than when people engage in interactions with weak- and strong-ties.

Hypothesis five. Increased social contact will result in stronger feelings of belonging, which will then mediate the effects of socializing on a momentary positive affect.

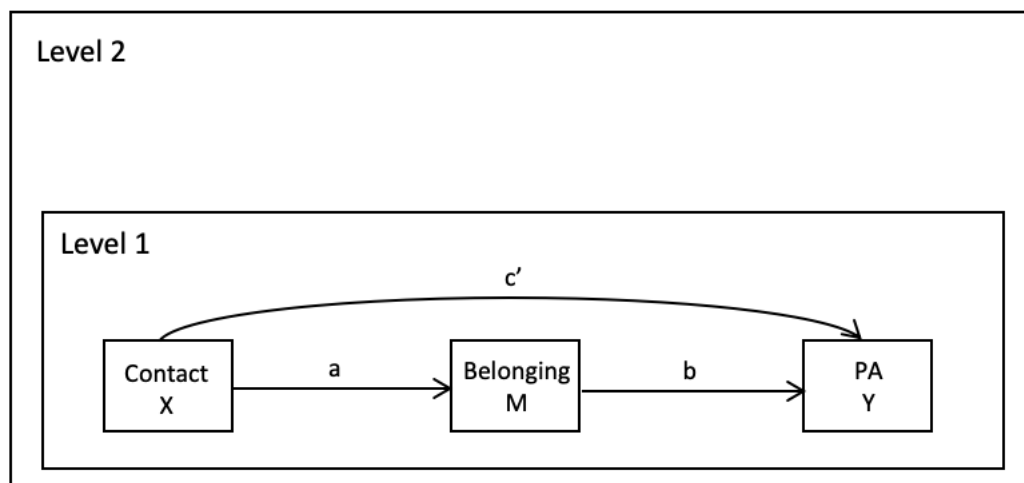


Figure 2. Diagram of the 1→1→1 mediation model with variables indicated in boxes: Contact (different types of social situations) is a primary predictor, Belonging (momentary sense of belonging) is a mediator, and PA (state positive affect) is an outcome variable

Hypothesis six. Studies have shown that, on average, extraverts are more prone to experiencing and maintaining higher levels of positive affect than introverts (Hemenover, 2003; Larsen & Ketelaar, 1991; Lucas & Baird, 2004; Smillie et al., 2012). Hence, I predict that more extraverted participants will report higher momentary positive affect and lower negative affect in all situations, compared to more introverted participants.

However, studies have also shown that introverts, when necessary, engage in extraverted behaviours (Fleeson & Gallagher, 2009), which leads to them experiencing momentary increase in a positive affect similar to that of extraverts' (Fleeson et al., 2002; Zelenski et al., 2013). Therefore, since the current study is based on momentary assessments of positive affect, I predict that introverts will also experience an increase in their state positive affect and a decrease in their negative affect in the social situations, similar in direction, to that of extraverts'. Yet, research has also indicated that introverts report, on average, a stronger preference for less social, or even solitary, situations than extraverts (Argyle & Lu, 1990; Asendorph & Wilpers, 1998; Leary et al., 2003; Lucas et al., 2008; Srivastava et al., 2008). I do not suspect that being completely alone will be bothersome to either less or more extraverted people, since people, on average, are alone multiple times daily. However, I predict that there will be a significant interaction between introversion/extraversion trait and the alone situation for the momentary PA. More extraverted participants will report smaller advantage in PA in the alone situation compared to more introverted ones, simply because it will not be their preferred way of spending time.

Overall, introverts and extraverts will both exhibit an amplification of positive affect in a similar manner, i.e. the more social contact they encounter (weak-ties not talking and alone not talking being the least social conditions), and the closer the people are to them in the social interactions, the higher momentary positive affect they will experience. However, there will be a main effect of introversion/extraversion trait because the levels of momentary positive affect experienced by extraverts will always be higher than those of introverts. There will also be an interactive pattern between that personality trait and social conditions, since the smallest difference between increased PA levels among introverts and extraverts is expected in the alone situations.

Hypothesis seven. The extraversion trait is associated with a greater sense of belonging (Swickert et al., 2002), hence, regardless of the social situation, extraverts are expected to report higher sense of belonging compared to more introverted participants. There would not be a simple main effect of situations because even in alone situations, participants would have an ability to have some social contact, since assessments ask about “a majority of time” spent in a particular social situation.

Method

Participants. Before data collection commenced, it was determined that gathering 4200 good data points (from 100 participants) would be sufficient for the analyses, since it has been shown that the standard errors of the Level 2 variances are usually estimated too small when the number of groups (here: participants) is substantially lower than 100 (Maas & Hox, 2005). When the current study opened for participants, it was one of the few in-lab studies available to students, hence I was able to obtain data from 453 participants (M age = 19.92 years, SD = 4.13, Range: 17-52, seven participants were excluded from the analyses because they provided less than two instances of data). All participants were Carleton University students, the majority of them were women (70.2%, males = 29.65%, other = .2%), and approximately half of them were White (55.5% Caucasian, 10% Black, 8.4% Arabic, 8.4% “Other”, 8% South Asian, 6.9% East Asian, 2.2%, and .7% Aboriginal). The participants were recruited using the online sign-up SONA system and were able to earn up to 3% credit towards their final grade in one of their introductory psychology classes, as well as a chance to win \$200 at the end of the study (see the Procedure section for more details).

Questionnaires completion. Each participant was asked to answer questions six times a day for a week, which would give 42 instances per person. Ideally, after accounting for a 20%

attrition rate, which is an average attrition rate for daily diary studies among college students (e.g., Losavio et al., 2011; Swim, Hyers, Cohen, & Ferguson, 2001), I should have obtained around 16,308 data instances from all of my participants. In reality, the first question of the study's EMA questionnaire was completed only 9317 times, with 9709 (51%) questionnaires or instances not started. The mean percentage of completed questionnaires among the participants was 48.87% ($M = 20.53$ questionnaires, $SD = 10.11$, $Range = 2-42$). As expected, the best response rates happened during the first three days of data collection with the rate decreasing with every new prompt, i.e. the first day's average response rate was 90.58%, which dropped to 50.08% by the fourth day, and to 17.1% by the last day of study. The Figure 3 below shows number of participants who completed specific number (and percentage) of questionnaires (instances) during the seven-day study. Overall, the 453 participants recruited in the current study provided 9317 data points, which was considered sufficient in terms of offering enough power to detect the effects of this study's analyses (please, see Appendix J for the discussion regarding the power and sample size choices).

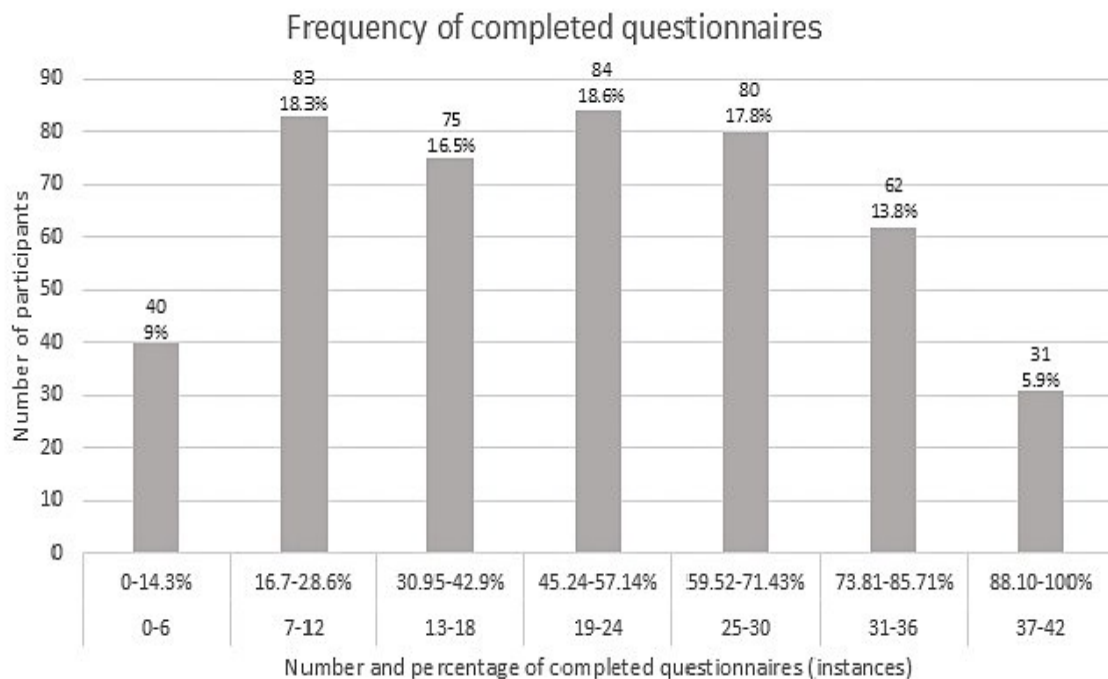


Figure 3. Histogram representing number of participants who completed specific number of questionnaires (instances).

Measures.

Demographics questionnaire. In the demographics section participants were asked to answer questions about their gender, age, and ethnic background (see Appendix A).

Introversion/extraversion dimension. The personality traits of the participants were assessed using the IPIP-NEO-120 personality inventory (Johnson, 2014; Appendix B). The IPIP-NEO-120 is a 120-item, publicly available measure, which asks participants to indicate on a scale from 1 – *very inaccurate* to 5 – *very accurate*, how well each of the 120 statements, such as “make friends easily” or “talk to a lot of different people at parties”, describes them. The answers allow for an assessment of the main five personality dimensions: extraversion, neuroticism, agreeableness, openness to experience, and conscientiousness; as well as the six

sub-traits of each of the main dimensions (Johnson, 2014). In order to prevent demand characteristics, all five dimensions were measured in the current study, however only the traits of introversion/extraversion, and related to it, emotional stability/neuroticism were of interest. The obtained Cronbach alphas of those two traits were comparable to those obtained by Johnson (2014). Specifically, the Cronbach α for introversion/extraversion in the present investigation was .88, while that for emotional stability/neuroticism was .90, which corresponded to Johnson's (2014) Cronbach alphas of .89 and .90, respectively.

Social contact. The types of social contact participants engaged in during each of the six 2-hour intervals during their day were assessed through the phone application mEMA (<http://ilumivu.com>), by asking them whether they spent the majority of that time interval alone, around strangers or people they did not know well, or around people they knew well. Next, they were asked whether they talked to someone during that time. If participants indicated that they talked to someone, they were asked three additional questions. First, they were asked about the approximate number of people they talked to in person, excluding emailing, Internet chats, and phone texts, and they could choose an answer between 1 – 5 or more. Second, they were asked the approximate length of the longest conversation by choosing one of five options. Third, they were asked whether the person they talked to the longest was someone they knew well, or a stranger or someone they did not know well. Next, all participants were asked about whether they talked to someone over the phone using their voice or through text messages, chat messengers, or emails. If they indicated they used technology to communicate with others, they were further prompted to indicate which technological method they used the most since the last time they were asked. All the answers within the smartphone application required participants to choose one answer in the multiple-choice questions (see Appendix D).

Behaviour. In order to determine whether participants' possible amplification of positive affect was due to a specific type of social contact, or whether it originated in them acting more extraverted during social interactions, I assessed the extent of the participants' state of extraverted behaviour. Specifically, the participants were asked to determine how they acted by rating six adjectives on the scale from 1 – *Very Slightly or Not at All* to 7 – *Extremely or A Lot*. The adjectives, such as *quiet**, *energetic*, *talkative*, *assertive*, *shy**, and *bold*, are similar to the ones used by Fleeson and Wilt (2010; Cronbach $\alpha = .83$), with adjective *quiet** added to the group (asterisks next to adjectives indicate reverse scored items, see Appendix D).

State positive and negative affects. I suspected that for most people, going out and being alone with others, i.e. being around people while not talking to them, would result in experiencing more positive, pleasant emotions than feelings of arousal. Hence, I decided to measure the participants' state positive and negative affects using the Scale of Positive and Negative Emotions (SPANE; Diener et al., 2009). The SPANE consists of eight adjectives, which assess the pure valence felt in different social situations (*positive*, *negative*, *good*, *bad*, *pleasant*, *unpleasant*, *happy*, *sad*), as well as four adjectives assessing more aroused pleasantness and unpleasantness (*joy*, *contented*, *angry*, *afraid*). The measure has been shown to have a good internal consistency [$\alpha = .89$ for SPANE Balanced, with $\alpha = .87$ for SPANE Positive Affect (PA), and $\alpha = .81$ for SPANE Negative Affect (NA); Diener et al., 2009].

Although the SPANE scale originally asks participants to rate the frequency of experiencing the 10 different emotions, in the current study, similarly to the study of Sandstrom and Dunn (2014b), the scale was adjusted in order to assess state affects. Hence, each time participants were prompted to answer questions about their social interactions, or a lack of thereof, they were also asked to judge the intensity of experiencing the 10 emotions by choosing

one of the five answers ranging from 1 = *Not at All or Slightly* to 5 = *Extremely* (see Appendix D).

Momentary sense of belonging. Due to the scarcity of measures assessing a momentary sense of belonging, and based on the solution found in research of Sandstrom and Dunn (2014b), I used a composite measure of momentary sense of belonging (see Appendix D). Within each of the smart phone questionnaires, participants were first asked to answer two reverse scored questions from the Social Connectedness scale (“I feel distant from people” and “I feel like an outsider”; Lee, Draper, & Lee, 2001), as well as one question from the Sense of Community scale (“I feel like I belong here”; Davidson & Cotter, 1986). All three questions were answered using six-point Likert scale (1 – *strongly disagree* and 6 – *strongly agree*). In the Sandstrom and Dunn’s (2014b) investigation, the composite measure of belongingness, with the single question from the Sense of Community scale, averaged with the remaining two questions, reached internal consistency of $\alpha = .63$.

Procedure. After participants signed up for the study through the SONA system of Carleton University, they were invited to the Carleton University Happy Lab for an introductory meeting. The meeting was open to up to ten participants at a time, but it took place even if only one participant signed up or showed up. During this meeting, participants met the researcher or research assistant, who explained the study by going through the PowerPoint presentation, answered all questions the participants may have had, instructed them how to download and use the phone application, and what to do in case of problems with the software. During this visit, participants were told that the study would take 7 days, during which they would be asked to fill out the same questionnaire on their smartphones 6 times a day. Next, the study’s reward plan was explained. Specifically, they were made aware that simply coming to the lab meeting and

filling the two questionnaires would earn them 1% class credit, which would be rewarded the same day as the meeting. If they completed the phone questionnaire between 42 (all instances) and 32 data collection points they would receive a full credit (2%) towards their psychology class' grade, which together with the in-lab portion of the study would give them a full 3% credit. If they answered the phone questions between 31-21 times, they would receive 1.5%, 20-10 instances would earn them 1% credit, and providing data less than 10 times would give them .5% credit. Furthermore, those participants who obtained the full 3% credit were also entered into a draw of \$200 at the end of the data collection period. If participants decided to participate in the study, they were invited to sign the informed consent form and they obtained their unique ID numbers necessary for the study's phone application. After filling out the two in-lab questionnaires: the demographics questionnaire and the IPIP-NEO-120 personality inventory (Johnson, 2014), the participants were asked to go to the AppStore (for users of iPhones) or to the PlayStore (for users of Androids phones) and download the mEMA application created by the Ilumivu Inc (<https://illumivu.com>). The participants downloaded the application and were instructed to input their unique ID code, after which they were taken to the main screen of the app. Next, they were told that the application would not contact them until the next Monday, when the study would start for all participants who signed up in a given week. Participants were also shown how to upload their answers to the Ilumivu Inc servers. They were strongly encouraged to do it after each time they answered the questionnaire in order to prevent any data loss, but they were also made aware that it was possible to answer questionnaires without the Internet connection and upload the answers of many instances all at once at a later time.

Lastly, using the PowerPoint presentation, participants were shown how the questionnaire would look on their phones. Participants were told that each time their phones prompted them to

answer the questionnaire, they would first see a screen reminding them what we meant by terms such as “being alone”, “being around strangers or people you do not know very well”, and “being around people you know well” (see Appendix C). Next, they were shown the exact questions the phone app would ask them, and they were reminded that they should not answer questions when it was not safe. To accommodate times when participants were not able to answer questions, e.g. during lectures, when walking or driving, participants were given the ability to forfeit the data collection up to 10 times and still receive the full class credit and a chance of winning the monetary award.

The period of Study 1 was set for one week based on the findings by Reis and Wheeler (1991), who studied social interactions with the Rochester Interaction Record, as well as based on the recommendations by Hartner, Schmidt, and Csikszentmihalyi (2007). Reis and Wheeler (1991) positioned that a period of 1-2 weeks was seen as optimal for such investigation, because each day in a week has its own structure of social activities, which is then repeated successively in the next week. On the other hand, a study lasting over two weeks was seen as taxing for participants, which could potentially affect the quality of the data (Reis & Wheeler, 1991). Since, the sample in the Study 1 consisted of busy, yet often easily bored, university students, I decided to follow Hartner and colleagues’ (2007) advice and keep the study period no longer than one week.

The application prompted participants to answer questions at random times, once within each 2-hour interval of a day, starting from 10 a.m. and with the last prompt happening no later than 9:45 p.m. (e.g., between 10 a.m. - 12 p.m., 12 p.m.- 2 p.m., etc.). Each two prompts for answering the surveys were set to happen no sooner than 15 minutes apart (e.g., if the survey of the 2-hour block between 10:00 a.m. and 12 p.m. started at 11:55 a.m., the next survey could not

happen earlier than 12:10 p.m.). Participants had 15 minutes to complete each questionnaire, which was approximately three times as long as needed for answering the questions. If they stopped in the middle, they could come to it within those 15 minutes only; otherwise, they had to wait for the new prompt and a new questionnaire. This schedule was chosen based on the recommendation of Larson and Csikszentmihalyi (2014), as well as due to the fact that the review of a signal-contingent method, where participants are signaled at random intervals to answer questions, indicated that the average number of times participants are signaled to answer questions was 8-12 per day (Reis & Gable, 2000). I have chosen the lower number of prompts per day, again, due to the participants consisting of young adults with busy student schedules.

After 10 p.m. on Sundays, after seven days of collecting responses, each participant's class credit was calculated separately and assigned to them in the SONA system. The following Mondays, participants received an email with an attached debriefing form, information about the ending of the study, and information that the appropriate class credit has been assigned to them. Participants were told during the in-lab meeting that if they decide to terminate their participation, they should send an email informing the main researcher. In cases of receiving such termination emails, the class credits were calculated the same day and the note was made not to use the provided data. In cases where participants stopped providing data some time during the week without informing researchers, their existing data was still used in the analyses if they answered the questionnaire two or more times.

Data Analysis and Coding Scheme

Initial examination and cleaning of the data, as well as obtaining descriptive statistics and calculating the bivariate correlations, were completed in the SPSS program. The data in the Study 1 was hierarchical, it was characterized by multiple observations nested within

participants, and it was unbalanced, because participants provided different numbers of data instances. Since repeated responses by the same individual could not be treated as if they were independent, most of the analyses were performed with the Multilevel Modeling (MLM) methodology (Raudenbush & Bryk, 2002) using the HLM program (version 7.03).

Data normality and missingness. The exploration of the data started with an understanding that all the questions of the current study could be answered through an analysis of two-level models (i.e., Level 1 – within-person daily observations, Level 2 – between-participants’ characteristics; Nezlek, 2011). As such, it was necessary to assess whether each of the participants provided at least two data instances. Seven participants provided less than two data instances, and since there was no possibility of comparing their assessments of positive affect and belonging resulting from different social situations, their data was excluded from future analyses.

Next, all the missing data was coded as such, and all the subsequent multilevel models’ analyses were conducted using maximum likelihood estimation, since it allows for the existence of the missing at random data. The data normality was tested with histograms and Q-Q plots, and the impact of the few potential outliers was determined by excluding them from the analyses and comparing the results of such tests with the results including all the data. Considering that there were no significant differences between the two types of analyses, either in the direction or magnitude of estimates, the decision was made to include all the potential outliers in the final data analyses.

Suitability of multilevel data analysis. In order to assess whether the use of the multilevel modeling analyses was justifiable, the interclass correlations coefficients (ICCs) were calculated for each of the outcome variables. It has been accepted that the ICC should be higher

than .1 (more than 10% of variance should be attributed to between-people differences) for the use of multilevel analyses to be warranted (Dyer, Hanges, & Hall, 2005). Hence, obtaining in the current investigation ICCs of: 46% for positive affect, 48% for negative affect, and 52% for belongingness, signified that there was a significant Level 2 variability present in order to use the MLM for the analyses.

Data coding. Since the majority of the questions assessing social contact required the participants to choose between 2-3 mutually exclusive answers, such categorical questions had to be dummy coded. Correspondingly, since the hypotheses of the current study regarded situations such as being alone with others, i.e. being around weak-ties or strangers but not talking to them, codes had to be created by combining the answers of few questions of the questionnaire. The resulting six dummy variables were combinations of answers to questions assessing who the participants spent the majority of their time with since the last time they were asked (e.g., alone, around strangers or people they did not know well, or around people they knew very well) and whether or not they have talked to someone since the last time they were asked. For example, when the participants indicated they were alone for a majority of their time, yet they talked to someone during that time, a situation which could have occurred when they briefly communicated to others in person or via the use of technology, the resulting dummy variable of *AloneTalking* would be marked as 1. The five remaining dummy variables in this coding scheme were: *AloneNotTalking*, *Weak-tiesTalking*, *Weak-tiesNotTalking*, *Strong-tiesTalking*, and *Strong-tiesNotTalking*. The *Weak-tiesNotTalking* dummy variable represented the alone with others situation, in which participants were around people weakly-connected to them or around strangers, but they did not talk to anybody.

In order to control for social contact resulting from the use of the technology, i.e. talking on the phone, emailing, phone texting, and chatting on the Internet, another dummy coding structure was created (please, see Appendix E for information about creation of these dummy variables). All of the multilevel model analyses in the current study, as well as the mediation analyses, were performed using both sets of dummy variables. After comparing the results of both sets of analyses, it became evident that the corresponding estimates were often identical, and on average, they differed by only a few hundredths of a point. Consequently, and taking into consideration the more restrictive character of the second set of dummy variables, I decided to discuss the findings of the analyses performed only with the first set of the dummies, without controlling for the use of the technology.³

Multilevel modeling analyses. Since there were three dependent variables: state positive affect, state negative affect, and momentary sense of belonging, each of the sets of multilevel models were assessed three times. The Level 1 variables, i.e. the six dummy variables which differed within-person and represented different types of social contact and verbal communication or lack of thereof, as well as the variable representing an extent of extraverted behaviour exhibited by a participant, were all assessed multiple times for each person. The Level 2 variables in the current study, i.e. the variables which differed between-persons, were participants' scores on the introversion/extraversion and emotional stability/neuroticism dimensions. In all analyses, the six nonoverlapping dummy variables were entered uncentered,

³ The dummy codes used in the analyses were comprised of combination of information regarding participants' social contact and whether they verbally communicated with someone. Although there were multiple ways in which the data could have been coded, this coding scheme was chosen in order to capture the alone with others situation, i.e. a situation when participants were around people weakly connected to them or strangers, and they did not talk verbally with anybody.

while the variable representing extraverted behaviour was group mean centered (the mean of each of participants was subtracted from each of their individual scores). The Level 2 variables were entered grand mean centered (the overall mean of all participants' scores was subtracted from individual score of a participant).

Each model in the MLM analyses, with the exception of unconditional ones, were first tested twice, once with random intercept only, and the second time with random intercept and random slopes. The log-likelihoods were obtained for each test and the χ^2 test was used to evaluate which model had a better fit to the data. All those analyses indicated that the random intercept and random slope model was always better (for all dependent variables) than the random intercept and fixed slopes ones. Hence, only the former model types were used in the current study.

The analyses progressed according to acceptable format of assessing the simplest model first (the unconditional model – Model 1) and then advancing towards more complex ones (Nezlek, 2008, 2011). For all dependent variables, the unconditional model consisted of only random intercepts, with no other variables added on either level. Model 2 for each dependent variable was analyzed next. The Model 2 included always only the six dummy variables at Level 1. It is important to emphasize that since the predictor variable was categorical, only five dummy variables were entered into the model. The intercept variable was then treated as a representation of the sixth dummy variable, which was also the comparison group. However, in order to compare estimates using the HLM program, it was necessary to enter all dummy variables into the model. In such case, the intercept term was dropped from each tested model. The beta estimates then represented the value of a specific dependent variable in each of the social conditions, and not the difference between those conditions and the comparison group

(Nezlek, 2008, 2011). The HLM program allowed then to input desired contrasts for comparison (e.g., dummy1 vs dummy3). Hence, the type of comparison group used in the more traditional analysis method, i.e. with the intercept term, was then not of a significant meaning in this study and it was usually set as a first dummy variable in the file.

In Model 3 for each dependent variable, the dummy variables were added to Level 1 and the grand mean centered introversion/extraversion trait was added at Level 2, which allowed for an assessment of the differences in dependent variables between people with different levels of that trait when they encountered different social contact. Model 4, allowed for controlling of effects of extraverted behaviour, because together with the dummy variables of social contact, the group mean centered extraverted behaviour was entered at Level 1, leaving Level 2 unoccupied. The final model, Model 5 for each of the dependent variables, was an amalgamation of all the above tests. In this model, the uncentered dummy coded variables of social contact and group mean centered extraverted behaviour were entered at Level 1, while the group mean centered introversion/extraversion trait was entered at Level 2. Hence, the Model 5 was designed to investigate differences in dependent variables between people with different levels of introversion/extraversion trait when they encountered different social contact, and when controlling for their extraverted behaviour during that social or solitary experience. The final model (Model 5) of the study had a form of (please, see Appendix H for other assessed models):

$$\begin{aligned} \text{Level 1: } \gamma_{ij}(\text{PA, NA, or Belonging}) = & \beta_{0j} + \beta_{1j}(\text{AloneNotTalking}) + \beta_{2j}(\text{Weak-tiesTalking}) + \beta_{3j} \\ & (\text{Weak-tiesNotTalking}) + \beta_{4j}(\text{Strong-tiesTalking}) + \beta_{5j}(\text{Strong-tiesNotTalking}) + \beta_{6j} \\ & (\text{ExtravertedBehaviour}) + r_{ij}, \end{aligned}$$

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01} (\text{IntroversionExtraversionTrait}) + u_{0j},$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} (\text{IntroversionExtraversionTrait}) + u_{1j},$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21} (\text{IntroversionExtraversionTrait}) + u_{2j},$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31} (\text{IntroversionExtraversionTrait}) + u_{3j},$$

$$\beta_{4j} = \gamma_{40} + \gamma_{41} (\text{IntroversionExtraversionTrait}) + u_{4j},$$

$$\beta_{5j} = \gamma_{50} + \gamma_{51} (\text{IntroversionExtraversionTrait}) + u_{5j},$$

$$\beta_{6j} = \gamma_{60} + u_{6j}.$$

The γ_{ij} represented value of dependent variable for observation i for a participant j . The β_{0j} was the random intercept of the regression equation for a participant j , and it represented the main effect of the dummy variable *AloneTalking*, which is a comparison group. The β_{1j} to β_{5j} are the main effects of the dummy variables, while the β_{6j} is the main effect of the extraverted behaviour. Finally, the γ_{01} represented the direct effect of the introversion/extraversion trait on the outcome variable, while γ_{11} , γ_{21} , γ_{31} , γ_{41} , γ_{51} symbolized the cross-level interactions between social contacts (dummy variables) and the introversion/extraversion dimension for each of the dependent variables.

Exploratory analyses. A part the MLM analyses described above, performed with introversion/extraversion trait, was repeated for the emotional stability/neuroticism dimension. Since, people who are both, more neurotic and more introverted, have a higher possibility of exhibiting social anxiety (Gray, 1991), I explored whether more neurotic people exhibited different levels of positive and negative affects, and sense of belonging when in different social conditions than less neurotic people, and whether those patterns were similar to those obtained for introverts and extraverts.

Mediation. The model tested in the mediation analyses posited that the higher quality social contact a person experiences (starting at being alone and not talking to anybody and ending at the strong-ties contact with talking to friends or family members), the more positive affect a person would experience. However, this effect should be mediated by a momentary sense of belonging.

Since all of the predictors of this model were assessed multiple times a day for each participant and they belonged to the Level 1 of the model, the tested model was the lower-level mediation ($1 \rightarrow 1 \rightarrow 1$). I tested one variant of this mediation, i.e. the within-within mediation, where within-person social contact would be mediated by the within-person belonging, which would lead to positive affect – the mediation concerning only patterns experienced by individual participants. The second variant of this mediation, the between-between mediation was not tested, as the goal of this study was not to assess whether the proposed mediation paths were supported for people with varying amounts of different social contacts, but rather to assess the momentary impact of such situations on an individual.

The within-within mediation analyses were performed in the HLM program and was loosely based on the 3-steps (Baron & Kenny, 1986), which were not used to make decisions about the existence of mediation, but rather they were useful in calculating different paths, and the $a*b$ coefficients. The existence of mediations, or the lack of thereof, was based on the significance of those coefficients, assessed using the Monte Carlo method. As advised by Kenny (2018), the c path (the total effect) of the mediation was not calculated (Step 1), since for multilevel models the equation $c = c' + ab$ does not hold completely and it is better to infer the c path values from that equation, rather than to calculate them directly from the data. Step 2

involved testing the relationship between the predictor variable of social contact and the mediator of sense of belonging (path *a*). The tested model was:

$$\begin{aligned} \text{Level 1: } \gamma_{ij} (\text{M} = \text{belonging}) = & \beta_{0j} + \beta_{1j} (\text{AloneNotTalking}) + \beta_{2j} (\text{Weak-tiesTalking}) + \beta_{3j} \\ & (\text{Weak-tiesNotTalking}) + \beta_{4j} (\text{Strong-tiesTalking}) + \beta_{5j} (\text{Strong-tiesNotTalking}) \\ & + r_{ij}, \end{aligned}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + u_{0j}, \text{ (this represents } a_0 \text{ value)}$$

$$\beta_{1j} = \gamma_{10}, \text{ (} a_1 \text{ value)}$$

$$\beta_{2j} = \gamma_{20}, \text{ (} a_2 \text{ value)}$$

$$\beta_{3j} = \gamma_{30}, \text{ (} a_3 \text{ value)}$$

$$\beta_{4j} = \gamma_{40}, \text{ (} a_4 \text{ value)}$$

$$\beta_{5j} = \gamma_{50}, \text{ (} a_5 \text{ value)}$$

The above model had random intercept and fixed slopes because the previous MLM analysis (Model 2 with belonging as a dependent variable, random intercept, and random slopes) indicated that all the slopes were of the same general pattern. After obtaining the six values of the six *a* paths, Step 3 of the mediation analysis required finding paths *b* and *c'*, hence an analysis was performed of the below model:

$$\begin{aligned} \text{Level 1: } \gamma_{ij} (\text{PA}) = & \beta_{0j} + \beta_{1j} (\text{AloneNotTalking}) + \beta_{2j} (\text{Weak-tiesTalking}) + \beta_{3j} \\ & (\text{Weak-tiesNotTalking}) + \beta_{4j} (\text{Strong-tiesTalking}) + \beta_{5j} (\text{Strong-tiesNotTalking}) + \beta_{6j} \\ & (\text{M=Belonging}) + r_{ij}, \end{aligned}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + u_{0j}, \text{ (this represented } c'_0 \text{ value)}$$

$$\beta_{1j} = \gamma_{10}, \text{ (} c'_1 \text{ value)}$$

$$\beta_{2j} = \gamma_{20}, \text{ (} c'_2 \text{ value)}$$

$$\beta_{3j} = \gamma_{30}, (c'_3 \text{ value})$$

$$\beta_{4j} = \gamma_{40}, (c'_4 \text{ value})$$

$$\beta_{5j} = \gamma_{50}, (c'_5 \text{ value})$$

$$\beta_{6j} = \gamma_{60} \text{ (this represented } b \text{ value).}$$

Next, the obtained six path a values were combined with the six values representing direct effect (c' path), and with the one value constituting the b path. This new equation represented the total mediation (path c):

$$PA = [c'_0 + (b)(a_0)] + [c'_1 + (b)(a_1)] (\text{AloneNotTalking}) + [c'_2 + (b)(a_2)] (\text{Weak-tiesTalking}) + [c'_3 + (b)(a_3)] (\text{Weak-tiesNotTalking}) + [c'_4 + (b)(a_4)] (\text{Strong-tiesTalking}) + [c'_5 + (b)(a_5)] (\text{Strong-tiesNotTalking}).$$

Each of the above product terms ($b*a$) symbolized the six indirect effects for each of the social contact dummy variables. In order to assess whether the indirect effects were statistically significant, the Monte Carlo method was implemented (Selig, & Preacher, 2008). Specifically, the confidence intervals' calculator was used six times, each time imputing variables corresponding to only one social contact dummy variable, with covariance between a and b set to 0, since those values were obtained in separate analyses.

Results

Descriptive statistics.

The frequency analyses' results presented here refer to within-person differences, i.e. differences measured at Level 1. Since participants provided a varying number of completed questionnaires (ranging from 2 to 42), some participants' contribution to these analyses was more substantial than that of participants who completed smaller number of instances. Overall, participants reported being with strong-ties the most often ($N = 4570$ instances, 49.2%), being

alone less often ($N = 2587$, 27.6%), and being with weak-ties the fewest times ($N = 2160$, 23.2%). They also indicated that if they talked to someone, which more often than not they did ($N = 6539$ instances, 70.2%), the most often they talked to only one person ($N = 2011$ instances, 10.6%), and such conversations lasted most frequently 15 minutes and more ($N = 2954$ instances, 45.18%). The current study's participants most often refrained from talking on the phone ($N = 6728$ instances, 72.3%), but chose more often than not to use other technological means of communication ($N = 6223$ instances, 66.9%). Specifically, most frequently they texted using their phones ($N = 4620$, 74.1%), followed by chatting online ($N = 1497$, 24%), and they wrote emails the least often ($N = 115$ instances, 1.8%). Detailed information indicating the average number of times participants have chosen each of the answers to questions assessing their social experiences are located in the Table 1 below.

Table 1.

Descriptive Statistics of Variables Assessing Social Contact in the Questionnaire

Question	Answers	<i>M</i>	<i>SD</i>	<i>Range</i>
For the majority of time I was:	Alone	5.71	5.46	0-29
	Weak-ties	4.77	4.38	0-23
	Strong-ties	10.09	7.08	0-33
I talked to someone:	Yes	14.43	8.41	0-39
	No	6.13	5.83	0-33
I talked to:	1 person	4.44	4.22	0-28
	2 people	3.46	2.93	0-15
	3 people	2.35	2.39	0-14
	4 people	1.34	1.78	0-11
	5 or more people	2.85	3.25	0-26
My longest conversation was:	Less than 5 mins	2.91	2.97	0-18
	5-10 mins	2.71	2.81	0-17
	10-15 mins	2.29	2.46	0-15
	More than 15 mins	6.52	5.90	0-33
My longest talk was with:	Weak-ties	2.88	3.05	0-17
	Strong-ties	11.56	7.69	0-38
I talked on the phone:	Yes	5.69	5.51	0-29
	No	14.85	9.32	0-40
I used email, phone texted, or chatted on the Internet:	Yes	13.74	8.68	1-38
	No	6.81	7.05	0-32
I used the most:	Email	.25	.88	0-12
	Internet chat	3.30	5.41	0-29
	Phone Texting	10.20	8.77	0-38

Note: The mean, standard deviation, and range refer to number of times a specific answer was chosen.

The hypotheses of the current study were assessed using dummy variables constructed from the answers to the survey questions. This coding schema showed that out of all the possible combinations, the strong-ties not talking situation occurred the least frequently, while the strong-ties talking situation was the most frequent (see Figure 4 below).

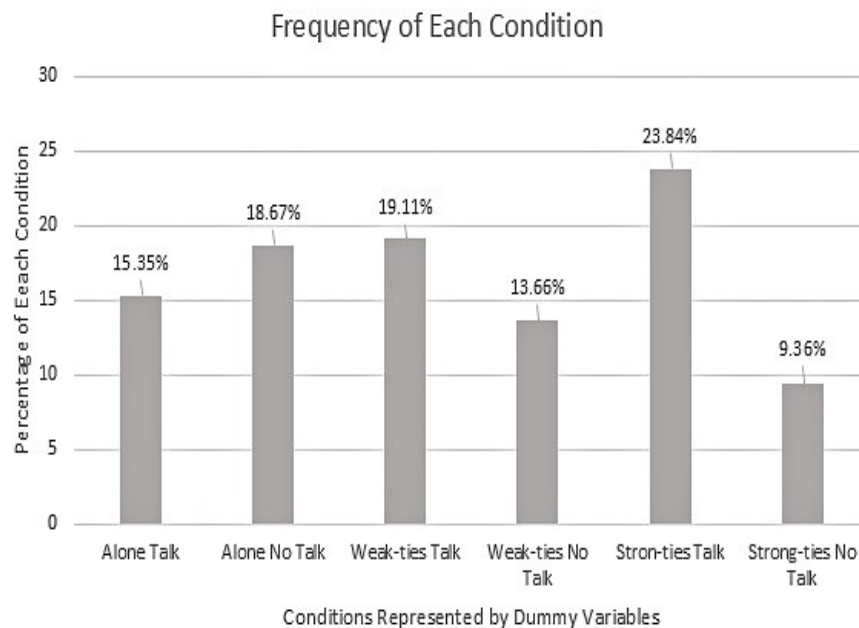


Figure 4. Percentage of Occurrence of Each Social Situation Represented by the Dummy Codes

Descriptive statistics of the remaining variables used in the study, representing average sense of belonging, positive and negative affects, and the average extraverted behaviour obtained in all of the social situations, i.e. in all reported instances, are presented in the Table 2 below. The Table 2 also includes average extraversion/introversion and emotional stability/neuroticism personality traits' levels reported by participants.

Table 2.

Descriptive Statistics of Variables Assessed in Study 1

Measure	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>N</i>
Sense of Belonging	4.63	1.11	1-6	6525
Extraverted Behaviour	3.66	1.15	1-7	9262
State Positive Affect	2.79	.70	1-5	9281
State Negative Affect	1.85	.56	1-5	9276
Introversion/Extraversion	3.26	.57	1.63-4.67	444
Emotional Stability / Neuroticism	2.94	.66	1.42- 4.46	439

Bivariate correlations.

Relationships between the personality traits of introversion/extraversion and emotional stability/neuroticism, as well as the average of all daily measures of positive affect, negative affect, sense of belonging, as well as the average extraverted behaviour were all assessed in the bivariate correlation analysis (see Table 3 below).

Table 3.

Bivariate Correlations Between Average Positive and Negative Affects, Sense of Belonging, Extraverted Behaviour, and Personality Traits of Introversion/Extraversion and Emotional Stability/Neuroticism in Study 1

	1	2	3	4	5	6
1. Ave Positive Affect	-					
2. Ave Negative Affect	.07	-				
3. Ave Belonging	.48**	-.43**	-			
4. Ave Extravert Behaviour	.55**	.08	.38**	-		
5. Extraversion Trait	.37**	.03	.36**	.53**	-	
6. Neuroticism Trait	-.25**	.25**	-.33**	-.34**	-.53**	-

Note 1: ** $p < .01$

Note 2: *Ave Positive Affect* – the average positive affect exhibited during the 7 days of the study; *Ave Negative Affect* – the average negative affect during the 7 days of the study; *Ave Belonging* – the average sense of belonging during the 7 days of the study; *Ave Extravert Behaviour* – the average extraverted behaviour exhibited over the 7 days

Regarding the outcome variables measured multiple times each day, the momentary positive and negative affects were not correlated with each other. The remaining correlations followed the expected pattern, i.e. momentary positive affect was positively associated with belonging, extraverted behaviour, and extraverted trait, as well as negatively correlated with neuroticism trait. The momentary negative affect, on the other hand, was negatively correlated with belonging and positively correlated with neuroticism. The momentary sense of belonging was negatively correlated to negative affect and neuroticism, while it was positively associated with the remaining variables.

Since the current study was designed to assess people multiple times a day during their everyday life experiences, I expected that if such experiences were to bring an enhancement in positive affect, such affect would be, on average, characterized more by heightened pleasantness than by increased arousal. This expectation was supported since I found lower than normal correlation between positive affect and extraversion ($r = .37, p < .01$), which was comparable to the size of similar correlations found in neutral situations (situations with a neutral or “everyday” level of arousal), as well as to those in other studies measuring momentary changes in affect ($r = .15$ in neutral situations; $r = .18$ in moment-report data; Lucas & Baird, 2004).

Multilevel analyses.

Hypothesis 1. In this hypothesis, I indicated that being with weak-ties and not talking would lead to better outcomes (higher positive affect, lower negative affect, higher sense of belonging) than being completely alone, i.e. being in the alone and not talking situation. The results of three different MLM analyses (see Model 2 in the Analysis Plan section), one for each dependent variable, indicated that there was no statistically significant difference in positive affect between the weak-ties not talking ($\beta = 2.58, SE = .03$) and the alone not talking ($\beta = 2.62,$

$SE = .03$) conditions ($\chi^2(1) = 2.64, p = .10$). Similarly, although in both these conditions negative affect levels were lower than levels of positive affect, there was no statistically significant difference in negative affect between the weak-ties not talking ($\beta = 1.89, SE = .03$) and the alone not talking ($\beta = 1.85, SE = .02$) conditions ($\chi^2(1) = 2.96, p = .08$). There was, however, a statistically significant difference ($\chi^2(1) = 13.98, p < .001$) in levels of belonging between the weak-ties not talking ($\beta = 4.23, SE = .05$) and the alone not talking ($\beta = 4.40, SE = .05$), but this difference was in opposition to the hypothesized direction. Overall, the analyses did not support Hypothesis 1. Instead, I found that being around weak-ties and not talking to them resulted in lower momentary sense of belonging, and similar levels of positive and negative affects, compared to being completely alone (see Figure 5 below for means of PA, NA, and sense of belonging in each social situation; please, see Appendix I for tables illustrating differences between all social conditions for state positive affect, state negative affect, and the momentary sense of belonging).

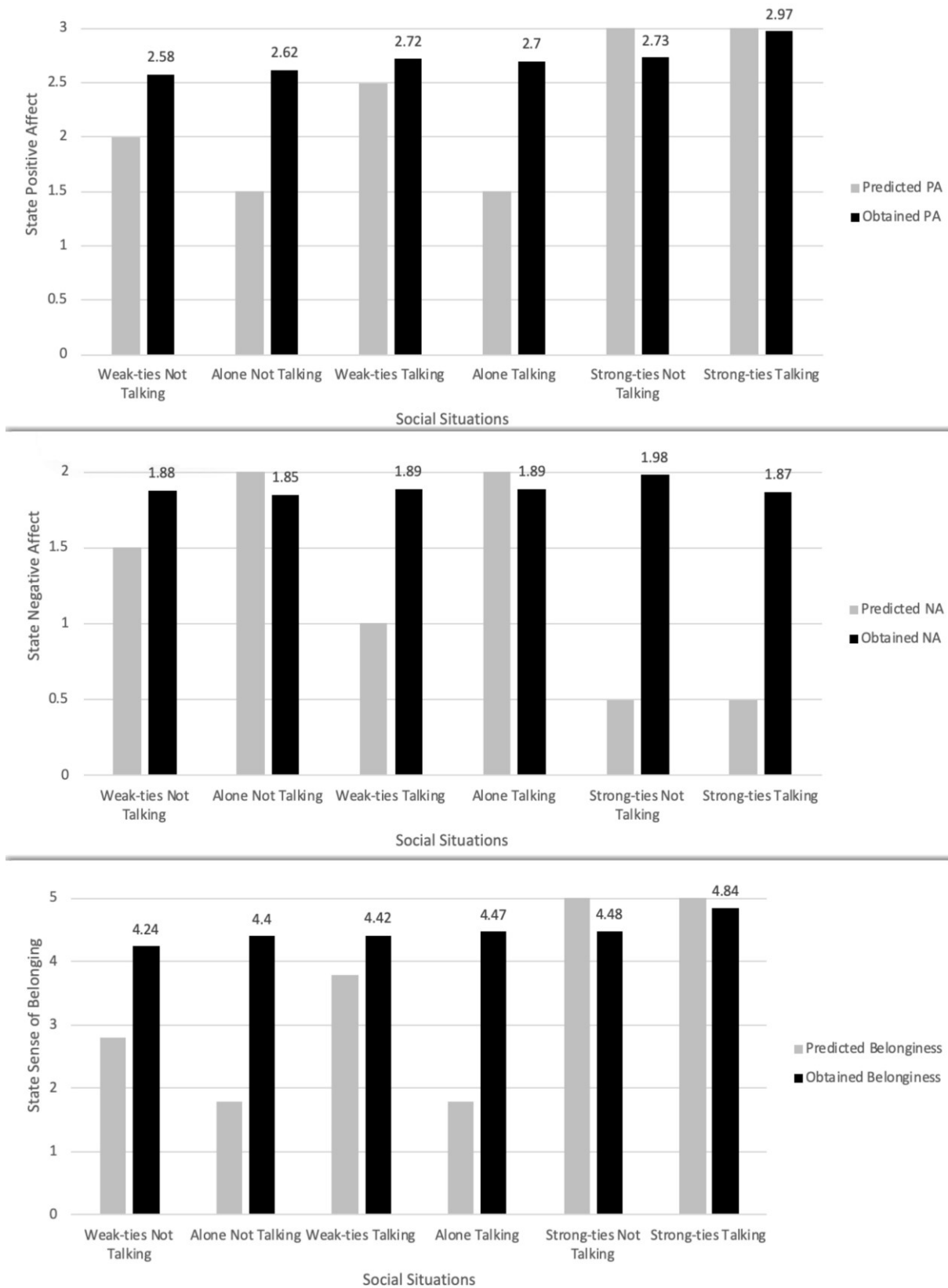


Figure 5. Predicted and obtained means of momentary positive and negative affects, and sense of belonging in situations ranging from the least to the most social.

Hypothesis 2. In Hypothesis 2, I predicted that being alone with others would be associated with lower positive affect, lower sense of belonging, and higher negative affect than being with weak-ties and talking to them. The analyses of the three Level 2 MLM models indicated that participants reported significantly lower positive affect ($\chi^2(1) = 28.52, p < .001$) and lower sense of belonging ($\chi^2(1) = 19.50, p < .001$) when being with weak-ties and not talking ($\beta = 2.58, SE = .03$ for PA; $\beta = 4.23, SE = .05$ for belonging) than when being with weak-ties and talking to them ($\beta = 2.72, SE = .03$ for PA; $\beta = 4.41, SE = .05$ for belonging). However, there was no statistically significant difference ($\chi^2(1) = .0002, p > .50$) between levels of negative affect reported when participants were with weak-ties and did not talk ($\beta = 1.89, SE = .03$) and when they were with weak-ties and talked to others ($\beta = 1.89, SE = .02$). Based on these findings, the Hypothesis 2 was only partially supported.

Hypothesis 3. Similar to Hypothesis 2, only parts of Hypothesis 3 were supported. In this hypothesis, I predicted that when participants talked to weak-ties, they would report lower state positive affect and higher state negative affect than when they talked to strong-ties. The analyses of the Model 2 showed that, indeed, interacting verbally with people with whom one has weak-ties was associated with significantly lower momentary positive affect ($\beta = 2.72, SE = .03$) than talking to strong-ties ($\beta = 2.97, SE = .02; \chi^2(1) = 141.80, p < .001$). However, incongruent with the prediction, talking to weak-ties ($\beta = 1.89, SE = .02$) did not lead to significantly higher negative affect than the one reported when talking to strong-ties ($\beta = 1.87, SE = .02$). In fact, there was no significant difference in the reported momentary negative affect in those two social situations ($\chi^2(1) = 1.43, p = .23$).

Hypothesis 4. First, in Hypothesis 4, I predicted that there would be significant differences in the momentary sense of belonging resulting from being in different social

circumstances. Second, I expected that the highest momentary sense of belonging would be reported after talking to strong-ties. Lower sense of belonging would be reported in talking to weak-ties, while even a lower one would then be reported after being with weak-ties and not talking to anybody, i.e. being alone with others. Finally, the lowest sense of belonging would result from being completely alone (alone and not talking condition).

The results indicated that, indeed, the momentary sense of belonging when talking to the strong-ties was the highest ($\beta = 4.83$, $SE = .04$, $p < .001$). The second and third highest scores were reported after being with strong-ties and not talking ($\beta = 4.48$, $SE = .07$) and when being alone and talking ($\beta = 4.47$, $SE = .02$), however the sense of belonging was statistically similar in those conditions ($\chi^2(1) = .02$, $p > .5$). A lower sense of belonging was a consequence of talking to weak-ties ($\beta = 4.41$, $SE = .05$), which was similar to that of being alone and not talking ($\beta = 4.40$, $SE = .05$; $\chi^2(1) = .05$, $p > .5$). The lowest sense of belonging was reported after being alone with others ($\beta = 4.23$, $SE = .05$, $p < .001$). Furthermore, only the momentary sense of belonging after talking to strong-ties and after not talking to weak-ties were significantly different from the sense of belonging reported in all other social contexts (see Table 2 below). Hence, it is reasonable to conclude that Hypothesis 4 was not supported.

Hypothesis 5. In Hypothesis 5, I predicted that the momentary sense of belonging would mediate the relationship between social contexts and momentary positive affect. The within-within, 1-1-1 mediation was analyzed in the HLM program (see Figure 6 below).

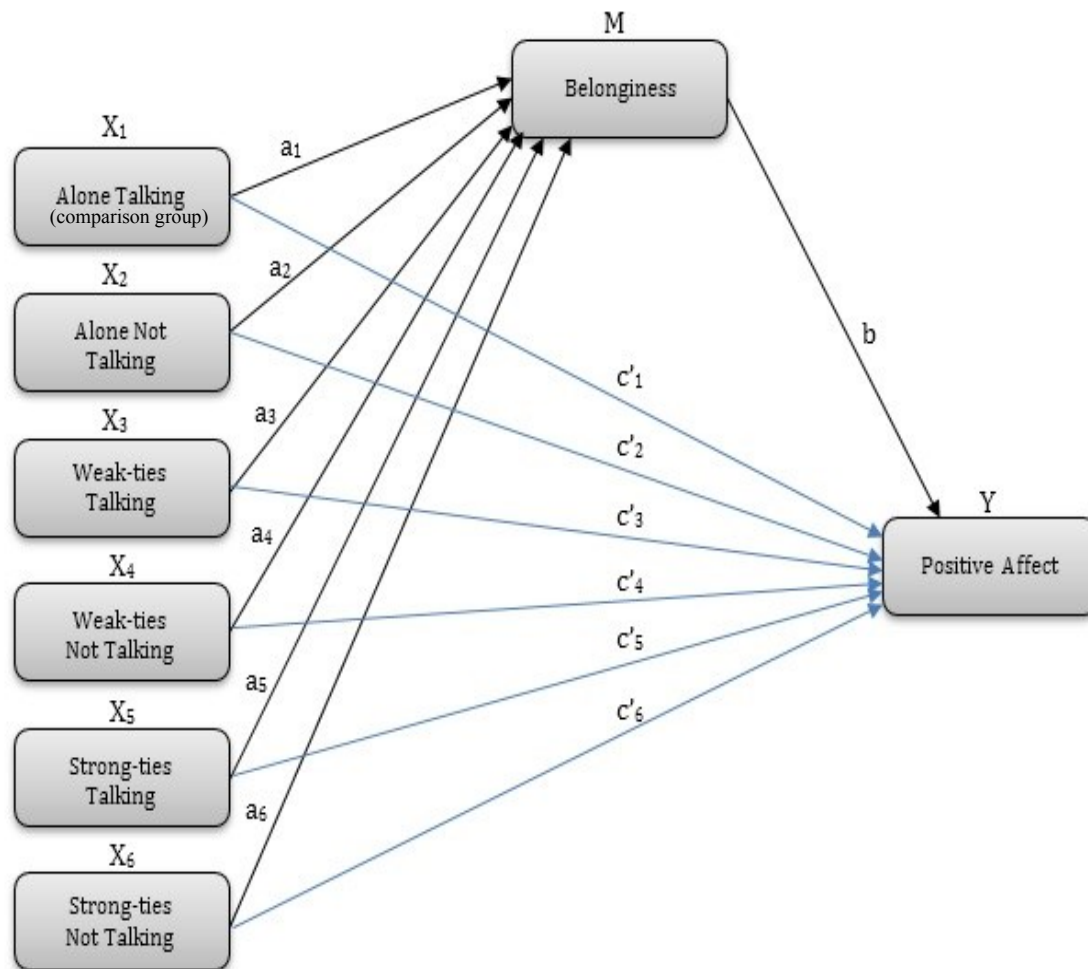


Figure 6. Mediation model (1-1-1) showing momentary sense of belonging mediating the relationship between social contexts and momentary positive affect

The obtained scores for each of the dummy variables, based on each of the 3-step method (Baron & Kenny, 1986), are presented in Table 4 below.

Table 4.

Results of Within-Within 1-1-1 Mediation Analyses in Study 1

	Path's indicator	β	<i>SE</i>	<i>t</i>	<i>p</i>
Step 2 Path <i>a</i>					
Alone Talk (Constant)	a ₁	4.47	.05	95.63	< .001
Alone No Talk	a ₂	-.07	.03	-1.96	.05
Weak-ties Talk	a ₃	-.08	.04	-2.12	.03
Weak-ties No Talk	a ₄	-.25	.04	-5.80	< .001
Strong-ties Talk	a ₅	.37	.03	11.84	< .001
Strong-ties No Talk	a ₆	-.01	.05	-.10	.92
Step 3 Paths <i>b</i> and <i>c'</i>					
Alone Talk (Constant)	c' ₁	2.72	.03	95.69	< .001
Alone No Talk	c' ₂	-.06	.02	-2.64	.01
Weak-ties Talk	c' ₃	.05	.02	2.50	.10
Weak-ties No Talk	c' ₄	-.06	.03	-2.19	.03
Strong-ties Talk	c' ₅	.19	.02	9.98	< .001
Strong-ties No Talk	c' ₆	.03	.03	1.07	.29
Sense of Belonging	b	.24	.01	36.62	< .001
Step 1 Path <i>c</i> = <i>c'</i> + <i>ab</i>					
Alone Talk	c ₁	3.34			
Alone No Talk	c ₂	3.27			
Weak-ties Talk	c ₃	3.37			
Weak-ties No Talk	c ₄	3.22			
Strong-ties Talk	c ₅	3.62			
Strong-ties No Talk	c ₆	3.37			

Note 1: Bolded numbers indicate statistical significance

The analyses of path *a* (Step 2) denoted that the relationship between social contexts and belonging was significant for all but the *Strong-tiesNotTalking* dummy variable, which was

associated with a similar level of sense of belonging to that of a comparison variable, i.e. the *AloneTalking* dummy variable. The ranking of the amounts of the momentary sense of belonging experienced in each social context was identical to that discussed for the Hypothesis 4. Specifically, the most belonging was associated with being with strong-ties talking, then alone talking (presumably to strong-ties using phone or computer) and strong-ties not talking, followed by weak-ties talking and alone not talking, with the least sense of belonging resulting from being with weak-ties and staying quiet. The current study supported the part of the hypothesis claiming that the increased social contact should lead to higher sense of belonging, especially if it is assumed that talking to strong-ties is the situation with the most social contact, being alone and talking (using phone or the computer to communicate with, most likely, strong-ties) provides more social contact than talking to weak-ties, while being alone and not talking is the least social experience.

The Step 3 allowed for the assessment of paths *b* and *c'* of the mediation model. The path *b* was significant, and the analysis showed that for every unit increase in the momentary sense of belonging, there would be a .24 unit increase in the momentary positive affect ($SE = .01$, $p < .001$; see Table 3). The direct effects (paths *c'*) for the *Weak-tiesTalking* and the *Strong-tiesNotTalking* dummy variables were not statistically significant. This implied that the positive affect levels resulting from these conditions were not significantly different from that of the alone and talking condition. Furthermore, only in two conditions (weak-ties not talking and alone not talking) participants reported significantly lower (by .6 units) positive affect than that reported in the comparison condition.

The results of both Steps 2 and 3 were used to calculate the total mediation effects (paths *c*) and the six indirect effects of this mediation ($a*b$; see Table 5 below). Each of these effects

represented the indirect effect on positive affect through the sense of belonging of being in a specific social situation relative to being in the alone talking situation, i.e. the comparison condition.

Table 5.

Indirect Effects for Within-Within Mediation in Study 1

	Indirect Effect (<i>ab</i>)	<i>95% CI</i>	
		<i>Lower Level</i>	<i>Upper Level</i>
Within-Within			
Alone Talking	1.07	.98	1.16
Alone Not Talking	-.02	-.03	-.003
Weak-ties Talking	-.02	-.04	-.0002
Weak-ties Not Talking	-.06	-.08	-.04
Strong-ties Talking	.09	.07	.11
Strong-ties Not Talking	-.001	-.01	.003

Note 1: Alone Talking was a comparison group

The Monte Carlo method (Selig & Preacher, 2008) was used to check statistical significance of the indirect effects and the results (see Table 5) showed that only the indirect effect of the *Strong-tiesNotTalking* dummy variable contained the null value. This indicated that indirect effects of all other social conditions were statistically significant. According to Hayes and Preacher (2014), in order to conclude that a variable mediates the effect of a predictor on an outcome, evidence is needed that at least one relative indirect effect is significantly different from 0. Based on all the findings, I concluded that the Hypothesis 5 was supported, since increased social contact led to higher momentary sense of belonging, which then mediated the effects of participants experiencing most social situations on the momentary positive affect.

Hypothesis 6. This hypothesis contained three predictions: 1) there would be a main effect of introversion/extraversion trait, such that in all the social situations, more extraverted

people would report higher momentary positive affect and lower negative affect than more introverted people; 2) since introverts engage in extraverted behaviours (Fleeson & Gallagher, 2009) and then experience higher momentary positive affect (Fleeson et al., 2002; Zelenski et al., 2013), I predicted that both introverts and extraverts would experience more positive affect in more social situations (weak-ties not talking and alone not talking qualifying as the least social contact); however as per *prediction 1*, introverts would not reach the same level of positive affect in the same social conditions as extraverts; 3) there would be an interactive pattern between social conditions and the introversion/extraversion trait, which would occur due to the smallest difference between more extraverted and more introverted people in their positive affect in the alone talking and alone not talking conditions.

In order to assess these predictions of Hypothesis 6, I assessed Model 3 for positive and negative affects. Each of the Model 3 contained the social contact dummy variables at Level 1 and the introversion/extraversion trait measure at Level 2. The full results of these analyses are presented in Table 6 below.

Table 6.

Results of Multilevel Model Analyses of Model 3 for Momentary Positive and Negative Affects in Study 1

	Positive Affect				Negative Affect			
	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>p</i>
<u>Level 1 (within-person)</u>								
Intercept (AT)	2.70	.03	92.90	<.001	1.89	.03	74.32	<.001
ANT	-.08	.02	-3.15	.002	-.05	.02	-2.26	.03
WT	-.02	.03	.96	.34	-.01	.02	-.34	.73
WNT	-.12	.03	-3.87	<.001	-.01	.03	-.45	.65
ST	.27	.02	11.10	<.001	-.03	.02	-1.39	.17
SNT	.03	.04	.72	.47	.08	.04	2.26	.02
ANT x ExtTr	.01	.04	.30	.77	.01	.04	.38	.70
WT x ExtTr	.15	.05	3.19	.002	.02	.04	.58	.56
WNT x ExtTr	.04	.05	.70	.49	-.01	.05	-.20	.84
ST x ExtTr	.05	.04	1.13	.26	.02	.03	.48	.63
SNT x ExtTr	.07	.07	1.00	.32	.04	.06	.71	.48
<u>Level 2 (between-persons)</u>								
ExtTr	.23	.05	4.49	<.001	.004	.04	.09	.93

Note 1: Bolded numbers indicate statistical significance

Note 2: AT = Alone and Talking (comparison group), ANT = Alone and Not Talking, WT = Weak-ties Talking, WNT = Weak-ties Not Talking, ST = Strong-ties Talking, SNT = Strong-ties Not Talking, ExtBeh = extraverted behaviour, ExtTr = introversion/extraversion trait

The analysis for the PA as a dependent variable showed that there was a significant main effect of trait introversion/extraversion on the positive affect averaged across the social situations. Specifically, at the average of all social situations, i.e. at the reference social condition of alone and talking, for every 1 SD increase in the extraversion trait's score, i.e. for

more extraverted participants, the average PA increased by .23 units ($p < .001$). *Prediction 1* of the Hypothesis 6 was then supported for PA, since more extraverted participants reported significantly higher PA than more introverted ones in all of the social situations. This finding was further accentuated by the significant interaction term between the weak-ties talking situation and introversion/extraversion trait (see Table 6 above). The difference in reported PA for more introverted participants between being in weak-ties talking and alone talking situations was larger than the difference in PA for more extraverted participants between the same two conditions (see Figure 7 below).

On the other hand, the results indicated that there was no significant main effect of the introversion/extraversion trait when NA was a dependent variable, since 1 SD increase in that trait's score (i.e., being more extraverted), resulted only with .004 units higher negative affect ($p = .93$). I concluded, therefore, that *Prediction 1* for NA was not supported, as there was no main effect of the introversion/extraversion trait on NA and none of the interaction terms were significant (see Table 6). These findings indicated that negative affect reported in any of the social conditions did not depend on levels of that personality trait.

Prediction 3 stated that the smallest difference in PA between more extraverted and more introverted people would occur in the alone talking and alone not talking conditions. This prediction was not supported, since the only significant interaction term for PA was found between weak-ties talking situation and introversion/extraversion trait (see Table 6). All the remaining interaction terms, which were not significant, showed that the reported PA in the rest of the conditions did not depend on levels of introversion/extraversion trait (see Figure 7 showing simple slopes for all of the social contact). Hence, the alone conditions did not

represent the cases with the smallest PA differences between less and more extraverted people (PA for introverts and extraverts was similar in other than alone conditions).

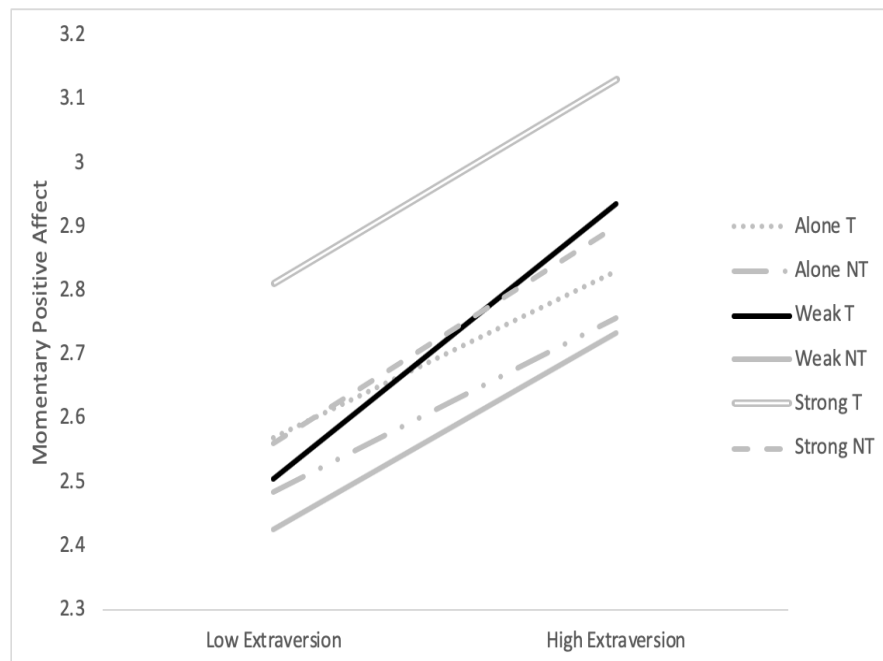


Figure 7. Simple slopes for multilevel Model 3 analysis for positive affect

Although I did not make predictions about negative affect, I analyzed the models using NA as a dependent variable (see Table 6). The results denoted that none of the interaction terms for NA between social situations and introversion/extraversion trait were significant. These findings, together with previously discussed not significant main effect of introversion/extraversion trait, indicated that the impact of social situations on NA did not vary as a function of that personality trait.

The *Prediction 2* of Hypothesis 6 was supported, since for introverts and extraverts there was a significant main effect of situations, where higher PA was reported in more social situations. As seen in Table 6 and discussed above, the only significant interaction term was that

between the introversion/extraversion trait and the weak-ties talking situation. The interaction depicted that introverts reported lower PA in weak-ties talking situation than in the alone talking, while extraverted reported higher PA in weak-ties talking and lower PA in alone talking conditions. However, this interaction term did not have much impact on the ranking of PA reported in different social situations because for both, introverts and extraverts, there were no statistical differences between PA in alone talking and weak-ties talking (difference of .03, $\chi^2(1) = .89, p > .50$), as well as between alone talking and strong-ties not talking situations (difference of .03, $\chi^2(1) = .53, p > .50$). Hence, *Prediction 2* became similar to those in Hypothesis 1-3, and it showed that both introverts and extraverts reported the lowest positive affect when with weak-ties and not talking, which was statistically equivalent to being alone and not talking (difference of .04, $\chi^2(1) = 2.20, p = .13$), and the highest PA was reported in the most social condition – being with strong-ties and talking (see Table 6).

In terms of negative affect, there was no main effect of introversion/extraversion trait on NA and this trait did not affect relationships between social situations and NA, as indicated by all interaction terms being not significant. Hence, the results of Hypotheses 1-3 showed that NA levels did not decrease as sociability of situations increased, instead they stayed similar in different conditions.

Extraverted behaviour. Since some people act less extraverted than others even in very social situations, I also tested whether such variations in exhibited extraverted behaviours could have been responsible for people experiencing lower state positive affect than others. Model 5 was created in order to control for the effects of the momentary extraverted behaviour (see Data Analysis Plan) and the results of its analysis were compared to those of Model 3. The analysis of Model 5 for the momentary PA led to the same conclusions as those of Model 3, i.e. there was a

main effect of introversion/extraversion trait on PA. This finding indicated that at the average level of all social situations (here: being in the reference situation of alone talking) and controlling for participants' extraverted behaviour, 1 SD increase in introversion/extraversion trait was associated with .29 units increase in PA ($SE = .05$, $t(441) = 6.09$, $p < .001$). Also, similarly to the findings of the Model 3, the weak-ties talking situation, as compared to the alone talking condition, was the only one, which effects on PA marginally varied, based on levels of introversion/extraversion trait's levels ($\beta = .07$, $SE = .04$, $t(441) = 1.92$, $p = .055$). Equivalent tests of Model 5 for NA yield the same conclusions as test of the Model 3, i.e. there was no main effect of introversion/extraversion trait on NA ($p = .75$), and none of the social situations' effects on NA was dependent on levels of that personality trait. In conclusion, controlling for the extraverted behaviour did not have expected consequences, as it did not seem to significantly influence obtained ratings for neither positive nor negative affects.

Overall, the Hypothesis 6 was supported only partially for PA, since its predictions 1 and 2 were supported, but the Prediction 3 did not yield expected results. This hypothesis, however, was not supported for NA, as none of the predictions were supported when negative affect was a dependent variable.

Hypothesis 7. In this hypothesis I predicted that more extraverted people would report higher momentary sense of belonging in all social situations, compared to less extraverted ones. The results supported this hypothesis by showing that there was a significant main effect of introversion/extraversion trait. Hence, being at the average of all social situations (i.e., in the alone talking situation), 1 SD increase in this personality trait was associated with .49 units higher sense of belonging ($SE = .09$, $t(441) = 5.47$, $p < .001$). Also, non-significant interaction

terms between introversion/extraversion trait and social conditions showed that higher sense of belonging reported by more extraverted people was similar across all social situations.

Discussion

The main goal of Study 1 was to assess whether people would benefit more from being alone with others. Specifically, I wanted to find out whether being around strangers or around not well-known people (weak-ties) while not talking to them was better in terms of affect and belongingness than being completely alone (here: being in alone not talking situation). The results of the current study showed that being alone with others was not associated a higher positive affect and sense of belonging, and a lower negative affect, as compared to being alone. In fact, being alone and not talking to anybody generated similar levels of positive and negative affect, but higher levels of sense of belonging, than being alone with others.

The remaining findings regarding positive affect, but not the momentary negative affect and sense of belonging, followed the expectations and supported findings of existing research. Study 1 showed that, although the levels of momentary negative affect stayed similar in various social situations, an increase in positive affect was associated with a progressive familiarity of participants' conversation partners. These findings partially supported the results of Sandstrom and Dunn (2014a), which showed that being with weak-ties and having a small chat with them generated higher momentary PA and sense of belonging, and lower NA, as compared to being with weak-ties but talking as little as possible to them. The existence of strong affect was most visible in situations when participants were around people closely connected to them. The highest PA in Study 1 was reported after participants talked to friends or family members, which supported existing research showing that, across cultures and in various age groups, being around and talking to family and friends leads to higher PA than being around co-workers,

acquaintances, or strangers (Chui, Hoppmann, Gerstorf, Walker, & Luszcz, 2014; Coan et al., 2006; Cohen, 2004; Downie, Mageau, & Koestner, 2008; King & Reis, 2012; Mehl et al., 2010; Oishi, Napa Scollon, Diener, & Biswas-Diener, 2004; Vogel, Ram, Conroy, Pincus, & Gerstorf, 2017). However, being with people strongly connected to them but not talking to them, also resulted in participants reporting the highest momentary negative affect, although this difference was not statistically significant. Such situation could have occurred when participants were with strong-ties in a situation underlined by anger or boredom, where nobody felt like talking to anybody, or when they were with strong-ties but were unable to interact with them, e.g. sitting with friends in a classroom. Since the participants of Study 1 were predominately young university students, the strong negative feelings when not speaking to strong-ties could have been a result of participants' conflicts with parents or other family members. Studies pointed out that among strong-ties, people reported more positive affect when being around friends than when interacting with their families, and this association becomes more prevalent as people mature (Chui et al., 2014; Csikszentmihalyi & Hunter, 2003; Larsen, Mannell, & Zuzanek, 1986; Mueller et al., 2019). This is understandable, since being with friends is predominately associated with leisure activities, an ability to choose those activities and one's companions, while being with family is often underlined by duties, routines, and not always being around like-minded people (Larson et al., 1986; Saphire-Bernstein & Taylor, 2013).

The obtained negative affect findings were inconsistent with existing research and were surprising because affect was measured with the Scale of Positive and Negative Emotions (Diener et al., 2009), which treats PA as inversely proportional to NA. These findings were further accentuated by the outcome of a bivariate correlation analysis, which showed that averages of momentary positive and negative affects were not significantly correlated. It is

possible that participants in Study 1 did not report significant differences in negative affect between any of the social conditions because everyday situations are not naturally characterized as generating high levels of negative affect. Also, since the survey questions measured affect resulting from social situations, participants could have been affected by demand characteristics. Being in social situations could have made them act, or make them report affect and belonging, in accordance with social rules expected in Western cultures, e.g. smiling even when feeling sad or being polite when feeling angry. Although the study asked participants to report their feelings every two hours, their reports could have reflected their more salient, expressed emotions, which were still more easily remembered, than actual feelings.

In terms of momentary sense of belonging, the results of the current study did not support the main prediction that people would feel higher momentary sense of belonging when alone with others compared to being completely alone and not interacting with anybody. In fact, the results indicated that it would be worst, in terms of experienced sense of belonging, to be alone with others.

It is important to note that, even when being completely alone, most people are aware that this solitary state is not a permanent one. People's awareness of belonging to a family, to a work organization, or to various other social groups does not disappear instantly when they spend a day alone. However, people are sensitive to being ignored or rejected by others. Some researchers argue that, since being connected to others has been instrumental for human survival for centuries, our brains are wired to detect even the smallest hints of social rejection (Sebastian, Viding, Williams, & Blakemore, 2010; Williams & Zadro, 2005; van Beest & Williams, 2006). This notion has been supported by experimental research showing that even minimal cues of acknowledgement from others, e.g. someone making an eye contact or smiling at us, lead to

feelings of inclusion and belonging (Wesselmann, Cardoso, Slater, & Kipling, 2012; Wirth, Sacco, Hugenberg, & Williams, 2010). On the other hand, when people ignore us, it can lead to questioning our physical and psychological attributes, which then could result in actually finding reasons for our poor fit with others and overall lower well-being (Leary, Tambor, Terdal, & Downs, 1995; Nezlek, Kowalski, Leary, Blevins, & Holgate, 1997). Therefore, the main reason for reporting a lower state sense of belonging in Study 1 when people were alone with others, as opposed to when they were completely alone, could be seen as parallel to the consequences of social rejection. Being in a social environment where others talk and laugh with each other, while we are not talking to anybody, is likely to make us more aware of our aloneness than being completely alone, and possibly occupied with other things.

Furthermore, Study 1's results showed that momentary sense of belonging mediated relationship between social situations and state PA. Specifically, I found that as increased social contact (contact with people more connected to us) led to higher momentary sense of belonging, which then resulted in reporting higher momentary positive affect. These findings supported existing research showing that being with, and talking to people closely connected to us, produces the highest levels of sense of belonging (Allen, 2006; Coan et al., 2006; Cohen, 2004; King & Reis, 2012; Pinquart & Sorensen, 2003; Lyubomirsky et al., 2005). More importantly, by replicating Sandstrom and Dunn's (2014b) findings, which showed that talking to weak-ties leads to a higher momentary sense of belonging than being alone with them, Study 1 provided more evidence that even a momentary improvement in our sense of belonging has a positive impact on people's mood.

Finally, although no specific predictions were made about people's sense of belonging in other situations, it is not surprising that participants reported the second highest sense of

belonging the strong-ties not talking situation. It is understandable that being in close physical vicinity to family and friends, even when not talking to them led to higher sense of belonging than when being alone with others, since we do not need to talk to people we know well to know that they are a part of our group. Being among family members or long-known friends, even when everybody does their own thing, is more likely to create stronger feelings of belongingness than a small chat with a shop keeper. However, more interesting was the fact that being with strong-ties and not talking was associated with similar belongingness as being alone and talking. Being alone and talking situation was characterized by being alone for majority of the time, yet communicating with others via phone, texting, or the Internet, making such situations not truly alone. It is likely that similar sense of belonging was found between these situations, because being alone and talking involved communicating using technology with predominantly strong-ties. Thus, participants did not have to talk to or even see friends or family members to feel belongingness resulting from knowing that they were connected to those others. In fact, in their 2004 experience sampling study, van Roekel, Scholte, Engels, Goossens, and Verhagen showed that adolescents indicated that they felt more momentary loneliness when they were around others at school than when they were at home or other locations. The authors attributed this finding to adolescents being less likely to communicate freely, even via technological means, with their strong-ties while at school, while being around family or friends, or communicating with them, was much easier in other locations (van Roekel et al., 2014). Interestingly, van Roekel's et al. (2014) results were opposite to Larson's, who in 1981, when stationary phones were the main means connecting people, found that adolescents reported lower levels of state loneliness at school than at home.

In the current investigation, I was also interested in whether the associations between social conditions and affective outcomes varied between more and less extraverted people. In accordance with the predictions, more extraverted people reported higher positive affect and sense of belonging in all situations. Although both introverts and extraverts reported higher PA in more social situations, introverts never reached the same level of PA as more extraverted participants in any of the situations. This finding again supported Study 1's prediction and findings of the existing research showing that, on average, extraverts report higher positive affect than introverts (e.g., Diener, Lucas, & Oishi, 2018; Steel, Schmidt, Bosco, & Uggersley, 2019). However, the findings of Study 1 did not support the prediction that, since introverts prefer solitude and less social situations more than extraverts (Argyle & Lu, 1990; Asendorph & Wilpers, 1998; Leary et al., 2003; Lucas et al., 2008; Srivastava et al., 2008), the difference in PA between extraverts and introverts would be the smallest in the alone condition.

Also contrary to the predictions, in Study 1 I found that momentary negative affect was similar for introverts and extraverts across situations. These results supported existing research showing that extraversion is more closely associated with PA than with NA (Diener, Oishi, & Lucas, 2003; Lucas & Fujita, 2000). The correlational analyses also showed that PA was positively, yet not significantly, correlated with NA. Thus, these findings cast doubt at usefulness of the SPANE measure to mainly capture the unpleasant-pleasant dimension. The SPANE was chosen for this research in order to measure pleasantness (including low-arousal PA) better, compared to using the PANAS, with its more independent activated pleasant and unpleasant dimensions. It is possible that modifying the SPANE to make it suitable for assessing state PA and NA, instead of the average levels of those dimensions, caused the above unexpected findings.

Furthermore, I did not find any significant differences in momentary sense of belonging resulting from being in different social situations, between more introverted and more extraverted people. Although the results did not support my exact predictions, the main effect of introversion/extraversion trait on belongingness was significant, which mirrored the existing research showing that, on average, more extraverted people report a greater sense of belonging than less extraverted ones across situations (Swickert et al., 2002).

Finally, regardless of people's levels of introversion/extraversion trait, most people are capable of acting extraverted when it is needed (Fleeson, 2001, 2004; Heller, Komar, & Lee, 2007; Smillie, 2013; Zelenski et al., 2012; Zelenski et al., 2013). Such extraverted behaviours could then be responsible for higher momentary positive affect and lower negative affect in situations, which require people to act more outgoing or talkative. Controlling for self-reported extraverted behaviour, i.e. state extraversion, during the analyses of Study 1, showed that the extent to which participants acted extraverted did not impact the general pattern of results of any of the three dependent variables. Thus, it did not matter whether people acted more or less extraverted in more social situations, extraverts still reported higher affective and belongingness scores across conditions. This finding further supported my prediction that positive social situations are able to produce similar affective and belongingness enhancement for more introverted and more extraverted people. However, since more extraverted people have a higher baseline levels of PA and sense of belonging and lower baseline NA, compared to more introverted people, experiencing this universal, situationally-brought enhancement, resulted in extraverts still reporting higher PA and belongingness and lower NA than introverts. This finding also showed that the types of a social situations people are in seem to be more important for mood and belongingness than the extent of exhibited extraverted behaviour such situations

evoke in different people. For example, being at a football game and sitting around loud strangers would enhance our momentary positive affect and sense of belonging, regardless of how much we decide to engage in a conversation with the strangers or dance on the stands.

The value of Study 1 also lies in the use of the EMA technique to obtain affective and belongingness outcomes associated with being in different social situations, very soon after those situations have occurred. Recently, due to the more widespread use of smartphones, such data collection is gaining popularity, yet there are still not many published studies assessing the impact of different social situations on people's well-being. In a recently published study, Mueller et al. (2019) obtained similar results to those of Study 1. In fact, participants in Mueller and collaborators' study (2019) also used smartphones to provide information about each face-to-face interaction lasting more than five minutes, as well as their resulting momentary affect levels. However, these authors did not include any measures of the non-talking around people or being alone situations in their study. Mueller et al. (2019) found that their participants were: the happiest after interactions with friends; less happy when interacting with family; even less happy due to interacting with everybody else who did not fit in the three other categories; and they felt the least happy after interacting with colleagues or co-workers (Mueller et al., 2019). In both, Mueller's et al. (2019) study and Study 1 of this dissertation, the highest PA was due to talking to strong-ties (friends and family) and the lower one was a result of talking to weak-ties (co-workers). Mueller et al. (2019) also found similar results regarding more extraverted and more neurotic participants, since in their study, similarly to my research, more extraverted and more emotionally stable people reported higher happiness than more introverted or more neurotic ones across situations.

Limitations of Study 1 and Recommendations.

The first limitation of the current study stemmed from the majority of its participants being young students from a North American university. Although studies using student samples are valuable in the psychology field as they help to test new hypotheses, such samples also limit the generalizability of findings (Henrich, Heine, & Norenzayan, 2010; Peterson, 2001). In order to improve the generalizability of the results, it would be useful to repeat the study with participants better representing the general population, and especially with the inclusion of older generations. Since one of the major social situations (being alone and talking) was based on a connection with others through technological means, it is possible that different findings would be obtained from the general population, especially when including people who use less technology to communicate with others.

The generalizability of the Study 1 was also affected by the fact that people's assumptions about others' preferences for social contact are culturally based, and they are strengthened by behavioural conventions people observe in their everyday lives. Hence, the findings of Study 1 could be less similar in different cultures, especially in more collectivist ones. However, even among individualistic cultures, there could be differences based on different places people come from. For example, in smaller communities or places where it is generally more common to talk to people on the street, being alone with others, i.e. not talking to anybody while in a public space, could lead to others' negative responses, which would make such social situation affectively worse than being completely alone. While being in bigger cities, where it is conventional to keep to oneself, being alone with others could result in similar or better outcomes as being alone. It would be interesting to compare the outcomes of different

social situations, not only between different types of cultures or countries, but also between different communities.

The second limitation of Study 1 resulted from the study's data collection being based on technology. The phone application used in the study was chosen because of it being available for both, iPhones and Androids phones. However, the application, which was used in a medical field research with a limited number of participants, did not have a full capability of receiving the volume of data generated by hundreds of people at the same time, which was not disclosed beforehand. The major technical difficulty resulted from the inability to have participants start the phone portion of the study right after in-lab presentation, because of a limited number of data libraries available. Instead, all participants who took part in the in-lab portion of the study during a specific week, had to start the phone surveys the following Monday. This resulted in increased participants' confusion, and multiple instances of data being not recorded. The data was also lost in many occasions due to: the need for participants to manually upload the filled-out surveys, which not always worked at a first try, and forgetting to do it later; needing to "restart" the application by deleting and reinstalling it, which often resulted in deleting not uploaded yet surveys; or simply due to the whole system stopping to work for days during the data collection because of it being bombarded by too many data inputs at the same time. Overall, participants were facing many problems with the app, which could not be resolved by researchers running the study. This resulted in participants being noticeably less diligent in providing their data, as compared to their data input before they encountered technical issues. The obvious recommendation for a future similar study is to use a different phone application or to use a phone application that only tells participants when to fill out a survey, which then requires them to click on a link leading to the Internet based questionnaire. That way, the need

for remembering to upload already filled out questionnaire would be eliminated. A web page-based survey, however, would require participants to have Internet access, which, although more widely accessible now than ever before, is still not always present. It was noticeable and understandable that students, often being on a fixed budget, were not willing to pay for the use of their cellular data in order to participate in the study, when the wi-fi was not accessible.

The third major limitation of Study 1 comes from the formulation of questions regarding interacting with others, which were used in the phone survey. During the analyses, dummy variables represented a combination of answers to the questions about who participants spent the majority of the time with, whether they talked to someone in person, and whether they used any form of technology to communicate with others during that time. The results obtained for when the use of technology was controlled for, and for when it was not, were similar, and I believe it was a result of an imprecision of the questions asking about technology usage. Specifically, those questions asked whether participants talked on their phones, texted, or emailed since the last time they were asked. It is highly likely that nowadays Canadian students used any of those means of communication during a two-hour period at least once. Hence, these questions would be more useful if they asked whether the majority of the time was spent talking to someone in person vs. communicating through using technology.

The fourth limitation of Study 1 came from not differentiating between different purposes of social interactions. It has been shown that social situation can have different affective results for different people (Diener, Larsen, & Emmons, 1984; Newton, Pladevall-Guyer, Gonzalez, & Smith, 2018). Similarly, social interactions, depending on their purposes, can result in increasing or decreasing momentary positive affect (Csikszentmihalyi & Hunter, 2003). For example, Mueller et al. (2019), found that participants in his EMA study reported feeling happier after

social interactions that had a socially oriented purpose, i.e. people spending recreational time together, compared to social interactions with a task-related purpose, i.e. interacting with others to accomplish a task, usually requiring more focus and self-control. Since participants in Study 1 only indicated whether they talked to someone for a majority of the time since the last time they were asked, their affect after such interactions could have been a result of a conversation with a professor about their failing mark, or it could have resulted from a friendly chat with café barista. Although the Study 1's primary purpose was concerned with situations without social interactions, including questions about the purpose of interactions would allow for better understanding of consequences of all social situations.

Overall, although in Study 1, I replicated findings showing that more social contact is associated with increased positive affective outcomes, the main purpose of the study was not accomplished, since I was unable to extend the encouraging findings of weak-ties interactions to the being alone with others situation.

Study 2

The second study was designed, and its data collection took place, concurrently with the Study 1. The main goals of Study 2 were to test if being in a more social situation would result in higher positive affect than being in a less social one, as well as to test two reasons for a possible amplification of people's positive affect while they were alone with others, i.e. when they were with weak-ties or strangers and did not talk. First, I wanted to assess whether people who were alone with others reported higher positive affect than those being completely alone, and whether this higher PA could be explained by sharing a space with others, regardless of performing the same tasks as them. Secondly, I wanted to test whether people experienced a higher momentary sense of belonging when they were alone with others than when they were

completely alone. In order to accomplish those goals, Study 2 took place in a controlled laboratory environment and participants were randomly assigned to one of three conditions: watching a mood enhancing video: 1) while being alone, 2) together with a confederate, or 3) watching the video while the confederate was in the room but was doing something different. The last two conditions represented the being alone with others situation, since participants and confederates were asked not to speak to each other.

The experimental character of Study 2, which allowed for careful manipulations in laboratory condition, resulted in a greater control of extraneous variables, and being able to supplement Study 1's findings by testing whether simultaneous task performance or simply sharing a space together (nonshared task condition) causes higher positive affect when people are alone with others. Although Study 1 did not support the notion that merely being around others increased positive affect, Study 2 was based on shared task laboratory studies showing that this seems probable (Shteynberg et al., 2014). Additionally, Study 2 was designed to extend the research on the results of simultaneous task performance, i.e. it allowed to test whether simply being together in the same space could lead to an increase in both positive affect and sense of belonging, rather than the necessity of sharing tasks as suggested by others. Finally, by assessing participants' personality traits, Study 2 tested possible differences among introverts and extraverts in experienced momentary positive affect and the sense of belonging resulting from various types of social contact, as well as resulting from performing a task simultaneously with others vs. performing that task alone.

Hypotheses

Momentary positive and negative affects.

Hypothesis one. Participants in all conditions will report an amplification of state positive affect and lower state negative affect, compared to their baseline levels of positive and negative affect, due to the positive affect induction.

Hypothesis two. There will be a significant difference in state positive affect amplification between conditions. Specifically, contrary to the idea of Shteynberg and colleagues (2014) that people's attention needs to be occupied by the same object, I predict that simply being together will make a difference in people's emotions. Hence, I expect that participants in the shared task condition (shared emotional experience) and nonshared task condition will report a similar amplification of momentary positive affect (and lowering of negative affect) after watching the video. I also expect that, compared to the amplification of PA and reduction of NA reported in those two social conditions, the increase in PA and reduction in NA will be lower in the alone condition.

Sense of belonging.

Hypothesis three. Since even minimal cues signaling a sense of belonging, e.g. when interacting with people with whom we share weak-ties, have been shown to increase people's momentary sense of belonging (Sandstrom & Dunn, 2014b), it is possible that a similar effect can be achieved while being around others without talking to them. Hence, I expect that participants in shared and nonshared task conditions will report a similar momentary post-test sense of belonging and that the level of the post-test sense of belonging experienced by participants in those conditions will be higher than that of participants in the alone condition.

Hypothesis four. Increased social contact, i.e. in both shared and nonshared task conditions, will result in stronger feelings of post-test belonging, which will mediate the effects of socializing on a post-test momentary positive affect.

Introversion/extraversion trait and momentary positive affect.

Hypothesis five. Similar to Study 1, since on average extraverts are more prone to experiencing and maintaining higher levels of positive affect levels than introverts (Hemenover, 2003; Larsen & Ketelaar, 1991; Lucas & Baird, 2004; Smillie et al., 2012), I expect that there will be a significant main effect of introversion/extraversion trait, such that in all experimental conditions, more extraverted participants will report higher momentary positive affect and also lower negative affect (since the affect measure used in this study treats PA and NA as inversely proportional to each other), compared to more introverted participants. This also means that a significant main effect of this personality trait will be present before positive affect induction, since more extraverted participants should report, on average, higher PA than less extraverted ones.

Studies have also shown that introverts often act extraverted when needed (Fleeson & Gallagher, 2009), which leads to them experiencing a momentary increase in positive affect, similar to that of extraverts (Fleeson et al., 2002). Since the current study is based on momentary assessments of positive and negative affects, it is expected that more introverted people will experience an increase in their positive affect and a decrease in their negative affect in the social conditions, i.e. in the shared and nonshared task conditions, similar to the increase of PA (and decrease of NA) experienced by more extraverted people. I expect that the smallest increase in positive affect (and decrease in NA) will be reported by both groups in the alone condition (see Figure 8 below).

Furthermore, I predict that there will be a significant interaction between introversion/extraversion trait and the Alone condition. Since introverts report, on average, a stronger preference for less social, or even solitary, situations than extraverts (Argyle & Lu, 1990; Asendorph & Wilpers, 1998; Leary et al., 2003; Lucas et al., 2008; Srivastava et al., 2008), the relationship between Alone experimental condition and the post-test increase in PA and decrease in NA will depend on the level of people's introversion/extraversion trait. I expect that the Alone condition will not be bothersome for anybody, but more extraverted people could potentially find it less ideal than less extraverted ones, since they will be left alone in the room with nobody to share their increasing positive affect. Hence, I suspect that more introverted participants will report larger increase in PA in the Alone condition than more extraverted ones.

Finally, it is important to state that the overall PA and NA reported by more extraverted participants in all conditions will always be higher and lower, respectively, than that reported by less extraverted people, since their initial, or average, levels of PA and NA are different.

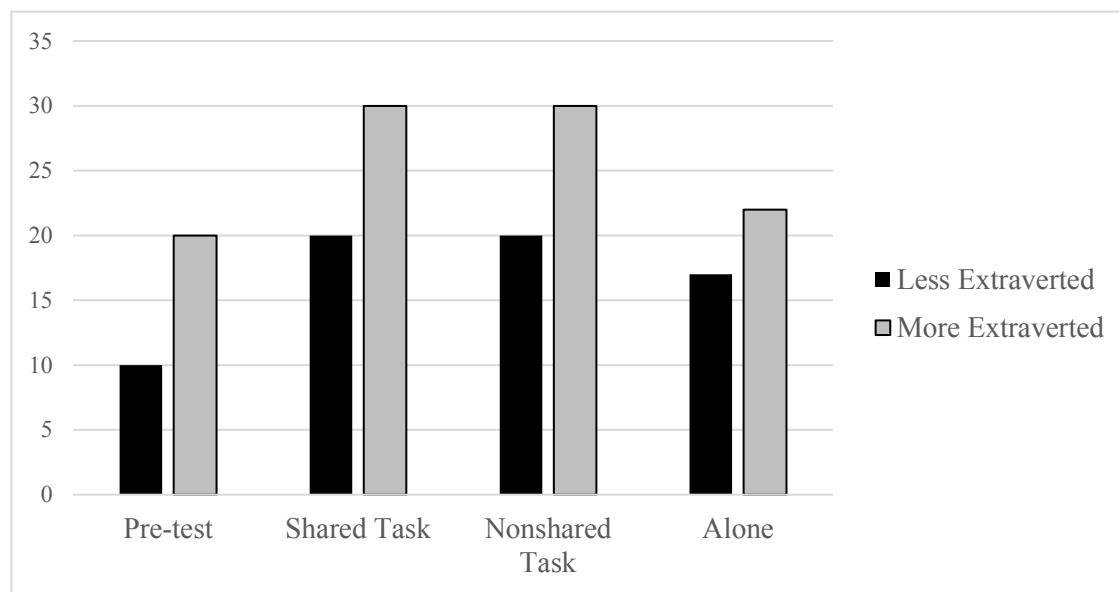


Figure 8. Predicted positive affect in different conditions for less and more extraverted participants in Study 2

Introversion/extraversion trait and a momentary sense of belonging.

Hypothesis six. Since extraversion is associated with a greater sense of belonging (Swickert et al., 2002), it is expected that there will be a main effect of introversion/extraversion trait on momentary sense of belonging for both, pre-and post-test momentary sense of belonging. However, due to scarcity of research in the area of momentary sense of belonging and personality traits, the remaining prediction has a more intuitive character. Since participants will be completely alone in the alone condition, I suspect that momentary sense of belonging of these participants will be lower than the one of participants in the remaining two, more social conditions. Furthermore, more introverted people are known to spend more time alone, yet they still experience the need for social contact and belongingness, as shown by them having fewer, yet closer friends than extraverts. Hence, I expect to find a non-significant interaction between

extraversion/introversion trait and conditions. Overall, extraverts will report more belongingness than introverts during pre- and post-test and across conditions.

Method

Participants. Two hundred sixty-seven participants took part in the current study, which was titled Personality and Aesthetic Assessment of Different Art Forms.⁴ Before the analyses started, data from two of the 267 participants were excluded from analyses based on the comments of the confederate. One of the two participants was using his phone during the majority of the video presentation, and it was not clear whether the positive affect induction was present in this case. The second excluded participant engaged in a neutral responding bias, which involved answering the majority of the questions with the same, middle range answer. The final number of participants in Study 2 was 265.

The participants were recruited to the study using the online sign-up SONA system from among Carleton University's students attending introductory psychology courses. Participants were between 15 and 71 years old ($M = 20.33$, $SD = 5.48$), were predominantly White (51.7% Caucasian, 13.2% Black, 10.6% East Asian, 7.2% "Other", 6.8% Arabic, 6% South Asian, 2.6% Hispanic, and 1.1% Aboriginal) and women (78.9%, 20.4% males, .4% other). Each participant was randomly assigned to one of the three experimental conditions: performing a task alone ($n = 88$), performing nonshared task ($n = 88$), or performing a shared task at the same time ($n = 89$).

⁴ The number of participants has been determined based on a-priori test, which showed that to obtain medium effect size ($d = .50$) and an acceptable minimum statistical power ($1 - \beta = .80$), at a probability level (α) of .05, the total number of participants in each group of the sample should have been at least $n = 65$. Since this study had three conditions ($N = 195$), and since I anticipated that some participants' data would not be usable (e.g., in case they did not give permission to use their data after learning of used deception), I determined the final sample size as approximately 240 participants ($195 + 45$ extra). The total number of participants who took part in the study was 267.

The demographics of participants in each of the conditions were homogenous in terms of age ranges, gender, and ethnicity. For their participation, each student received .5 credits towards their final grade in their introductory psychology class.

Measures.

Demographics questionnaire. Participants were asked to fill out the same demographics questionnaire as participants in Study 1 (see Appendix A).

Positive affect induction. In order to make participants feel a higher level of state positive affect, they were asked to watch a five-minute long video comprised of 50 changing images, with each picture displayed for five seconds and one-second fade between each image. The pleasant and relaxing images of smiling faces and landscapes, among others, came from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008), and instrumental music, which accompanied the images, was *Venus, the Bringer of Peace* by Gustav Holst (Holst, 1987). Participants were instructed to watch the videos, paying attention to the images and music.

The video was chosen due to its positive, yet low arousal valence, since I suspected that, for most people, going out and being alone with others results in experiencing more positive, pleasant emotions, rather than feelings of arousal. Although it is possible that some people experience some arousal due to feeling uncertain when leaving their familiar place and being around others, even if they do not interact with anybody.

The video contained images chosen based on their published valence and arousal ratings (Lang et al., 2008), similarly to the chosen music, which was to provide low arousal in the previous research (Baumgartner, Esslen, & Jäncke, 2006; Jeffries, Smilek, Eich, & Enns, 2008).

The video used in the Study 2 has been previously used in research and was shown to evoke desired effects on emotions (Nealis, van Allen, & Zelenski, 2016).

State positive and negative affects. The state positive and negative affects were assessed by the same measure used in the Study 1, i.e. the Scale of Positive and Negative Emotions (Diener et al., 2009; see Appendix F). The obtained Cronbach alphas for the pre-test momentary PA and NA were .85 and .79, respectively, and .80 (PA) and .77 (NA) for the post-test. These alphas were comparable to those obtained by Diener et al. (2009; $\alpha = .87$ for PA, $\alpha = .81$ for NA).

Momentary sense of belonging. The levels of the momentary sense of belonging were assessed by the same measure used in the Study 1 (i.e., the composite measure based on the solution found in research of Sandstrom and Dunn (2014b); see Appendix G). The obtained Cronbach alphas for the momentary sense of belonging were .82 (pre-test) and .77 (post-test). These alphas were higher than Cronbach's alpha of .63 acquired originally by Sandstrom and Dunn (2014b).

Introversion/extraversion dimension. The levels of introversion and extraversion of the participants were assessed by the same measure used in Study 1 (i.e., the IPIP-NEO-120; Johnson, 2014; see Appendix B). In the current investigation, the obtained Cronbach's alphas for the introversion/extraversion and emotional stability/neuroticism traits were the same ($\alpha = .88$) and were comparable to the ones obtained in the original publication of the scale, i.e. $\alpha = .89$ for introversion/extraversion, and $\alpha = .90$ for neuroticism (Johnson, 2014).

Procedure. Participants were invited one at a time to the Carleton University Happy Lab to participate in the study called Personality Differences in Appreciation of Different Art Forms. Here, they were told that the main purpose of the study was to find out how people with different

personality traits respond to different forms of art, such as paintings, music, and film. The study took place in one of the rooms of the lab, where there were two tables prepared, with one monitor and a keyboard on one table and a book with pictures of paintings, titled *The Metropolitan Museum of Art* by Howard Hibbard (1984), on the other one. There were two sets of chairs positioned on the same side of each of the tables.

Upon their arrival at the lab, each participant was randomly assigned to one of the conditions of the study. In the shared and nonshared task conditions, a confederate was waiting outside the lab for a participant and told the participant that she came early and was instructed to knock at the door when the other participant arrived, so that they could enter the lab together. The confederate was instructed to be stoic and silent throughout the experiment. There was a 15 minutes break between each time the study was ran. The break was needed in order for participants leaving the lab to avoid meeting new ones, as well as to reinforce the cover story of the confederates as participants, in case a participant came to the lab early. In cases of very eager participants, who came to the lab much earlier than their designated time slot, they were told that the other participant (i.e., the confederate) was also much earlier and was waiting in another room in the lab already.

Participants in all conditions were given the informed consent form to read and they were asked to sign it if they decided they wanted to participate in the experiment. Participants (and confederates) were then told that they could not talk to each other during the study and that they were required to complete two tasks each during the 30-minute study. Regardless of the condition to which participants were assigned in the study, they were always asked to sit in front of the computer. In the shared task condition, the confederate was instructed to sit next to a participant, and they both were sitting at the same computer. In the nonshared task condition, the

confederate was instructed to sit at a different table, in front of the book with pictures of paintings. In the alone condition, participants were alone in the room and were sitting in front of the computer. In all conditions, participants were told that they would start the study by completing the video task first and that there will be a switch in the second part of the study to them viewing a book with paintings. If participants were in a shared task condition, they were told that they, and the confederate, would watch the video and then they would both go to a different table where they both would rate the paintings in the book. If they were in the nonshared task condition, participants were told they would switch the tasks with the other participant, i.e. they would rate the paintings as a second task and that the other participant (i.e. the confederate) would then watch the video. Participants in the alone condition were always told that they needed to start from the video task and then move to the paintings rating task.

Before the video was initiated, participants in all conditions were asked to fill out the demographics questionnaire, the questionnaire assessing their personality traits, as well as the pre-experimental measures of their positive affect, negative affect, and their sense of belonging. The questionnaires were printed in a 10-point Times New Roman font, making them more difficult to read from the further distance, preventing the participants from seeing the confederate's responses. The confederates were instructed to respond to all questions using the midpoint of the scale with a small mark. After the last page of the pre-experimental sense of belonging questionnaires, participants saw a sheet instructing them to stop there. After that, the experimenter, who was monitoring the progress of the study from the other room, through a one-way mirror, came to the room and initiated the video for both the participant and the confederate (shared task), or for a participant only (alone condition). In the nonshared task condition, the experimenter asked participants to put on the headphones before watching the video, hence, only

the participant heard the video sounds. Wearing the headphones further isolated the participant from the confederate, reinforcing the nonshared task condition. When the video started, the confederate was asked to start looking through the book of paintings. Both participant and confederate were reminded to pay attention to the content and not to talk to each other. After five minutes, when the experimenter saw that the video ended, she came back to the room and asked the confederate to stop looking through the book (the nonshared task condition) and to fill out the rest of the questionnaires. The post-experimental questionnaires asked participants about their momentary positive and negative affects and their momentary sense of belonging. When participants reached the end of the questionnaire package, the experimenter came back to the room and announced that at that point the study was over and there was not another task to complete. The experimenter then debriefed participants by explaining the true purpose of the study, ask them for permission to use their data, and assigned them their class credit.

Data Analysis

Data cleaning. The data was cleaned during entry into the SPSS program. There were not many missing values and they all had a missing at random characteristic. The analyses started by obtaining descriptive statistics and calculating the bivariate correlations for the entire sample, as well as for each condition separately. During the pre- and post-test tests, the normality and homoskedasticity of variances were assessed and deemed satisfactory. The analyses were run with and without the exclusion of potential outliers, and since the obtained results were similar, i.e. no directional or significance changes in coefficients, it was determined to keep all of the participants in the final analysis.

Mixed ANOVA. The analyses involved performing two-way mixed ANOVA tests for PA, NA, and sense of belonging. Each of these 2 x 3 ANOVA analyses included one within-

subject factor called *time* with two levels (pre-test and post-test), one between-subject factor called *condition* with three levels, representing each of the experimental condition (shared task, nonshared task, alone), and one of the three dependent variables. Assessing the statistical significance of the interaction term (*time*condition*) in each of these analyses provided an answer to whether the pattern of differences between different dependent variables' scores for participants in different conditions were different at pre- vs. post-test times.

Moderation. Multiple hierarchical regression analyses were performed in order to assess whether trait introversion/extraversion moderated the relationship between experimental conditions and dependent variables, i.e. the post-test PA, post-test NA, post-test sense of belonging.

Since the SPSS program does not provide simultaneous conclusions about multicategorical predictors, dummy variables representing two out of three experimental situations, and the group-centered measure of introversion/extraversion trait, were entered in Step 1, while interaction terms between experimental situation and that personality trait were both entered in Step 2. Using this hierarchical regression analysis allowed to check if adding the product terms explained additional variance in output variables. This, together with examining significance of those product tests, was equivalent to finding out whether introversion/extraversion trait moderated relationship between experimental conditions and post-test outcome variables. The tested regression model had a form:

$$Y_i \text{ (DV)} = \beta_0 + \beta_1 (\text{SharedTask})_{i1} + \beta_2 (\text{NonsharedTask})_{i2} + \beta_3 (\text{Introversion/extraversion})_{i3} + \beta_4 (\text{SharedTask})_{i1} (\text{Introversion/extraversion})_{i3} + \beta_5 (\text{NonsharedTask})_{i2} (\text{Introversion/extraversion})_{i3} + \epsilon_i,$$

where Y_i denoted a measure of one of dependent variables; the $(Introversion/extraversion)_3$ denoted a mean-centered participants' scores on trait introversion/extraversion; the $(SharedTask)_{i1} = 1$ if participant i was in the shared task condition; the $(NonsharedTask)_{i3} = 1$ if participant i was in the nonshared task condition. The alone condition was the reference group, hence if a participant was in an alone condition, the intercept (β_0) represented that person's score on the PA. The terms $(SharedTask)_{i1} * (Introversion/extraversion)_{i3}$ and $(NonsharedTask)_{i2} * (Introversion/extraversion)_{i3}$ denoted interaction terms. The estimated regression functions for people in each condition were as follows:

- the Alone condition: $\hat{y} = \beta_0 + \beta_3 (Introversion/extraversion)_{i3}$,
- the Shared Task condition: $\hat{y} = (\beta_0 + \beta_1) + (\beta_3 + \beta_4) (Introversion/extraversion)_{i3}$;
- the Nonshared Task condition: $\hat{y} = (\beta_0 + \beta_2) + (\beta_3 + \beta_5) (Introversion/extraversion)_{i3}$.

Results

Descriptive statistics and bivariate correlations. The pre- and post-tests' PA and sense of belonging had normally distributed scores; however, the pre- and post-test scores of NA were positively skewed, indicating that more participants have chosen lower scores of NA. This distribution was expected and understandable, since in everyday situations people do not experience strong negative feelings (pre-test NA), and because the study was designed to elicit positive feelings (post-test NA). The means of all dependent variables, for each of the three experimental conditions, as well as the overall means of those variables, can be found in Table 7. The means of the remaining measures used in the current study showed that the average level of reported introversion/extraversion trait was 3.17 ($SD = .57$, $Range = 1.13 - 4.67$) and the level of emotional stability/neuroticism was 3.01 units ($SD = .60$, $Range = 1.54 - 4.54$) on the 5-unit scale.

Table 7.

Means of Pre- and Post-test Momentary Positive and Negative Affects and Momentary Sense of Belonging Overall and in Each Condition in Study 2

Measure	Condition	Mean	Standard Deviation	N
PRE-TEST				
Positive Affect	Overall	3.22	.87	264
Negative Affect	Overall	1.48	.62	265
Belonging	Overall	3.96	1.23	265
Positive Affect				
	Shared Task	3.33	.78	89
	Nonshared Task	3.10	.91	87
	Alone	3.24	.90	88
Negative Affect				
	Shared Task	1.46	.61	89
	Nonshared Task	1.46	.54	88
	Alone	1.51	.72	88
Belonging				
	Shared Task	4.15	1.21	89
	Nonshared Task	3.82	1.13	88
	Alone	3.90	1.33	88
POST-TEST				
Positive Affect	Overall	3.39	.90	263
Negative Affect	Overall	1.30	.46	265
Belonging	Overall	4.27	1.10	264
Positive Affect				
	Shared Task	3.46	.94	89
	Nonshared Task	3.27	.84	87
	Alone	3.43	.93	87
Negative Affect				
	Shared Task	1.27	.39	89
	Nonshared Task	1.31	.44	88
	Alone	1.30	.54	88
Belonging				
	Shared Task	4.49	1.07	89
	Nonshared Task	4.07	1.03	88
	Alone	4.26	1.17	87

Note 1: Belonging = Sense of Belonging

The overall bivariate correlations between all dependent variables and personality traits of introversion/extraversion and emotional stability/neuroticism showed expected trends (see

Table 8). The bivariate correlations between all of the abovementioned variables were also assessed for each of the experimental conditions and are presented in Appendix L.

Table 8.

Overall Correlations of Pre- and Post-test Momentary Positive Affect, Negative Affect, Sense of Belonging, and Introversion/Extraversion and Emotional Stability/Neuroticism Traits in Study 2

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1.Extraversion	-							
2.Neuroticism	-.45**	-						
3.Pre-PA	.33**	-.34**	-					
4.Pre-NA	-.20**	.39**	-.50**	-				
5.Pre-Belong	.51**	-.44*	.44**	-.38**	-			
6.Post-PA	.29**	-.22**	.73**	-.36**	.38**	-		
7.Post-NA	-.07	.16*	-.25**	.60**	-.24**	-.44**	-	
8.Post-Belong	.49**	-.35**	.45**	-.37**	.86**	.47**	-.30**	-

Note 1: * $p < .05$; ** $p < .01$.

Note 2: Pre = Pre-test; Post = Post-test; PA = Positive Affect; NA = Negative Affect; Belong = Sense of Belonging

Hypothesis one. In this hypothesis, I predicted that, due to the positive affect induction introduced in the Study 2, participants in all conditions would report higher PA and lower NA, as compared to their baseline pre-test levels of those affects. The analyses of mixed ANOVA with repeated measures for the positive and negative affects indicated that there was a main effect of *time* ($F(1, 260) = 17.33, p < .001, \eta^2 = .06$ for positive affect; $F(1, 262) = 34.66, p < .001, \eta^2 = .12$ for negative affect). These findings meant that, the Hypothesis 1 was supported because, averaging over all of the experimental conditions, positive affect significantly increased, while negative affect decreased, between the pre- and the post-test (see Figure 9 below).

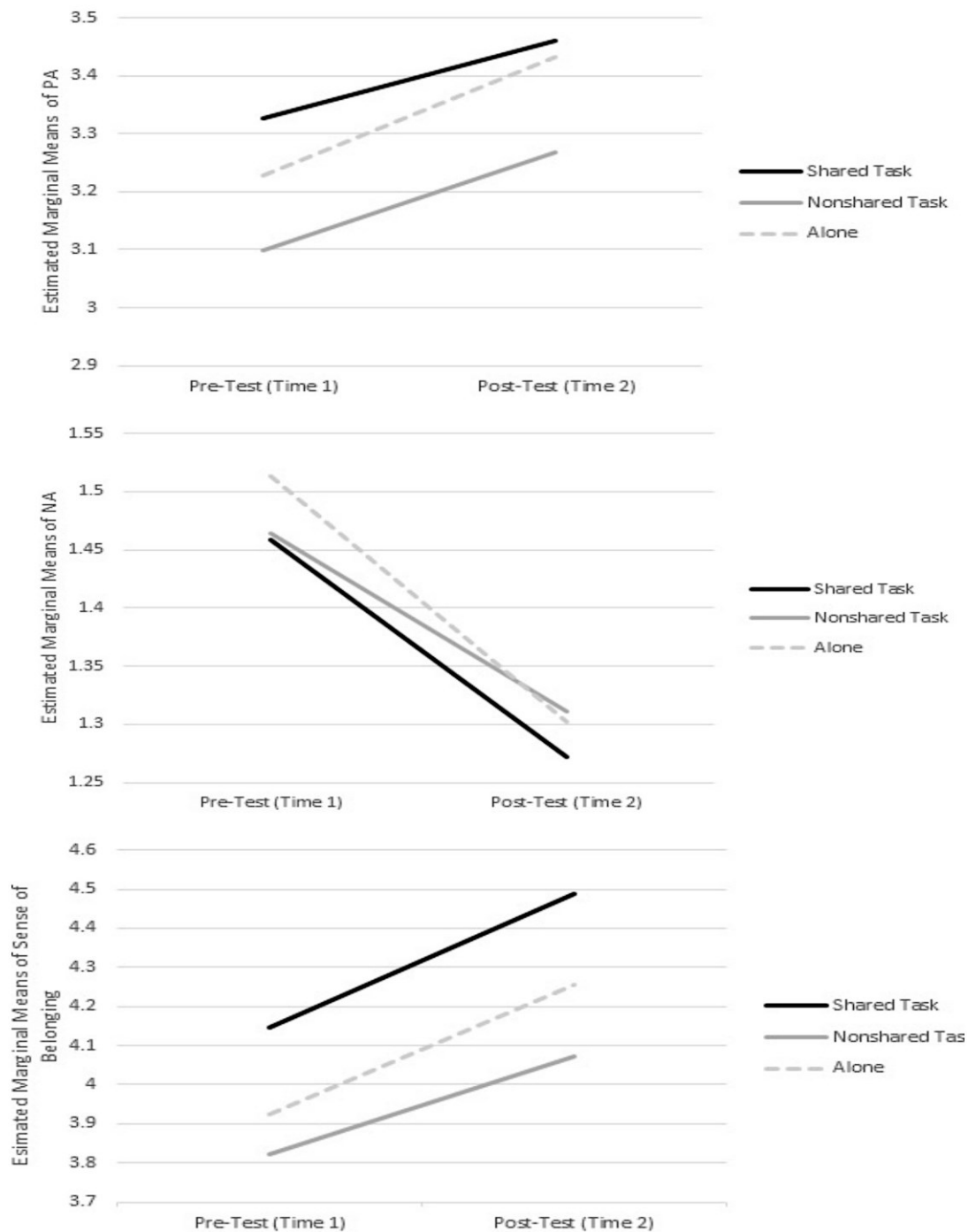


Figure 9. Graphs showing lack of statistically significant *time x condition* interactions for positive affect, negative affect, and sense of belonging in Study 2

Hypothesis two. I predicted that there would be a significant difference in state positive affect amplification between conditions; specifically, that participants in the shared and nonshared task conditions would report a similar amplification of momentary positive affect (and reduction of negative affect), compared to participants being alone. The analysis showed that interactions between *time* and *condition* for PA and NA were not statistically significant ($F(2, 260) = .25, p = .78, \eta^2 = .002$ for PA; $F(2, 262) = .30, p = .74, \eta^2 = .002$ for NA), indicating that the pre- and post-test ratings of PA and NA did not significantly differ between people being in different experimental groups. The simple main effects of *condition* for PA ($F(2, 260) = 1.52, p = .22, \eta^2 = .01$) and NA ($F(2, 262) = .17, p = .84, \eta^2 = .01$) were also not significant. Therefore, the Hypothesis 2 was supported only partially, because participants in shared and nonshared task conditions reported similar PA and NA in pre- and post-testing. However, participants in those conditions did not report significantly higher PA and significantly lower NA than participants in the alone condition (see Figure 9 above).

Hypothesis three. In this hypothesis, I predicted that participants in the shared and nonshared task conditions would report similar post-test momentary sense of belonging, which depicts an amplification of the sense of belonging from pre- to post-test measurements. I also predicted that this similar post-test sense of belonging in the social conditions would be higher than that in the alone condition. The analyses showed that interaction between *time* and *condition* for sense of belonging was not statistically significant ($F(2, 261) = .55, p = .58, \eta^2 = .004$), indicating that the pre- and post-test ratings of sense of belonging did not significantly differ between participants being in different experimental conditions. Also, although there was a significant simple main effect of *time* for sense of belonging ($F(1, 261) = 61.78, p < .001, \eta^2 = .19$), showing that across conditions participants reported higher sense of belonging after the

positive affect induction than before it, the main effect of *condition* was not significant ($F(2, 261) = 2.48, p = .09, \eta^2 = .02$), indicating that across the whole time of the study, there were no overall differences in sense of belonging between people in different experimental conditions. Based on these results, it is then evident that the Hypothesis 3 was supported only partially, because participants in shared and nonshared task conditions, i.e. when being alone with others, reported similar sense of belonging in pre- and post-testing. However, sense of belonging in those conditions was not significantly higher than that reported in the alone condition (see Figure 9).

Hypothesis four. I predicted that increased social contact, i.e. in both shared and nonshared task conditions, would result in stronger feelings of post-test belonging, which would then mediate the effects of socializing on a post-test momentary positive affect. This hypothesis was not supported, since the increased social contact (being in the shared or nonshared task conditions) did not result in higher post-test sense of belonging than having less social contact, i.e. being in alone condition (see Results of Hypothesis 3).

Hypothesis five. The first prediction of this hypothesis stated that more extraverted participants would report higher momentary PA and lower NA in all conditions before positive affect induction and also after it, since extraverts, on average, report higher positive affect than introverts. The two regression analyses for the pre-test PA and pre-test NA (with the alone condition as a comparison condition) showed that there were significant main effects of introversion/extraversion trait on pre-test PA and NA. Every 1 SD increase in introversion/extraversion trait level, i.e. being more extraverted, was associated with .49 units higher pre-test PA ($SE = .09, t(253) = 5.49, p < .001$) and with .21 units lower momentary pre-test NA ($SE = .07, t(254) = -3.18, p = .002$). Furthermore, due to randomly assigning

participants to experimental conditions, there was no reason to assume that there were any differences in pre-test PA and pre-test NA between more introverted and more extraverted people based on a condition to which they were assigned, as supported by not significant interaction terms between trait introversion/extraversion and conditions for both, pre-test positive and negative affects. Overall, these analyses indicated that before experimental manipulation, more extraverted participants reported higher levels of momentary PA and lower levels of momentary NA in all conditions, as compared to more introverted participants. Further analyses also depicted that there were simple main effects of trait introversion/extraversion for post-test PA but not for post-test NA. Across conditions, every 1 SD increase in that trait, i.e. being more extraverted, was associated with .44 units higher post-test PA ($SE = .10$, $t(253) = 4.65$, $p < .001$), and with only .05 units lower momentary post-test NA ($SE = .05$, $t(254) = -1.03$, $p = .31$). For the post-test PA, the interactions between introversion/extraversion trait and both, shared task condition ($\beta_4 = -.23$, $SE = .23$, $t(251) = -1.01$, $p = .31$) and nonshared task conditions ($\beta_5 = -.37$, $SE = .25$, $t(251) = -1.51$, $p = .13$) were not significant. For the post-test NA, only the interaction term between introversion/extraversion trait and shared task condition was marginally significant ($\beta_4 = .23$, $SE = .12$, $t(251) = 1.98$, $p = .049$), while interaction term for nonshared task condition was not significant ($\beta_5 = .11$, $SE = .13$, $t(251) = .90$, $p = .37$). Hence, the post-test findings showed that more extraverted participants reported higher post-test PA across conditions than less extraverted people. Compared to the alone condition, the relationship between conditions and post-test PA did not vary depending on trait introversion/extraversion levels. On the other hand, more extraverted participants did not report significantly lower post-test NA across conditions than less extraverted ones. Compared to the alone condition, more introverted participants being in the shared task condition reported marginally less post-test NA

than they did in alone condition, while more extraverted participants in the shared task condition reported significantly more NA than they did in alone condition (see Figure 10 below). The prediction that more extraverted participants would experience higher post-test PA in all conditions was supported, but the prediction that extraverts would experience lower post-test NA than introverts in all conditions was not.

Taken together, the first prediction of Hypothesis 5, that more extraverted participants would report higher PA and lower NA than less extraverted ones in all conditions was supported for pre- and post-test PA and for the pre-test NA only, even if there was not much difference in PA or NA between different conditions.

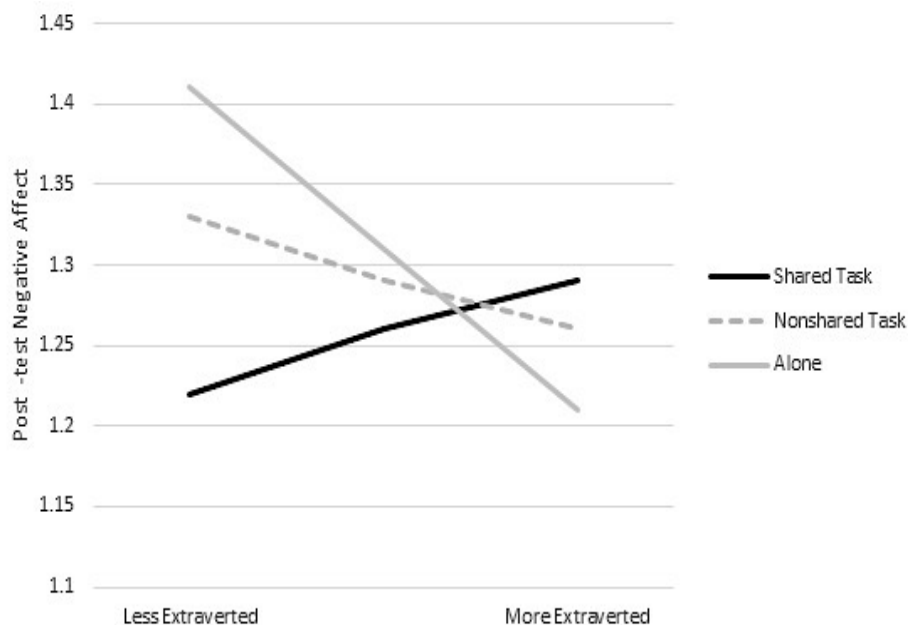


Figure 10. Simple slopes for post-test negative affect of more and less extraverted people being in different experimental conditions in Study 2

In Hypothesis 5, I also predicted that more introverted people would experience an increase in their positive affect and a decrease in their negative affect in the social conditions, i.e. in the shared and nonshared task conditions, similar to the increase in PA and decrease in NA experienced by more extraverted people (*Prediction 2*). I further expected that the smallest increase in positive affect (i.e., lower PA) and decrease in negative affect (higher NA) would be reported by both, more introverted and more extraverted participants, in the alone condition, i.e. there would be a significant interaction between alone condition and introversion/extraversion trait (*Prediction 3*).

Since Study 2 was based on random assignment and since no differences were found between condition for pre-test PA and NA, the increase in PA and decrease in NA were equivalent to post-test PA and NA, respectively. The regression analysis discussed above for the post-test PA showed that the *Prediction 2* of the Hypothesis 5 was partially supported for post-test PA, because even though extraverts reported higher post-test PA in all conditions than introverts, there was no difference in the increase in PA between different conditions for either introverts or extraverts. Although reported PA in the social conditions was similar among introverts and extraverts, that post-test PA was not smaller in the alone condition, which indicated that *Prediction 3* was not supported for PA.

The analyses for post-test NA resulted with both main effects not being significant, but compared to the alone condition, the relationship between shared task condition and post-test NA depended marginally on introversion/extraversion trait level. Hence, *Prediction 2* and *Prediction 3* were not supported for the post-test NA because, for both introverts and extraverts, the social conditions were not characterized by a similar post-test NA, and that post-test NA was not lower than the post-test NA in the alone condition. Taken together, the mixed results obtained from

analyses of the three predictions of Hypothesis 5 indicated that this hypothesis was supported only partially.

Hypothesis six. In this hypothesis I predicted that more extraverted participants would report a significantly higher pre- and post-test sense of belonging in all conditions, compared to more introverted participants and that there would not be significant interaction terms between any of the conditions and introversion/extraversion trait. The regression analyses for the pre-test and post-test sense of belonging indicated that the main effect of the introversion/extraversion trait was significant; hence, when averaging across all conditions, 1 SD increase in introversion/extraverted trait, i.e. being more extraverted, was associated with 1.08 units higher pre-test sense of belonging ($SE = .12$, $t(254) = 9.33$, $p < .001$) and .93 unit higher post-test sense of belonging ($SE = .10$, $t(253) = 8.94$, $p < .001$). Contrary to my expectations, the post-test findings were further qualified by one of the interaction terms between conditions and introversion/extraversion trait reaching significance. Specifically, the interaction term for the nonshared task condition ($\beta_5 = -.60$, $SE = .27$, $t(250) = -2.27$, $p = .02$, 95% CI [-1.13; -.08]) and the simple slopes (see Figure 11 below) indicated that, more introverted participants reported higher sense of belonging in the nonshared task condition than in the alone condition. On the other hand, more extraverted participants reported lower sense of belonging in the nonshared task condition than they did in the alone condition. However, these differences between less and more extraverted people did not change the overall conclusion that extraverts reported higher sense of belonging in all conditions. Overall then, Hypothesis 6 was partially supported, because

its main prediction was correct, while the prediction about non-significant interaction terms was not.⁵

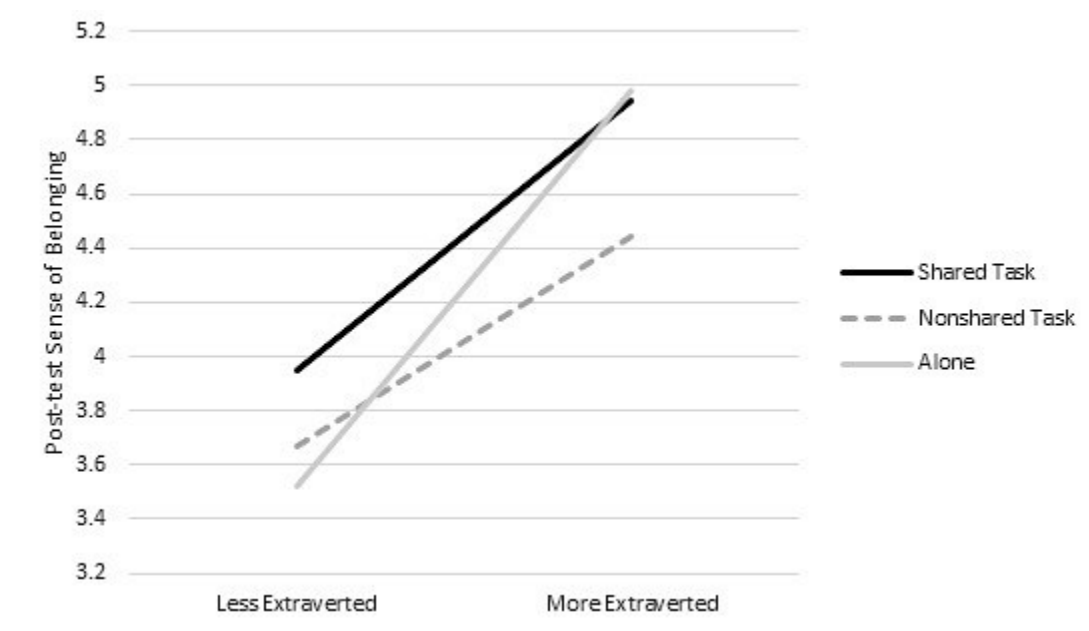


Figure 11. Simple slopes for post-test sense of belonging of more and less extraverted people being in different experimental conditions in Study 2

Discussion

The main purpose of Study 2 was to assess whether being alone with others was associated with higher momentary positive affect than being completely alone. The secondary purpose of this study was to test two possible explanations for such possible amplification of state positive affect. Specifically, I wanted to know: a) whether being alone with others

⁵ Additional analyses have been conducted for emotional stability/neuroticism trait and they are presented in Appendix M.

increased people's momentary sense of belonging, which then resulted in people experiencing higher PA; or b) whether simply being around people and sharing the same physical space with them, regardless of talking to them or performing the same task as them, could be responsible for such PA amplification. The results indicated that being alone with others did not produce higher momentary positive affect than being completely alone. Furthermore, being alone with others, whether performing the same task as them or not, did not lead to a different momentary sense of belonging, or positive and negative affects, than being completely alone. Although the results of Study 2 did not provide support for any of the above ideas, those results address the existing research in the area of affective outcomes of a simultaneous task performance.

The results of Study 2 indicated that the video used to enhance participants' state PA and reduce their state NA worked as intended since participants in all three conditions, i.e. the alone, shared task, and nonshared task conditions, reported higher post-test PA and lower post-test NA, compared to those variables' pre-test values. Although I did not find differences in post-test momentary PA or NA between the alone and either the shared or nonshared task conditions, the value of this study lies in it being a close replication of one of the Shteynberg et al. (2014) investigations. By including the alone and shared task conditions, as seen in the original study, and finding that there were no differences in reported PA between participants in those conditions, I showed that the conceptual replication of that study did not work. Specifically, completing a task together with someone and having one's attention occupied by the same, emotion-enhancing entity, which occupied the other person's attention, did not lead to higher amplification of experienced emotions than amplification resulting from completing that task alone. Additionally, by adding the nonshared task condition in Study 2, in which a participant watched the PA enhancing video in a presence of a confederate who was occupied by another

task, I was able to extend the existing research. The results indicated that it did not matter in terms of reported amplified PA, whether participants completed different tasks while sharing a physical space together, or whether their attention was simultaneously occupied by the same task.

The above findings were inconsistent with the claims of the shared attention theory as an explanation of affective amplification resulting from simultaneous task performance. However, in order to make a definite claim regarding usefulness of the share attention theory, more research is needed. Shteynberg (2015) claimed that all shared tasks, not only the ones resulting in affective outcomes, could be explained by participants concentrating their attention on the same entity. Although Shteynberg and collaborators (2014) found that, compared to people completing a task alone in a room, people performing the same tasks at the same time as others reported an amplification of PA or NA (depending on the pictures' content), those results became marginally significant only after the authors controlled for the participants' gender and their baseline arousal and mood. Since my conceptual replication of that study, even after controlling for gender and pre-test measures, resulted in statistically non-significant findings, it is likely that performing a mood effecting task together does not result in an amplification of emotions over and above those experienced when performing that task alone. Since Shteynberg (2015) used the shared task theory to explain the affect amplification results of his study, among other shared task studies' outcomes, it is possible that his theory is erroneous, in that it explains something which does not exist, or exists in limited contexts. For example, in recent studies, Boothby, Smith, Clark, and Bargh (2017) showed that participants liked images presented on a screen more when they viewed them with someone they knew, compared to participants who viewed images with unknown co-experiencer, or who viewed the images alone. Also,

participants viewing those images with someone they did not know rated them less favourably than participants viewing them alone. These findings could mean that Shteynberg's (2015) theory explains affect amplification, which happens among familiar others, but which is absent or reversed when people are among unknown others. In order to reach more definite conclusions, more research is needed. First, it would be vital to check whether performing the same task simultaneously with another person leads to similar outcomes, i.e. better cognitive abilities (Desender et al., 2016, Eskenazi et al., 2013; Shteynberg, 2010) or stronger sensory sensations (Boothby et al., 2014), and whether those results are different depending on the familiarity levels of co-experiencers. Second, only after consistently obtaining such results, we could start assessing whether the shared attention theory can actually explain those findings.

In Study 2, I also addressed the existing research in the area of simultaneous task performance and its effects on people's mood, by testing whether the obtained affective results could be explained by the amplified momentary sense of belonging. In accordance with existing research, which found that even minimal cues signaling belongingness increase people's momentary sense of belonging (Leary & Baumeister, 2000), i.e. similar to results of weak-ties interactions (Sandstrom & Dunn, 2014a), the results of Study 2 showed that participants in all conditions reported a higher sense of belonging at the end of the study compared to when they first arrived. However, there were no significant differences between post-test sense of belonging between different conditions. These findings, combined with knowing that all participants, regardless of the condition they were in, felt more positive and less negative affect, could indicate that the positivity created by the experiment resulted in all participants also feeling more sense of belonging. On the other hand, the enhanced sense of belonging could have also resulted from the repeated contact with the experimenter delivering study's directions.

Regardless of the reason for the lack of differences in belongingness between conditions, these results further showed that momentary sense of belonging appeared not to mediate the effects of socializing on the post-test positive affect, since increased social contact, i.e. being in shared and nonshared task conditions, did not result in a higher post-test sense of belonging than having less social contact (being in the alone condition). However, it is important to remember, that there were also no differences in positive affect between conditions. This meant that the test of momentary sense of belonging as a mediator was not a strong one, since there was no effect which was supposed to be mediated.

Finally, Study 2's analyses also included personality traits. Although the findings of Study 2 indicated that there were no overall differences in affect or belongingness between participants in different conditions, I assessed whether these findings were similar for less and more extraverted participants. The analyses supported existing research, which showed that, on average, extraverts are more prone to experiencing and maintaining higher levels of positive affect levels than introverts (Hemenover, 2003; Larsen & Ketelaar, 1991; Lucas & Baird, 2004; Smillie et al., 2012). Hence, in all experimental conditions of Study 2, more extraverted participants reported higher pre- and post-test momentary positive affect, compared to more introverted participants. However, contrary to my prediction, extraverts did not report significantly lower post-test NA than introverts across conditions. These findings supported research showing that extraversion is more closely associated with PA than with NA (Diener, Oishi, & Lucas, 2003; Lucas & Fujita, 2000), and they were exemplified by the current study's lack of strong negative correlations between the SPANE's scales of NA and PA.

The results also indicated that the last of my predictions was not correct because there was no significant interaction between introversion/extraversion trait and the alone condition.

Contrary to my expectations and existing research showing that, on average, introverts spend more time in less social situations than extraverts (Argyle & Lu, 1990; Asendorph & Wilpers, 1998; Leary et al., 2003; Lucas et al., 2008; Srivastava et al., 2008), introverts in Study 2 did not report higher post-test PA in the alone condition than more extraverted participants. This finding, taken together with a significant interaction term between the shared task condition and introversion/extraversion trait, showing that, compared to the alone condition, extraverts reported significantly more post-test NA in the shared task condition, while more introverted people reported less post-test NA in that condition, was quite unexpected. It is possible that more introverted participants felt better, and more extraverted participants felt worse, in the shared task condition, compared to their momentary affect in the alone condition, because they were asked not to speak to a confederate in what would normally be considered a social condition. Being around another person who undergoes the same research procedure could have been more reassuring for more introverted participants, as they did not feel pressure to communicate to anybody, but they could gather behavioural clues from another person being in the same strange, new environment. On the other hand, being more extraverted and being prevented from talking and asking questions, i.e. being prevented from the natural way of gathering information in order to reassure oneself of proper behaviour, could have been more distressing than being alone.

Finally, Study 2 provided information regarding the differences between less and more extraverted participants in their reported momentary sense of belonging in different experimental conditions. It is known that more extraverted people report, on average, a greater sense of belonging (Swickert et al., 2002). Also, Sandstrom and Dunn (2014b) reported that weak-tie interactions had a stronger impact on momentary sense of belonging of more introverted people than on extraverted ones, but also that more extraverted people reported higher momentary sense

of belonging than introverts. Overall, momentary differences in sense of belonging between people with different levels of different personality traits have not been extensively studied.

Thus, my predictions about the differences in momentary sense of belonging between less and more extraverted participants had more intuitive and exploratory character.

As expected, more extraverted participants reported a significantly higher pre- and post-test momentary sense of belonging in all conditions, compared to more introverted participants, which supported existing research (Swickert et al., 2002). Furthermore, compared to the alone condition, more introverted participants reported higher sense of belonging in the nonshared task condition, while more extraverted participants reported lower sense of belonging in that condition. It is possible that this difference is a result of extraverts being more people oriented and relying more on socially connecting with others than introverts (Breil et al., 2019; Eaton & Funder, 2003; Fleeson & Gallagher, 2009; Sherman, Rauthmann, Brown, Serfass, & Jones, 2015). Extraverts then felt less momentary belongingness in the nonshared task condition than in the alone condition, because they could have felt left out in a room with another person, who was doing something completely different and ignoring them. On the other hand, the nonshared task condition did not have such an impact on introverts belongingness because they do not rely as much on socially connecting with strangers (Mehl et al., 2006) or being socially accepted. Hence, just being in a room with another person could make them feel more sense of belonging than being completely alone. Based on the above findings, and contrary to my predictions, both introverts and extraverts did not report similar post-test sense of belonging in specific conditions.

Limitations of Study 2 and Recommendations.

As the second study of this dissertation showed, simply working side-by-side someone, even when doing the same thing, was not a sufficient condition to feel better or less lonely in the

student sample. One possible explanation for these findings stems from the reduced generalizability of the Study 2's findings, resulting from participants being primarily young students, who were put in situations that were unusual for them. Being told not to talk to anybody in the room, being prevented from communicating with others via technological means, and being placed in a new, uncertain situation of laboratory experiment, could have made participants in all conditions uncomfortable or anxious. These negative feelings could have then cancelled out any subtle affective and belongingness differences resulting from being in a specific condition. It is important to add that, although the NA reported in each of the conditions were relatively low and similar, the positive affect and sense of belonging differences between those conditions were expected to be small, since in a conceptually similar study, Shteynberg et al. (2014) obtained only marginally significant affective differences between conditions.

It is possible that if participants spent more than the average 30 minutes in the lab, more pronounced differences would have emerged between conditions. Based on the previous research which showed that even a quick exchange of words with not well-known people had a noticeable impact on people's affect (e.g., Sandstrom & Dunn, 2014b), the 30 minutes seemed like a reasonable length of time for this study. It is, however, also feasible that the effects of being around others when not talking to them could have required spending a longer time together to manifest themselves. Similarly to Oldenburg's (1999) idea of the third places, which allow people to satisfy their need to belong through repeatedly visiting the same pub or bar, it is possible that frequenting the same café or library, getting used to the surroundings, people, and the workings of such places, leads to a better affective outcomes and increased belongingness. Obviously, it is not possible to replicate such circumstances in a laboratory setting, but it would be useful to extend the time participants spent together with others.

The already limited 30 minutes of the study was further impacted by the considerable amount of time spent by researchers delivering directions for consecutive tasks that participants were asked to complete. These constant disruptions and contact with a researcher made even the alone condition more social than intended. The use of a researcher, instead of the computer, for delivering of the instructions was a conscious decision, and it was made to prevent participants from becoming totally absorbed in their own tasks within their own screens, while ignoring the world around them. It would have been beneficial, however, if the study's instructions, and not only the video, were shown on the shared computer screen, limiting the contact with a researcher.

Finally, although the study took place in the lab, not all aspects of it were controllable. Specifically, during the time of Study 2's data collection, two other studies were taking place in the laboratory. The occasional conversations being heard outside of the study's door increased realism of the alone with others conditions, but they could have prevented participants in the alone condition from truly believing they were alone and not connected to the bustling student community.

Overall, in Study 2, I was unable to show that being alone with others was associated with higher momentary positive affect than being alone. Consequently, I was also unable to demonstrate correctness of the two explanations for amplification of PA when being alone with others, i.e. the increase in momentary sense of belonging and sharing a physical space together. However, through Study 2, I was able to address the simultaneous task performance studies and show that performing the same task as others was not associated with stronger affective outcomes (i.e., a failure to replicate past work).

General Discussion

Being socially connected is beneficial for humans in terms of their overall physical and psychological health (Diener & Seligman, 2002; Hawkley et al., 2006; Heine et al., 2002; Uchino et al., 1996). Although it could be difficult to immediately improve our overall well-being, especially if we do not have close family or friends, but there are things we can do to improve how we feel in the moment. For example, we can boost our momentary positive affect and sense of belonging by having a small chat with a coffee barista (Sandstrom & Dunn, 2014b) or we can talk to other passengers during our morning commute (Epley & Schroeder, 2014). Yet, there are many people for whom even such small chats are difficult to initiate, sometimes because they do not want to disturb others, and mistakenly assume that such chats would not be welcomed by anybody (Epley & Schroeder, 2014). Knowing that for most people it is instrumental to have at least some form of social contact, the purpose of this research project was to assess whether the benefits of being around others could be achieved in more suitable ways for people who are less socially inclined, shy, more introverted, or simply too annoyed to talk to random people on a particular day.

Study 1 was designed to test weak-ties situations, which have been shown to have a positive influence on momentary well-being (Sandstrom & Dunn, 2014b), but with further reduced social contact. In particular, I wanted to find out if any positive outcomes would have resulted from simply being around strangers, or not well-known people, even if people did not talk to them (i.e., being alone with others), as compared to being completely alone. The concurrently occurring Study 2 was designed to test whether being alone with others would lead to better affective and belongingness outcomes than being completely alone in the laboratory setting. Additionally, Study 2 tested two possible explanations of achieving positive effects from

being alone with others: the higher sense of belonging that might result from being around people, and the idea that sharing a physical space with others is a sufficient condition for experiencing a better mood. Furthermore, tests of the effects of simply being together, without the necessity of performing the same task as others, were also simultaneously addressing: a) the findings of previous research showing the affective amplifications resulting from simultaneous task performance (Shteynberg et al., 2014), and b) the shared attention theory (Shteynberg, 2015) postulated as an explanation for the above mentioned affective amplifications resulting from simultaneous task performance.

Overall, the results of both studies were not encouraging for the idea of spending time alone with others. Contrary to my predictions in Study 1, being around people weakly connected to us and not talking to them was similar to being completely alone in terms of felt momentary positive and negative affects, but it was worse in terms of felt momentary sense of belonging. Furthermore, the results showed that introverts did not benefit more from being alone with others than extraverts, since both less and more extraverted participants reported a higher momentary PA in more social conditions, which also supports the existing research (e.g. Smillie, 2013; Zelenski et al., 2013; Wilt et al., 2012). Furthermore, extraverts are known to have higher baseline levels of positive affect and sense of belonging (Diener et al., 2018; Steel et al., 2019; Swickert et al., 2002). The advantage of extraverts over introverts in terms of experienced PA and belongingness was evident in the results of both studies since I did not find any differences between introverts and extraverts resulting from being in a specific social situation (Study 1) or a specific experimental condition (Study 2). Thus, contrary to my predictions, there was nothing superior about being alone with others over being completely alone for either introverts or extraverts.

The findings of Study 2 indicated that being in one of the alone with others conditions, i.e. in the shared task or nonshared task conditions, was not superior to being in the alone condition since there were no differences between the conditions in terms of reported post-test PA, NA, or sense of belonging. These findings also addressed the results of simultaneous task performance study by Shteynberg et al. (2014) by showing that a close replication of that study was not successful. Contrary to the authors of the original study, I found no differences in affective outcomes between people who performed the same task together (watched the video) and those who performed the task alone. Also, since there were no significant differences in PA and sense of belonging between any of the conditions, I was unable to assess whether the amplification of affective outcomes would depend on performing the same task as others or whether it would be enough to simply share a physical space with others to boost one's mood.

In Study 2, I also checked for differences among less and more extraverted people. The results supported the predictions and showed that more extraverted participants reported higher pre- and post-test momentary PA and sense of belonging, and lower pre-test NA than introverts across conditions. Both introverts and extraverts felt higher PA after watching the video, but there were no differences between the being alone with others and being completely alone situations for either introverts or extraverts. There were, however, two unexpected findings. Extraverts reported a higher NA in the shared task condition and lower sense of belonging in the nonshared task condition than they did in the alone condition, relative to introverts. Although both extraverts and introverts reported a similar momentary sense of belonging in the two social conditions, i.e. in the being alone with others condition, only for introverts that level of sense of belonging was higher than sense of belonging in the alone condition.

The main value of this research project comes from the fact that no other study exists, to my knowledge, which assesses the affective and belongingness outcomes that result from being alone with others. Although it was expected that merely being around people, while not talking to them, would not surpass the value of human conversation (even if that interaction was with strangers or not-well-known people), there was still a possibility that being around others could lead to a better mood and sense of belonging than being completely alone. Instead, my research showed that being alone with others was not better in terms of momentary positive and negative affect, and in Study 1, it was worse for momentary sense of belonging than being alone. It is possible that being alone with others could make people feel less belongingness than being completely alone, especially if one felt ignored, judged, or perceived oneself as socially worse-off than the others they observe. It is also possible that similar momentary positive and negative affects were reported when alone with others and when completely alone because usually in those situations people have limited social interactions and spend more time with their own thoughts (Long et al., 2003; Westgate, Wilson, & Gilbert, 2017). Hence, such situations are more likely to produce similar lower arousal and neutrally valenced emotions (Nguyen, Ryan, & Deci, 2018). Finally, it is also possible that not everybody considered being alone with others as a more positive situation than being completely alone. Some people could regard being silent around people weakly connected to them, or around strangers, as unnatural, uncomfortable, or anxiety provoking. However, since being alone with others is a part of everyday life, I assumed that the majority of people who are bothered by such situations found ways to cope with them and in time, such situations became more natural to them. Nowadays, standing in line in a coffee shop and waiting for their turn, people are likely to be fiddling with their phones or using headphones to listen to music. Such behaviours are considered more normal than being around

others and not being engaged in a task. Since I have not found any differences in the results of both studies when controlling for introversion/extraversion trait levels of my participants, it seems unlikely that some people, e.g. more introverted ones, were more uncomfortable being alone with others and they used technology, reading, or working as coping strategies. It is more probable then, that people consider being alone with others more as a normal everyday situation and the use of tasks during that time is possibly their way of dealing with boredom. This explanation is even more plausible if we remember that when being completely alone people are likely to engage in similar tasks, i.e. browsing the Internet or reading. In the future research, it would be beneficial to assess how anxious, uncomfortable, or bored people feel when being alone with others and when not performing any tasks. It would also be informative to evaluate people's affective predictions regarding being alone with others and compare them to their actual momentary affective outcomes. It is possible that, similarly to Epley and Schroeder's (2014) findings, some people assume they would feel worse being alone with others and those predictions impact their actual feelings later on, especially if they were unable to engage in any coping behaviours.

The findings of my research, showing that it is not better to be alone with others than to be completely alone, did not explain the reasons why so many people who work from home venture every day into cafés or so-called “shared office” spaces where they can rent a desk and work while being around others. Research shows that there are benefits in being alone. Voluntary solitude can be a good way of reducing self-consciousness and gaining freedom to think and do as we desire (Berlin, 1969; Larson, 1990; Long, & Averill, 2003). It is also a way to boost creativity, self-awareness, or spirituality (Csikszentmihalyi, 1996; France, 1997; Storr,

1989). Why do then people feel the need to step out of their safe houses and work quietly around others?

One possibility arises from the fact, that there are limits to positivity brought about by even voluntary solitude. In fact, the period of time after which people experience negative consequences of being completely alone could be an explanation for the findings of my research. During the ecological momentary assessment, being alone and being alone with others were momentary occurrences, often followed by periods of more social contact. Hence, the ratings of alone with others and completely alone situations reflected only the affective and belongingness outcomes experienced in those moments, ignoring the cumulative toil such situations create. Being alone briefly is different than prolonged lack of social contact. The findings of Study 2 also pointed to the possibility of this time limit explanation. As discussed previously, my inability to show affective and belongingness differences among people who performed the task together vs. those who completed the study alone could have been rooted in the relatively short time participants spent in the lab. Although we all live more or less surrounded by people, we are also conditioned, to a smaller or greater extent, to feel secure and positive during limited periods of solitude (cf. the attachment theory of John Bowlby, 1969, 1973, 1980). The 30 minutes of being alone during the study, mixed with constant interruptions from the experimenter, could have been too short for any negative effects of being alone to develop.

Summing up, the results of this investigation could mean that being alone with others did not improve affect and sense of belonging over and above the effects experienced when being completely alone, because the periods of aloneness in both studies were too short to develop negative consequences of that situation. More work is needed to fully understand the effects of being alone with others, since it is possible that it predominantly counteracts the consequences of

prolonged periods of being alone. Thus, we first would have to make sure that people experienced such negative consequences of prolongedly and repeatedly being alone, and only then assess if being alone with other has desired effects. It would be impossible to test the consequences of such prolonged isolation in a laboratory setting. However, it could be informative to perform another study using an experience sampling methodology, which would focus on a group of people who spent longer periods of time alone. For example, assessing momentary affective and belongingness outcomes of people working from home or of new mothers, who spent a considerable amount of time deprived of grown-up conversations, could shed more light on a potentially subtle, yet possibly beneficial effects of being alone with others.

Interestingly, existing research shows that it does not matter how long people are alone prior to weak-ties interactions for the affective and belongingness effects of such interactions to develop (Sandstrom & Dunn, 2014b). Hence, although being alone with others could still help in counteracting the long-term effects of being alone, where any form of human contact would be welcomed, it seems that the short-term solution for boosting affect and belongingness could be based on interacting with others. The impact of hearing a few friendly words is especially noticeable in times of their absence. Extensive research points to a multitude of detrimental physical and psychological effects of involuntary solitude and ostracism (Coplan & Bowker, 2014; Nezlek et al., 1997; Sebastian et al., 2010; Williams & Zadro, 2005). Although many people could draw on their autobiographical memories to find examples of feeling left-out, confused, or angered when their greetings or remarks met silent responses, it is especially impactful for vulnerable people. For example, research shows that one of the things which invalidates homeless people's dignity, and as a result, leads to their reduced self-worth, is not being responded to and being avoided by others passing them on the street (Golden, 1992;

Seltser & Miller, 1993; Snow & Anderson, 1993). A few simple kind words have the power to improve our mood and sense of belonging because they signal that we matter, that someone recognized our existence, and that we are welcomed. Thus, people choose to be around others, not necessarily only because the presence of others motivates them to work harder (e.g., Eskenazi et al., 2013), but also because they have an inner need to exchange those few words with others. This inner need to communicate with others is also seen in the fact, that it is common for people being alone for an extended period of time to have auditory hallucinations (Bond, 2014). Hearing others talk is so deeply imbedded in our brains, that when we do not hear anybody talk for a long time, our brains make up the conversations themselves. While some people enjoy having discussions with themselves, their pets, or inanimate objects; for others, it is a signal that they need to find people and “step out of their heads”. Obviously, my research did not include such an extreme form of solitude or an extended absence of hearing others. However, human contact is closely intertwined with verbal interactions with others; and it seems, that the easiest boost of positivity resulting from being around others is due to these verbal interactions. Thus, it is possible that being alone with others reduces the negativity of prolonged aloneness without bringing the positive rewards associated with interacting with others.

Therefore, a major implication resulting from my research is that being around people and keeping to oneself would not be as good a strategy for improving one’s feelings or reducing loneliness as going out and having a friendly chat with strangers. It would also be premature to advise people that going out and not talking to anybody, after a prolong period of being completely alone, could still help improve their moods and belongingness. Yet, it is known, that it is also not beneficial to anyone’s psychological, economical, and social well-being to completely isolate oneself from others, as shown by the socially withdrawn young people in

Japan, i.e. the hikikomori, who do not leave their houses or rooms for extended periods of time (Teo et al., 2015; Wong et al., 2015). In theory then, it could be beneficial to advise, especially people having troubles with socializing, to first try to have short conversation with a barista or anybody who is paid to be pleasant to customers. Having this initial training could allow them to gain more confidence in their abilities, to experience the positive consequences of such interactions, and it could possibly lead to them initiating longer weak-ties conversations more often. In fact, various studies have shown that most people, even more introverted ones, gain psychological benefits from being and communicating with others (Fleeson et al., 2002; McNiel & Fleeson, 2006; McNiel et al., 2010; Smillie, 2013; Zelenski et al., 2012; Zelenski et al., 2013). Similarly, in both of my studies, I also found that there were not many differences between less and more extraverted people in terms of how the different social situations or the study's conditions affected them. In reality, it could be difficult to convince some people, e.g. shy, introverted, sensitive, or people with low self-esteem, to initiate conversations with acquaintances or complete strangers, even if they were aware that they were making a forecasting error by predicting they would feel worse after such interactions (e.g., Epley & Schroeder, 2014). Talking to strangers is full of unknowns. If we advised people to first practice by talking to hospitality workers, it is still possible that some of these sensitive or self-doubting people could be negatively impacted by such interactions. For example, a barista could have been in a bad mood or too busy just once and could have made such weak-ties interaction unpleasant. Potentially, this experience would have a detrimental effect on the likelihood of some people having future small chats with weak-ties.

Thus, similarly to the still existing discussion around the introverts' reasons for not acting more extraverted more often, even if they know it makes them feel better, such deliberation

could very well exist around the reasons for people not engaging in more weak-ties interactions. It would be insensitive to tell people who have trouble socializing to constantly act extraverted or to practice talking to weak-ties enough times until it becomes their second nature and it stops causing them to cringe. It would be easier if they could become less lonely and get a boost in their positive affect by being alone with others. However, since I cannot advise that, as of yet, it seems that an effective way of boosting their positive affect and sense of belonging would be something everybody is already practicing, i.e. engaging in technologically-enabled interactions with weak- and strong-ties. In fact, the results of Study 1 supported existing research (e.g., Guillory, Hancock, Woodruff, & Keilman, 2015) by showing that being alone and interacting with others via a game system, Internet, or a smartphone, i.e. being alone and talking, did not suppress the affective results of face-to-face interactions with strong-ties, but was associated with improvements in participants' mood and sense of belonging.

Summing-up, in order to boost one's sense of belonging and positive affect, it is advisable to spend time talking to and being with family and friends (Coan et al., 2006; King & Reis, 2012; Lyubomirsky et al., 2005; Pinqart & Sorensen, 2003). In case this is not an option, small chats with people sharing the same physical spaces as us can boost our momentary positive affect and sense of belonging (Sandstrom & Dunn, 2014b). If we are not inclined towards talking to strangers, and face-to-face interactions with strong-ties are impossible, we can feel better by talking to others using various technological means. Yet, if we spent a considerable time being alone, going out and finding a place where we could be around others, even if we are not planning to talk to them, may still be a good choice. Although it is not proven, as of yet, that such alone with others contact would make us feel much better than being completely alone, the

change of scenery could “clear our heads”, and possibly let us experience something new and interesting.

Conclusion

Humans are predisposed to creating and maintaining social ties. Being around others strongly connected to us is associated with the most positive outcomes; while casual interactions with acquaintances and strangers have also been shown to result in higher momentary positive affect and sense of belonging. This dissertation extended the research about the outcomes of the interactions with weak-ties by removing the need for conversation, and its results showed that this casual verbal interaction was, in fact, the important ingredient, making the difference between feeling a higher positive affect and sense of belonging when being around others, compared to being completely alone. In attempting to explain the results, this dissertation also cast doubt on the shared attention theory as a mood enhancing phenomenon present in simultaneous task performance. Specifically, there was no difference in affective amplification resulting from simultaneously performing the same task, performing a different task than another person, or performing the task alone. Overall, the results showed that being around weakly tied to us others, without talking to them, is not affectively better than being completely alone, especially in short-duration solitary conditions. The positive affect resulting from doing something enjoyable will most likely be enhanced by sharing that experience with someone, especially when a few words could be exchanged.

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Appendix A**Demographics Questionnaire**

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other (please state): _____
- ☐ I would rather not say

What is your age? ____

What is your ethnic background?

- _____ Caucasian, White
- _____ Black (African, African American)
- _____ South Asian, Indian, Pakistani, etc.
- _____ East Asian, Chinese, Japanese, etc.
- _____ Arabic, Central Asian
- _____ Hispanic, Central, or South American
- _____ Aboriginal
- Other: _____

Appendix B

Personality Questionnaire - IPIP-NEO-120

On the following pages, there are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then fill in the bubble that corresponds to the number on the scale.

1	2	3	4	5
Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate

1. Worry about things	
2. Make friends easily	
3. Have a vivid imagination	
4. Trust others	
5. Complete tasks successfully	
6. Get angry easily	
7. Love large parties	
8. Believe in the importance of art	
9. Use others for my own ends	
10. Like to tidy up	
11. Often feel blue	
12. Take charge	
13. Experience my emotions intensely	
14. Love to help others	
15. Keep my promises	
16. Find it difficult to approach others	
17. Am always busy	
18. Prefer variety to routine	
19. Love a good fight	
20. Work hard	

21. Go on binges	
22. Love excitement	
23. Love to read challenging material	
24. Believe that I am better than others	
25. Am always prepared	
26. Panic easily	
27. Radiate joy	
28. My relationship to nature is an important part of who I am	
29. Sympathize with the homeless	
30. Jump into things without thinking	
31. Fear the worst	
32. Feel comfortable around people	
33. Enjoy wild flights of fantasy	
34. An ideal vacation spot for me would be a remote wilderness area	
35. Excel in what I do	
36. Get irritated easily	
37. Talk to a lot of different people at parties	
38. See beauty in the things that others might not notice	
39. Cheat to get ahead	
40. Often forget to put things in their proper place	

1	2	3	4	5
Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate

41. Dislike myself	
42. Try to lead others	
43. Feel others' emotions	
44. Am concerned about others	
45. Tell the truth	
46. Feel very connected to all living things and the earth	
47. Am always on the go	
48. Prefer to stick with things I know	
49. Yell at people	
50. Do more than what's expected of me	
51. Rarely overindulge	
52. Seek adventure	
53. Avoid philosophical discussions	
54. Think highly of myself	
55. Carry out my plans	
56. Become overwhelmed by events	
57. Have a lot of fun	
58. Always think about how my actions affect the environment	
59. Feel sympathy for those who are worse off than me	
60. Make rash decisions	
61. Am afraid of many things	
62. Avoid contact with others	
63. Love to daydream	
64. Trust what people say	

65. Handle tasks smoothly	
66. Lose my temper	
67. Prefer to be alone	
68. Do not like poetry	
69. Take adventure of others	
70. Leave a mess in my room	
71. Am often down in the dumps	
72. Take control of things	
73. Rarely notice my emotional reactions	
74. Am indifferent to the feelings of others	
75. Break rules	
76. Only feel comfortable with my friends	
77. Do a lot in my spare time	
78. Dislike change	
79. Insult people	
80. Do just enough work to get by	
81. Easily resist temptations	
82. Enjoy being reckless	
83. Have difficulty understanding abstract ideas	
84. Have a high opinion about myself	
85. Waste my time	
86. Feel that I'm unable to deal with things	
87. Love life	
88. Tend to vote for conservative political candidates	

1	2	3	4	5
Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate

89. Take notice of wildlife wherever I am		108. Am attached to conventional ways	
90. Rush into things		109. Get back at others	
91. Get stressed out easily		110. Put little time and effort into my work	
92. Keep others at a distance		111. Am able to control my cravings	
93. Like to get lost in thought		112. Act wild and crazy	
94. Distrust people		113. Am not interested in theoretical discussion	
95. Know how to get things done		114. Boast about my virtues	
96. Am not easily annoyed		115. Have difficulty starting tasks	
97. Avoid crowds		116. Remain calm under pressure	
98. Do not enjoy going to art museums		117. Look at the bright side of life	
99. Obstruct others' plans		118. Believe that we should be tough on crime	
100. Leave my belongings around		119. Try not to think about the needy	
101. Feel comfortable with myself		120. Act without thinking	
102. Wait for others to lead the way		121. Believe that others have good intentions	
103. Don't understand people who get emotional		122. Believe that there is no absolute right or wrong	
104. Take no time for others		123. My connection to nature and the environment is a part of my spirituality	
105. Break my promises		124. Am not interested in other people's problems	
106. Am not bothered by difficult social situations		125. Tend to vote for liberal political candidates	
107. Like to take it easy		126. Am afraid to draw attention to myself	

Appendix C

Information displayed before each questionnaire in the phone application mEMA

PLEASE REMEMBER

Being “**ALONE**” – any situation in which you were completely alone during the majority of the time, without any human interaction (verbal, through your phone, or via the Internet)

For example, these ARE NOT consider as being alone:

- walking on a street with other unknown people passing you by
- being alone and talking to someone on the phone, through text messages, or via Internet, or communicating with others while playing computer games

These ARE considered as being alone:

- being alone in your room/house and studying/reading/watching TV with only your pet(s) present
- being alone in any outdoor place with others being far away enough from you, you cannot see their facial features
- being in an empty public space (e.g., library, church, university hall) with no other people visible to you

Being “**AROUND STRANGERS OR PEOPLE YOU DO NOT KNOW WELL**” - any situation where you are around people, who are strangers or whom you do not know well, and with whom you did or did not talk to, e.g.

- Store clerks, bus drivers, a postman, people you pass on the streets
- Also neighbours, co-workers, or classmates but only if you exchange few words with and they ARE NOT your close friends.

Being “**AROUND PEOPLE YOU KNOW VERY WELL**” - any situation where you are around people, who you know well or with whom you have close ties, regardless whether you talked to them or not, e.g.

- Any close friends, family members, or your significant others
- Also applies to any co-workers, neighbours, classmates, who also ARE your close friends

Appendix D

The ESM Study Questionnaire

Questions regarding social contact, extraverted behaviour, and positive affect to be answered through the smartphone application, during each of the 2-hour intervals:

1. Since the last time you were asked, have you spent majority of your time:

- 1 – alone
- 2 – around strangers or people you do not know well
- 3 – around people you know very well

2. Since the last time we asked, have you talked to someone in person?

- 1 – yes
- 2 – no

If 1 chosen in Question 2:

2a. Approximately, how many people have you talked to in person (excluding the use of text messages, chat programs, or emailing)?

- 1 – 1
- 2 – 2
- 3 – 3
- 4 – 4
- 5 – 5 or more

2b. Approximately, how long would you say your longest conversation lasted?

- 1 – less than 5 mins
- 2 – 5-10 mins
- 3 – 10-15 mins
- 4 – 15 mins or more

2c. Who was the person/people you had the longest conversation with?

- 1 – stranger(s) or someone you do not know well (e.g., barista, mailman)
- 2 – someone you know very well (e.g., close friends, family members)

If 2 chosen in Question 2:

2d. Since the last time we asked, have you talked to someone on the phone?

- 1 – yes
- 2 – no

2e. Since the last time we asked, have you talked to someone using phone texting, chat messenger(s), or emailing?

- 1 – yes
- 2 – no

If 1 chosen in Question 2e:

2f. What type was the MAJORITY of those Internet or phone interactions?

- 1 – Emailing
- 2 – Chatting on the Internet
- 3 – Messaging on the phone

3. Since the last time we asked, how [Quiet*] were you?

- [Energetic]
- [Talkative]
- [Assertive]
- [Shy*]
- [Bold]

1 – Very Slightly or Not at All 7 – Extremely or A Lot

4. Since the last time we asked, how [positive/good] have you been feeling?

- [sad]
- [pleasant]
- [afraid]
- [unpleasant]
- [happy]
- [joyful]
- [angry]
- [contented]
- [negative/bad]

1 – Not at All or Very Slightly

2 – A Little

3 – Moderately

4 – Quite a Bit

5 – Extremely

5. Please answer the next 3 questions by referring to how you feel right now,
at this particular moment:

5a. I feel distant from people.

1 – Strongly Disagree 6 – Strongly Agree

5b. I feel like an outsider.

1 – Strongly Disagree 6 – Strongly Agree

5c. I feel like I belong here.

1 – Strongly Disagree 6 – Strongly Agree

Appendix E

Creating Dummy Variables for Controlling for Phone and Technology Usage

In order to control for talking on phones and other technology usage, e.g. using the Internet or texting, a new set of dummy variables was created. The dummy codes combining answers to the four questions: asking who the participants spent the majority time with, whether they talked to someone, and whether they talked to someone using a phone or any technology means, would result in 12 dummy variables – a number too overwhelming for multilevel analysis. Therefore, talking on the phone and using technologies questions were first combined together. Out of four different possibilities, two dummy codes were created: the *PhoneTechYes* and the *PhoneTechNo*. The former one was coded 1 when a person talked on the phone and used technology, when a person used phone and did not use technology, or a person did not talk on the phone but used technology, while the *PhoneTechNo* dummy was coded as 1 when a person did not talk on the phone and did not use technology. This coding schema made it easier to incorporate these newly created dummies with dummies representing different combinations of social conditions and the presence or absence of talking in-person. This coding protocol resulted in six new dummy variables representing different social experiences. For example, the *NewAloneNotTalking* dummy variable was coded 1 when a person was alone for a majority of the time, and did not communicate with others through any means, i.e. talking in person, on the phone, or using technology (*AloneNotTalking* + *PhoneTechNo*). On the other hand, the *NewAloneTalking* dummy represented someone who was alone and talked to others in one of the three ways (*AloneTalking* + *PhoneTechYes* or *AloneTalking* + *PhoneTechNo*, or *AloneNotTalking* + *PhoneTechYes*). Similar dummies were created for the weak- and strong-ties situations.

Appendix F**Affect Questionnaire**

The below scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word.

Indicate to what **extent you feel this way right now**, that is, **at the present moment**.

1	2	3	4	5
Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely

_____ 1. Positive / Good

_____ 2. Sad

_____ 3. Pleasant

_____ 4. Afraid

_____ 5. Unpleasant

_____ 6. Happy

_____ 7. Joyful

_____ 8. Angry

_____ 9. Contented

_____ 10. Negative / Bad

Appendix G

Sense of Belonging Questionnaire

Please, indicate how much you agree with each of the following statements.

While judging the statements, please think of how you feel **right now in this moment**:

1. I feel distant from people.	Strongly Disagree					Strongly Agree
	1	2	3	4	5	6
2. I feel like an outsider.	Strongly Disagree					Strongly Agree
	1	2	3	4	5	6
3. I feel like I belong here.	Strongly Disagree					Strongly Agree
	1	2	3	4	5	6

Appendix H

Equations Used in Multilevel Mediation Analyses

Models 1 (unconditional models)

Level 1: γ_{ij} (PA, NA, or Belonging) = $\beta_{0j} + r_{ij}$,

Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$.

Models 2

Level 1: γ_{ij} (PA, NA, or Belonging) = $\beta_{0j} + \beta_{1j}$ (AloneNotTalking) + β_{2j} (Weak-tiesTalking) + β_{3j} (Weak-tiesNotTalking) + β_{4j} (Strong-tiesTalking) + β_{5j} (Strong-tiesNotTalking) + r_{ij} ,

Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$,

$\beta_{1j} = \gamma_{10} + u_{1j}$,

$\beta_{2j} = \gamma_{20} + u_{2j}$,

$\beta_{3j} = \gamma_{30} + u_{3j}$,

$\beta_{4j} = \gamma_{40} + u_{4j}$,

$\beta_{5j} = \gamma_{50} + u_{5j}$.

Models 3

Level 1: γ_{ij} (PA, NA, or Belonging) = $\beta_{0j} + \beta_{1j}$ (AloneNotTalking) + β_{2j} (Weak-tiesTalking) + β_{3j} (Weak-tiesNotTalking) + β_{4j} (Strong-tiesTalking) + β_{5j} (Strong-tiesNotTalking) + r_{ij} ,

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}$ (IntroversionExtraversionTrait) + u_{0j} ,

$\beta_{1j} = \gamma_{10} + \gamma_{11}$ (IntroversionExtraversionTrait) + u_{1j} ,

$\beta_{2j} = \gamma_{20} + \gamma_{21}$ (IntroversionExtraversionTrait) + u_{2j} ,

$\beta_{3j} = \gamma_{30} + \gamma_{31}$ (IntroversionExtraversionTrait) + u_{3j} ,

$\beta_{4j} = \gamma_{40} + \gamma_{41}$ (IntroversionExtraversionTrait) + u_{4j} ,

$\beta_{5j} = \gamma_{50} + \gamma_{51}$ (IntroversionExtraversionTrait) + u_{5j} .

Models 4

Level 1: γ_{ij} (PA, NA, or Belonging) = $\beta_{0j} + \beta_{1j}$ (AloneNotTalking) + β_{2j} (Weak-tiesTalking) + β_{3j} (Weak-tiesNotTalking) + β_{4j} (Strong-tiesTalking) + β_{5j} (Strong-tiesNotTalking) + β_{6j} (ExtravertedBehaviour) + r_{ij} ,

Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$,

$\beta_{1j} = \gamma_{10} + u_{1j}$,

$\beta_{2j} = \gamma_{20} + u_{2j}$,

$\beta_{3j} = \gamma_{30} + u_{3j}$,

$\beta_{4j} = \gamma_{40} + u_{4j}$,

$\beta_{5j} = \gamma_{50} + u_{5j}$,

$\beta_{6j} = \gamma_{60} + u_{6j}$.

Appendix I

Tables of Differences between Social Conditions for State Positive and Negative Affects, and Momentary Sense of Belonging in Study 1

Table 9.

Differences in the State Positive Affect between Different Social Contexts

Differences between	Difference	$\chi^2(1)$	<i>p</i>
1. Alone Talking			
Alone Not Talking	.08	9.43	< .01
Weak-ties Talking	-.02	.71	> .5
Weak-ties Not Talking	.12	15.49	< .001
Strong-ties Talking	-.27	121.21	< .001
Strong-ties Not Talking	-.03	.50	> .5
2. Alone Not Talking			
Weak-ties Talking	-.10	15.52	< .001
Weak-ties Not Talking	.04	2.64	.10
Strong-ties Talking	-.35	222.35	< .001
Strong-ties Not Talking	-.11	7.59	.01
3. Weak-ties Talking			
Weak-ties Not Talking	.14	28.52	< .001
Strong-ties Talking	-.25	141.80	< .001
Strong-ties Not Talking	-.01	.02	> .5
4. Weak-ties Not Talking			
Strong-ties Talking	-.39	205.003	< .001
Strong-ties Not Talking	-.15	13.19	< .001
5. Strong-ties Talking			
Strong-ties Not Talking	.24	55.42	< .001

Note 1: The bolded numbers indicate statistically significant differences

Note 2: The difference column includes the differences between the bolded social situation and remaining situations located below it, e.g. the difference between alone talking condition and alone not talking condition is .08, which indicates that state positive affect in alone talking condition was higher by .08 points than that in alone not talking situation, and that it was a statistically significant difference ($p < .01$).

Table 10.

Differences in the State Negative Affect between Different Social Contexts

Differences between	Difference	$\chi^2(1)$	<i>p</i>
1. Alone Talking			
Alone Not Talking	.04	5.33	.02
Weak-ties Talking	.004	.14	> .5
Weak-ties Not Talking	.005	.12	> .5
Strong-ties Talking	.02	1.998	.15
Strong-ties Not Talking	-.08	4.99	.02
2. Alone Not Talking			
Weak-ties Talking	-.04	3.49	.06
Weak-ties Not Talking	-.04	2.96	.08
Strong-ties Talking	-.02	1.27	.26
Strong-ties Not Talking	-.12	13.19	< .001
3. Weak-ties Talking			
Weak-ties Not Talking	.0003	.0002	> .5
Strong-ties Talking	.02	1.43	.23
Strong-ties Not Talking	-.08	6.16	.01
4. Weak-ties Not Talking			
Strong-ties Talking	.02	.75	> .5
Strong-ties Not Talking	.08	6.02	.01
5. Strong-ties Talking			
Strong-ties Not Talking	-.10	10.63	.002

Note 1: The bolded numbers indicate statistically significant differences

Note 2: The difference column includes the differences between the bolded social situation and remaining situations located below it, e.g. the difference between alone talking condition and alone not talking condition is .04, which indicates that state negative affect in alone talking condition was higher by .04 points than that in alone not talking situation, and that it was a statistically significant difference ($p < .05$).

Table 11.

Differences in the Momentary Sense of Belonging between Different Social Contexts

Differences between	Difference	$\chi^2(1)$	<i>p</i>
1. Alone Talking			
Alone Not Talking	.07	2.57	.11
Weak-ties Talking	.06	1.57	.21
Weak-ties Not Talking	.24	19.66	< .001
Strong-ties Talking	-.36	91.87	< .001
Strong-ties Not Talking	-.01	.02	> .5
2. Alone Not Talking			
Weak-ties Talking	.01	.05	> .5
Weak-ties Not Talking	.17	13.98	< .001
Strong-ties Talking	-.43	127.70	< .001
Strong-ties Not Talking	-.08	1.60	.20
3. Weak-ties Talking			
Weak-ties Not Talking	.18	19.50	< .001
Strong-ties Talking	-.42	154.29	< .001
Strong-ties Not Talking	-.07	1.21	.27
4. Weak-ties Not Talking			
Strong-ties Talking	-.60	178.33	< .001
Strong-ties Not Talking	-.25	13.42	< .001
5. Strong-ties Talking			
Strong-ties Not Talking	.35	44.02	< .001

Note 1: The bolded numbers indicate statistically significant differences

Note 2: The difference column includes the differences between the bolded social situation and remaining situations located below it, e.g. the difference between alone talking condition and alone not talking condition is .07, which indicates that sense of belonging in alone talking condition was higher by .07 points than that in alone not talking situation, and that it was not a statistically significant difference ($p = .11$).

Appendix J

Power and Sample Size Rationale in Study 1

No strong evidence exists, which could guide researchers trying to decide on the optimal number of elements in each of the units of the multilevel model analysis. There is a small number of simulation studies investigating an accuracy of estimates for parameters of models with small sample sizes at different levels of analysis. The reviews of such simulations, e.g., Bolger and Laurenceau (2013) or Kreft and DeLeeuw (1998), indicated that the power of multilevel statistical models depends on the number of Level 1 and Level 2 units, with having a large number of groups (here: participants) being more important than a large number of individuals per group (here: observations per participant). The available simulation software is not yet advanced enough, testing only small sizes of units and assuming a balanced number of units in both levels of analysis, which rarely occurs in EMA studies. Hence, the decision regarding the needed sample size in the current study (i.e., around 150 participants) was based on the above reviews' findings showing, that: 1) the standard errors of Level 2 variances are estimated too small when the number of Level 2 units is less than 100, and 2) having at least 60 Level 2 units with 25 observations each (2500 total observations) provides sufficiently high power ($1-\beta > .80$) needed to detect small to moderate effects (Bolger & Laurenceau, 2013; Kreft & DeLeeuw, 1998).

Appendix K

Supplementary Analyses of Emotional Stability/Neuroticism Trait in Study 1

Exploratory analyses of Model 3 were performed for the momentary PA, NA, and sense of belonging when the social situations were entered as dummy variables at Level 1 and the emotional stability/neuroticism trait was entered at Level 2. In all the analyses, for the momentary positive and negative affect, and for the momentary sense of belonging, there were significant main effects of the emotional stability/neuroticism trait. Specifically, averaging over all social situations (i.e., in the alone talking condition, which was the reference situation), 1 SD increase in emotional stability/neuroticism trait, i.e. being more neurotic, was associated with: .20 units less PA ($SE = .05$, $t(436) = -4.35$, $p < .001$), .45 units less belonging ($SE = .05$, $t(441) = -4.21$, $p < .001$), and .14 units more NA ($SE = .04$, $t(436) = 3.62$, $p < .001$). However, none of the interaction terms in neither PA and NA analyses were significant, indicating that the relationships between social situations and those outcome variables did not depend on the neuroticism levels. The only significant interaction term for sense of belonging indicated that in the strong-ties talking situation, as compared to the alone talking condition, the reported momentary sense of belonging was significantly higher for more neurotic than less neurotic people ($\beta = .12$, $SE = .06$, $t(436) = 2.15$, $p = .032$).

Overall, in accordance with existing research (Chui et al., 2014; Shackman et al., 2017), the simple main effects for PA and NA showed that more emotionally stable participants reported higher PA and lower NA than more neurotic participants across situations. The results also show that the only significant difference between less and more neurotic people's sense of belonging levels were in the strong-ties talking situation. Compared to the alone talking condition, the reported momentary sense of belonging was marginally higher in the strong-ties

talking situation for more neurotic participants than for more emotionally stable ones. These results could stem from more neurotic people's preference for the face-to-face interactions with strong-ties because such contact is, on average, clearer and leaves less to interpretation, as compared to talking to others (even friends and family) using technology. Since more neurotic people need more reassurance and are more prone to worrying (Gray, 1991), communicating with others through texting or Internet, where the answers are not always immediately available, could lead them to experiencing more insecurity and anxiety than the same interactions would bring to more emotionally stable people.

Appendix L

Correlations Between Dependent Variables and Personality Traits in Each Experimental Condition of Study 2

Table 12.

Correlations of Pre- and Post-test Momentary PA, NA, Sense of Belonging, and Introversion/Extraversion and Emotional Stability/Neuroticism Traits for Shared Task Condition

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1.Extraversion	-							
2.Neuroticism	-.48**	-						
3.Pre-PA	.34**	-.35**	-					
4.Pre-NA	-.19	.29**	-.43**	-				
5.Pre-Belong	.52**	-.57*	.54**	-.33**	-			
6.Post-PA	.27**	-.23*	.78**	-.32**	.41**	-		
7.Post-NA	.09	.11	-.22*	.68**	-.15	-.32**	-	
8.Post-Belong	.50**	-.40**	.56**	-.32**	.81**	.55**	-.18	-

Note 1: * $p < .05$; ** $p < .01$.

Note 2: Pre = Pre-test; Post = Post-test; PA = Positive Affect; NA = Negative Affect; Belong = Sense of Belonging

Table 13.

Correlations of Pre- and Post-test Momentary PA, NA, Sense of Belonging, and Introversion/Extraversion and Emotional Stability/Neuroticism Traits for Nonshared Task Condition

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1.Extraversion	-							
2.Neuroticism	-.45**	-						
3.Pre-PA	.21	-.25*	-					
4.Pre-NA	-.22*	.46**	-.48**	-				
5.Pre-Belong	.39**	-.29**	.31**	-.28**	-			
6.Post-PA	.18	-.08	.71**	-.32**	.27*	-		
7.Post-NA	-.08	.08	-.13	.53**	-.18	-.36**	-	
8.Post-Belong	.35**	-.25*	.26*	-.23*	.88**	.29**	-.21*	-

Note 1: * $p < .05$; ** $p < .01$.

Note 2: Pre = Pre-test; Post = Post-test; PA = Positive Affect; NA = Negative Affect; Belong = Sense of Belonging

Table 14.

Correlations of Pre- and Post-test Momentary PA, NA, Sense of Belonging, and Introversion/Extraversion and Emotional Stability/Neuroticism Traits for Alone Condition

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1.Extraversion	-							
2.Neuroticism	-.43**	-						
3.Pre-PA	.43**	-.44**	-					
4.Pre-NA	-.19	.42**	-.57**	-				
5.Pre-Belong	.59**	-.45**	.47**	-.50**	-			
6.Post-PA	.38**	-.35**	.70**	-.44**	.42**	-		
7.Post-NA	-.18	.25*	-.35**	.60**	-.34**	-.58**	-	
8.Post-Belong	.60**	-.42**	.52**	-.51**	.88**	.53**	-.44**	-

Note 1: * $p < .05$; ** $p < .01$.

Note 2: Pre = Pre-test; Post = Post-test; PA = Positive Affect; NA = Negative Affect; Belong = Sense of Belonging

Appendix M

Supplementary Analyses of Emotional Stability/Neuroticism Trait in Study 2

The hierarchical linear regression analysis for pre-test positive and negative affects, and for sense of belonging, all led to similar conclusions. Specifically, none of the interaction terms for conditions and trait emotional stability/neuroticism, as well as none of the main effects of conditions were significant. However, the significant main effects of the neuroticism trait indicated that 1 SD increase in the neuroticism/emotional stability trait, i.e. being more neurotic was associated with: .50 units lower momentary positive affect ($SE = .09$, $t(251) = -5.80$, $p < .001$), .40 units higher momentary negative affect ($SE = .06$, $t(251) = 6.60$, $p < .001$), and with .90 units lower momentary sense of belonging ($SE = .12$, $t(251) = -7.75$, $p < .001$). Taken together, more emotionally stable participants reported better pre-test outcomes across conditions for all dependent variables, and there were no differences in pre-test PA, NA, and sense of belonging between conditions for the more and less neurotic participants.

Further tests showed that, for the post-test PA, the main effect of the emotional stability/neuroticism trait was significant, with more neurotic people reporting .34 units less post-test PA in the alone condition (the reference condition), than more emotionally stable participants ($SE = .09$, $t(250) = -3.66$, $p < .001$). Adding interaction terms between conditions and this personality trait to the analysis did not explain additional variance in the post-test PA variables, $R^2 \text{ change} = .01$, $p = .16$. However, the emotional stability/neuroticism trait seemed to moderate relationship between conditions and post-test PA, because even though the shared task x neuroticism interaction term was not significant ($\beta_4 = .19$, $SE = .23$, $t(250) = .83$, $p = .41$), the nonshared task x neuroticism interaction term was very close to reaching statistical significance, $\beta_5 = .45$, $SE = .23$, $t(250) = 1.92$, $p = .056$. Further assessment of the simple slopes showed that

less neurotic participants reported the highest and similar post-test PA in the alone (the highest PA) and shared task conditions, and much lower PA in the nonshared task condition. On the other hand, more neurotic participants reported slightly higher PA in the nonshared task condition than in the alone one (see Figure 12 below).

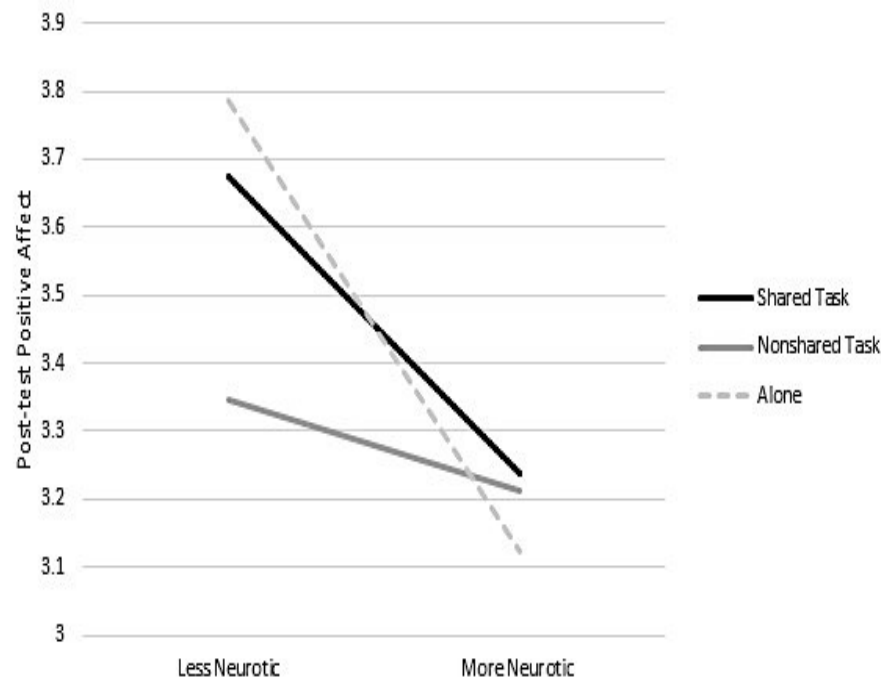


Figure 12. Simple slopes for post-test positive affect for less and more neurotic participants being in different experimental conditions in Study 2

In terms of the post-test NA and sense of belonging, for both of these dependent variables, the interaction terms between emotional stability/neuroticism and conditions, as well as the main effects of conditions were not significant. However, the main effects of the emotional stability/neuroticism trait were significant, indicating that more neurotic people reported significantly less post-test sense of belonging ($\beta_3 = -.65$, $SE = .11$, $t(250) = -6.07$, $p <$

.001) and a significantly higher post-test NA ($\beta_3 = .12$, $SE = .05$, $t(251) = 2.54$, $p = .01$) across conditions than less neurotic ones.

Overall, more emotionally stable participants reported better pre-test and post-test outcomes across conditions for all dependent variables. There were no differences in pre-test PA, NA, and sense of belonging between conditions among the more and less neurotic participants. In all conditions, less neurotic participants reported higher pre- and post-test PA and sense of belonging and lower pre- and post-test NA than more neurotic ones. Further results also indicated that there were no significant differences in pre- and post-test NA and sense of belonging and in pre-test PA among less or more neurotic people resulting from them being in different conditions. For the post-test PA, while more stable participants reported lower PA in the nonshared task condition, compared to the alone condition, more neurotic people felt better in the nonshared task than in the alone condition.

These findings support existing research, showing that more neurotic people feel better around others they know well (Chui et al., 2014; Shackman et al., 2017) because they know what to expect from such relationships, and because close others offer more reassurance (Shackman et al., 2017). The only differences between conditions were found in the post-test PA, where more stable participants reported a lower PA in the nonshared task condition than in the alone condition, compared to more neurotic people. This finding did not support research showing that more neurotic people assume others, especially strangers, do not like them, which causes them to feel uncomfortable and self-conscious around weak-ties (Back, Schmukle, & Egloff, 2011; Cuperman & Ickes, 2009). It could be that in Study 2, being in the new uncertain situation of a laboratory experiment, all participants were looking for some behavioural cues and reassurance. Hence, being more neurotic and needing more reassurance would make participants appreciate

even the nonshared task condition more than the alone one. On the other hand, more emotionally stable participants did not need reassurance as much, and they felt the lowest PA in the nonshared task condition because being around someone who was facing away from them and not talking to them could have been more unnatural and uncomfortable than performing the study alongside someone or by themselves.