

The Impact of Video-Communication on Older Adults' Psychological Well-Being:

A Mixed Methods Study

Natasha Bennett

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Department of Health and Human Sciences

University of Essex

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Abstract

Greater life expectancy has resulted in older adults becoming more vulnerable to social isolation, with increasing numbers of British older adults reporting loneliness in recent years. This trend is of concern as it has been documented that feeling a connection to others is a fundamental need for psychological well-being. It is therefore important to support older adults to maintain connections with others, in order to help increase, and prevent deterioration of, their well-being. The social presence theory asserts that visual presence during conversations can enhance the quality of communications between individuals and thus strengthen relationships. The use of video-communication by older adults may therefore lend itself as a tool to enhance communications with others and consequently increase their psychological well-being. This research utilised a mixed-methods quasi-experimental design to explore the impact of video-communication on the psychological well-being of older adults. Participants in the intervention condition received video-communication training sessions to help them communicate with their friends or relatives remotely via video. Participants in the control conditions received either email or basic computer skills training. Self-report measures were used to investigate the effectiveness of the video-communication in enhancing psychological well-being. Semi-structured interviews were also conducted with the participants in the intervention condition in order to capture the participants' experiences with using the video-communication and to corroborate the quantitative data. The quantitative data was subjected to statistical and clinically significant change tests, while the qualitative data was analysed using thematic analysis. Triangulation of the quantitative and qualitative data revealed that the video-communication increased some older adults' psychological well-being and the social support they received. The findings are discussed in relation to previous research. The clinical implications of the findings and directions for future research are also discussed.

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Introduction

This chapter opens with an account of the social context of the older adult population within the United Kingdom (UK), describing how older adults are at risk of social isolation. This is followed by a discussion about the importance of relationships and the theories that link supportive relationships with psychological well-being. The construct of psychological well-being is then defined and the well-being of the older adult population is reported. The research investigating older adults' psychological well-being in relation to using the internet is outlined and the potential of video-communication as a means for enhancing relationships and psychological well-being is discussed. A systematic literature review is subsequently presented exploring the impact of video-communication on older adults' psychological well-being, highlighting the methodological limitations and gaps in the literature. The chapter concludes with the current study's research aims to address these limitations.

Social Context

Individuals now live longer in the UK, due to improved medical treatments, living conditions and health habits (Office for National Statistics, 2014). Over the last thirty years (1982 to 2012), life expectancy at birth increased by around six years for females and eight years for males (Office for National Statistics, 2013a). Furthermore, within this same period, the number of centenarians in England and Wales has more than quadrupled (Office for National Statistics, 2014) and it is estimated that a third of babies born in 2013 will live to a hundred years old (Office for National Statistics, 2013a). This increased life expectancy, in addition to the aging of people born in the baby boom after the Second World War and the decline in birth rates since the 1960s (Office for National Statistics, 2013b), has resulted in a shift in the age distribution of the population; the proportion of older people compared to

younger people is increasing (Office for National Statistics, 2011).¹ It is projected that twenty-three percent of the population in the United Kingdom will be aged sixty-five and over by 2035 (Office for National Statistics, 2012), compared to seventeen percent in 2010 (Office for National Statistics, 2011).

The increasing aging population has led to greater attention to the health and social needs of the older adult population (Cornwell, 2012; Department of Health, 2001; Department of Health, 2014; House of Lords, 2013; Oliver, Foot, & Humphries, 2014). One area that has received considerable attention in recent years is the vulnerability of older adults to social isolation and loneliness (Foresight Mental Capital and Wellbeing Project, 2008; Windle, Francis & Coomber, 2011), due to: deterioration in health; loss of mobility (Matthews, Demakakos, Nazroo, & Shankar, 2014; Newsom & Schulz, 1996), retirement; and loss of friends and relatives to bereavements (Audit Commission, 2008). Studies conducted by the English Longitudinal Study of Ageing have reported that half of older adults living in England are at risk of becoming socially isolated (Tomaszewski & Barnes, 2008), with already two-thirds of adults over the age of fifty reporting low levels of social engagement (Matthews, Demakakos, Nazroo, & Shankar, 2014), and one third of males and two thirds of females over the age of eighty reporting a sense of social detachment (Gjona, Tabassum, & Breeze, 2006). Furthermore, Victor, Scambler, Bowling and Bond (2005) reported that out of their sample of 999 British adults over the age of sixty-five, almost one-third of the participants stated they were sometimes lonely, which they note is a much larger figure compared to earlier British research.

¹ In this study ‘older people’ or ‘older adults’ are defined as individuals aged 65 and over. This is the figure often used by government statistics and has, until recently, been the retirement age for individuals in the United Kingdom. It is noteworthy, however, that studies included in this thesis which refer to older adults may include individuals aged a few years below this parameter.

Importance of Relationships

Feeling a connection to others, which can be defined as feeling valued and supported, or fitting in with others, has been documented as a fundamental need for psychological well-being, irrespective of ethnicity and culture (Baumeister & Leary, 1995; Deci & Ryan, 2000). It is therefore of concern that social isolation and reporting on loneliness is increasing. The importance of positive relationships is of course not new; it has long been acknowledged by many key theorists in the psychological literature that connections with others are essential. For example, within the psychoanalytical field, infant and childhood relationships with primary caregivers are emphasised as crucial for psychological functioning; although Freud primarily focused upon libido drives towards others, he asserted in many of his later writings that poor psychological functioning was the result of the loss of a loved person (Freud, 1917/1963; Freud 1930/1961; Freud, 1933/1964; Freud, 1926/1959). Klein (1959/1975) and Winnicott (1960), amongst others (Gerhardt, 2015; Malekpour, 2007), extended Freud's theories by postulating that individuals are shaped in relation to their early relationships. Rogers (1959) and others (Buber, 1947; Cooley, 1964; Markus & Wurf, 1987) further noted that relationships throughout an individual's life continue to influence one's sense of self. Maslow's renowned theory of human motivation moreover discusses how love and affection from others are basic needs for human beings (1943) and essential for psychological well-being (1954). Similarly, Bowlby proclaimed throughout his publications that all human beings have an innate need to develop and maintain positive intimate attachments with others for physical survival, both in the early years (1958) and throughout the lifespan, for psychological well-being: emotional resilience, a sense of competence (1969), personal strength, enjoyment of life (1980) and feeling secure (1988).

Supporting these well renowned theories there is now an abundance of literature documenting that individuals who perceive they have supportive relationships with others,

compared with those who do not, experience less psychological distress: reduced depression (Besser & Priel, 2005; Jensen, et al., 2014; Peirce, Frone, Russell, Cooper, & Mudar, 2000), anxiety (Hipkins, Whitworth, Tarrier, & Jayson, 2004; Plaisier et al., 2007), loneliness (Russell, 1996), suicidal ideation (D'Attilio, Campbell, Lubold, Jacobson, & Richard, 1992) and suicidal attempts (Compton, Thompson, & Kaslow, 2005).² This phenomenon of individuals experiencing less psychological distress when they perceive they have supportive relationships with others has been observed with individuals facing general stressful life events (Chou & Chi, 2001; Parry, 1986; Schaefer, Coyne, & Lazarus, 1981; Syrotuik & D'Arcy, 1984), and more specifically, physical health illness (Courtens, Stevens, Crebolder, & Philipsen, 1996; Eom, et al., 2013; Karnell, Christensen, Rosenthal, Magnuson, & Funk, 2007; McDowell & Serovich, 2007), domestic violence (Carlson, McNutt, Choi, & Rose, 2002; Coker, et al., 2002), acculturative stress (Sirin, Ryce, Gupta, & Rogers-Sirin, 2013) and natural disasters (Kaniasty, 2012). Supportive relationships have not only been associated with reduced psychological distress, but also with positive dimensions of psychological well-being, including happiness, gratification, self-confidence (Meehan, Durlak, & Bryant, 1993) and higher levels of satisfaction with life (Diener & Seligman, 2002). The association of the reduction in psychological distress and enhancement in psychological well-being with supportive relationships has been reported across the lifespan: in adolescents (Brausch & Decker, 2014; Rothon, Goodwin, & Standsfeld, 2012), working-age adults (Carpenter, et al., 2015; Hou, Cerulli, Wittink, Caine, & Qiu, 2015) and older adults (Bruce, 2002; Chi & Chou, 2001; Glass, De Leon, Bassuk, & Berkman, 2006; Vanderhorst & McLaren, 2005).

Experimental studies have further shown improvements in psychological well-being when

² The term 'supportive relationships' is used as an alternative to the construct 'social support', which is widely used within the literature, due to the author's interpretation of the term social support as being connoted as something which is provided to another individual, rather than something which arises out of a dynamic interaction between persons. The term 'supportive relationships' is thus preferred by the author and is conceptualised as relationships that evoke any positive benefit for an individual.

supportive others have been present during stressors (Heaney, Price, & Rafferty, 1995; Heinrichs, Baumgartner, Kirschbaum, & Ehlert, 2003; Tan, Basta, Sullivan, & Davidson, 1995). In addition qualitative research has reported the benefits of supportive relationships (Connell, Brazier, O’Cathain, Lloyd-Jones, & Paisley, 2012).

Although the many correlational studies do not by themselves allow causal inferences to be drawn, their findings in combination with the data from experimental, longitudinal and qualitative studies provide strong support for the assertion that supportive relationships enhance psychological well-being.

Psychological Understanding of Supportive Relationships and Psychological Well-Being

Understanding the specifics of how supportive relationships affect psychological well-being has been a challenging endeavour for researchers, due to the complexities of the processes of interpersonal relationships (Lieberman, 1986; Thoits, 2011). However, despite the mechanisms accountable for the link between supportive relationships and psychological well-being not being well understood (Reblin & Uchino, 2008; Uchino, Bowen, Carlisle, & Birmingham, 2012), several theories have been proposed.

There is acknowledgement within the scientific community that supportive relationships can both buffer against the effects of stress (Cobb, 1976; Cohen & Wills, 1985) and directly increase well-being (Cohen & Willis, 1985; Lakey & Orehek, 2011). The buffer hypothesis affirms that when individuals perceive they have support from others they gain resources and their appraisal of stress-inducing situations changes; this subsequently increases their ability to cope with stress and indirectly bolsters their psychological well-being (Cobb, 1976). This theoretical model has received extensive empirical support and continues to be a prominent theory in understanding the relationship between supportive relationships and well-being (Frese, 1999; Huynh, Xanthopoulou, & Winefield, 2013; Lee,

Koeske, & Sales, 2004; Olstad, Sexton, & Sjøgaard, 2001; Raffaelli, et al., 2012; Wilcox, 1981). Other theorists claim that supportive relationships can also promote psychological growth and well-being directly, irrespective of stress, by: sharing positive news and events, which increases the positive affect experienced from the event; enhancing engagement in life opportunities; activating positive emotions including enjoyment, enthusiasm, and pride (Feeney & Collins, 2015); bolstering self-esteem (Lee & Robbins, 1998; Muhlenkamp & Sayles, 1986); and sustaining sense of identity (Thoits, 1983).

Research has further found that supportive relationships may contribute to an individual's sense of belonging (Hagerty, Williams, Coyne, & Early, 1996) and a growing body of evidence has documented that a higher sense of belonging has shown to be associated with lower depression (Choenarom, Williams, & Hagerty, 2005; Hagerty & Williams, 1999; McLaren & Challis, 2009), anxiety (Anant, 1969) and suicidal ideation (Bailey & McLaren, 2005; Hatcher & Stubbersfield, 2013; McLaren, Gomez, Bailey, & Van der Horst, 2007).

Social capital theories, embedded within the sociology field, further contribute to the literature in trying to explain the importance of social relationships upon psychological well-being. Conceptualisations of the construct of social capital have been varied throughout the literature; however the general consensus adopted is that individuals secure benefits to themselves by being in social networks (Portes, 2000). It is posited that benefits accrued include information from sharing knowledge, safety through societal norms and expectations, and trust; this facilitates social action and provides opportunities for social engagement (Coleman, 1988). Subsequently this promotes a sense of belonging and positive identity, thereby increasing psychological well-being (Kawachi & Berkman, 2001). However the construct of social capital has generally been studied at the ecological level, focusing on the social capital of communities (Kawachi & Berkman, 2000), rather than exploring the impact

of individual relationships. Overall supportive relationships seem to enhance psychological well-being in a number of possible ways.

The Construct of Psychological Well-Being

The term ‘psychological well-being’ has already been referred to many times throughout this study and warrants further discussion. In recent years government reports have discussed a shift from focusing primarily on illness to increased efforts on preventative health and well-being (Department of Health, 2011, 2013) and this has subsequently led to ‘well-being’ becoming a key term that has entered into the political arena, informing policies (Department of Health, 2005; Thomas, 2015). Despite the widespread use of the term both in the political arena and throughout the literature, it has been conceptualised in different ways. Two main constructs of well-being often discussed in the literature are those of hedonic and eudaimonic. Hedonic well-being views well-being as subjective internal states, generally concerned with positive affect and the absence of negative emotional states, for example happiness (Kahneman, 1999). The eudaimonic perspective, however, is concerned with self-realisation and an individual’s functioning, including personal growth, autonomy, self-acceptance, life purpose, positive relationships and a sense of mastery (Ryff, 1989). The eudaimonic theoretical stance furthermore states that the actions to achieve this may be at odds with a state of happiness (Ryff & Keyes, 1995). Recently, there has been acknowledgement that rather than seeing these two constructs of well-being as opposing, they should be understood as distinct but related constructs, which, measured together, provide a comprehensive understanding of psychological well-being (Fenney & Collins, 2014). Furthermore it has been advocated that, whilst it can be useful to gain a complete picture of well-being, it can be more meaningful to examine individual constructs that are deemed to contribute to overall well-being (Diener et al., 2010). Within the literature, the drive towards conceptualising well-being as a multi-dimensional construct consisting of both hedonic and

eudaimonic components has led to the emergence of alternative terms, such as ‘thriving’ and ‘flourishing’ (Fenney & Collincs, 2014); however, within this study, this integrated position of combining any aspect of the eudaimonic and hedonic perspective is referred to as ‘psychological well-being’.

Key concepts, associated with the eudaimonic and hedonic constructs of psychological well-being, which have already been referred to throughout this thesis and thus require clarity are social isolation, loneliness, social engagement and sense of belonging. Social isolation refers to the objective absence of relationships with other people and it is the opposite of social engagement (Steptoe, Shankar, Demakakos, & Wardle, 2013). Loneliness, however, is concerned with an individual’s subjective experience of feeling alone and, although a separate construct, is opposite to an individual’s sense of belonging. Individuals who are socially isolated are therefore not necessarily lonely and similarly individuals who are lonely are not necessarily socially isolated (de Jong Gierveld, Van Tilburg, & Dykstra, 2006). Cognitive discrepancy theories of loneliness postulate that loneliness results from a mismatch between the level of social engagement desired and the level achieved (Perlman & Peplau, 1981). Therefore, even though social isolation does not always lead to an individual feeling lonely, social isolation has been reported as a possible predictor factor for experiencing loneliness (Shahtahmasebi & Scott, 1996), and loneliness has been reported to be a risk factor for depression (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Cacioppo, Hawkley, & Thisted, 2010) and low self-esteem (Peplau, Miceli, & Morasch, 1982). Although social isolation or social engagement is encapsulated within the concept of psychological well-being, the constructs of loneliness and sense of belonging are considered more pertinent in evaluating an individual’s psychological well-being.

Psychological Well-Being of Older Adults

The psychological well-being of older adults has presented a mixed picture within the literature. While some studies report that older adults' psychological well-being remains stable (Ryff, 1995), or even increases during their older adulthood years (Hamarat, Thompson, Zabrucky, Steele, & Matheny, 2001), others have found that it declines (Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002; Steptoe, Demakakos, & de Oliveira, 2012). Closer exploration of this has revealed that psychological well-being in the older adult population is not uniformly distributed. It seems that the inconsistent results are attributed to the heterogeneous characteristics of the older adult population. For example, loneliness has been found to be a function of an individual's living status, age and quality of relationships; those aged eighty and above, living alone (Dykstra, 1990; Thomas, 2015), and lacking a confiding relationship are most strongly associated with loneliness (Adams, Sanders, & Auth, 2004; Victor et al., 2005). Furthermore, it is possible that older adults are less open to discussing their emotional well-being; therefore poor psychological well-being amongst older adults may be underestimated.

Given that many older adults' relationships with supportive others are reported to decrease during their later years, and evidence documents the importance of supportive relationships for well-being, it is clear that older adults who are living alone are at risk of deterioration in their psychological well-being. It is therefore essential to support older adults who live alone to maintain supportive relationships, in order to help increase, and prevent deterioration of, their well-being. Recognising this, initiatives to reduce social isolation and feelings of loneliness amongst older adults have become key priorities for the UK government, as highlighted in several reports and policies (Department of Health, 2011; Department for Work and Pensions, 2013; Public Health England, 2015).

The Internet and Older Adults' Psychological Well-Being

The inclusion of older adults into the digital world is one such government initiative that has recently led to the emergence of computer and internet training schemes for older adults, at various places across the UK (Green & Rossall, 2010).

The internet has revolutionised many aspects of contemporary life, opening up new opportunities for communication (Department for Business Innovation and Skills, 2009; Cabinet Office, 2014), with e-mail, video-communication, social networking sites, discussion fora and online chat rooms presenting as some examples of communication modes mediated by the internet. As the internet has gained increasing popularity, the impact of the internet on older adults' psychological well-being has received increasing research attention. The literature exploring the impact of internet use on older adults' psychological well-being has, however, yielded somewhat inconsistent findings.

There has been an abundance of research documenting the positive impact of internet use on older adults' psychological well-being. Many studies report an association between higher levels of internet use and higher levels of psychological well-being (Werner, Carlson, Jordan-Marsh, & Clark, 2011), including lower levels of depression (Carpenter & Buday, 2007; Choi & DiNitto, 2013; Cotten, Ford, Ford, & Hale, 2012; Erickson & Johnson, 2011; Hamer & Stamatakis, 2014), anxiety (Cho & DiNitto, 2013), and loneliness (Cotton et al., 2013; Sum, Mathews, Hughes, & Campbell, 2008), and higher levels of happiness (Sum, Mathews, Murghasem, & Hughes, 2009), self-efficacy (Erickson & Johnson, 2011), self-confidence and a sense of accomplishment (Heo, Kim, & Won, 2011). However causal inferences cannot be made by the cross-sectional research, and the associations found with these studies may be affected by confounding variables.

A number of experimental studies have therefore tried to account for this limitation of cross-sectional research. Such studies, which used a quasi-experimental design and

introduced older adults to the internet, including online communication, reported that from pre- to post-training sessions, there were statistically significant reductions in measures of loneliness (Blažun, Saranto, & Rissanen, 2012; Danowski & Sacks, 1980; Fokkema & Knipscheer, 2007; Shapira, Barak, & Gal, 2007; Sherer, 1996), and depression (Laganá & García, 2013; McConatha, McConatha, Deaner, & Dermigny, 1995; Shapira, Barak & Gal, 2007), in addition to significantly improved quality of life (Shapira, Barak & Gal, 2007; Woodward et al., 2011) and satisfaction with life (Groves & Slack, 1994; Sherer, 1996). Moreover, perceived support (Cody, Dunn, Hoppin, & Wendt, 1999; Woodward et al., 2011) and connectivity to others (Cody et al., 1999) were also found to significantly increase following exposure to the internet. Reduced depression and loneliness were additionally reported by a further two studies, although these studies were not able to demonstrate statistical significance (Dow et al., 2008; White, et al., 2002).

Qualitative studies have also generally found that using the internet, including internet communication, can promote older adults' psychological well-being in a number of ways, including enhancing their self-esteem and confidence (Aguilar, Boerema, & Harrison, 2010; Blit-Cohen & Litwin, 2004; Clark, 2002; Dow et al., 2008; Fokkema & Knipscheer, 2007; Nahm & Resnick, 2000), and helping them shape a positive identity (Aguilar et al., 2012; Shapira et al., 2007; Xie, 2007), with studies specifically identifying how it facilitates older adults to support others (Clark, 2002) and feel more useful and important (Sayago, Sloan, & Blat, 2011). Furthermore, qualitative studies have reported that internet communication reinforces existing relationships by helping individuals to keep in touch (Aguilar et al., 2012; Hartnett et al., 2013; Russell, Campbell, & Hughes, 2008), feel more connected with others (Blit-Cohen & Litwin, 2004; Clark, 2002; Dow et al., 2008; Gatto & Tak, 2008; Hartnet et al., 2013; Sayago, Sloan & Blatt, 2011), and feel a greater sense of belonging (Shapira et al., 2007). Lastly, qualitative studies have also reported that older adults felt less isolated and

lonely (Aguilar et al., 2012; Ballantyne, Trenwith, Zubrinich, & Corlis, 2010; Cark, 2002; Fokkema & Knipscheer, 2007; Malcolm et al., 2002) and experienced more positive emotions (Shapira et al., 2007), including enjoyment (Nahm & Resnick, 2000), as a result of using the internet.

Despite these positive findings of the internet on older adults' psychological well-being and social support other studies have not found such positive benefits. One study found that older adults who used the internet to communicate with others via chat rooms and email was associated with them experiencing more psychological problems than those who used online communication less often (Noel & Epstein, 2008), while another study found no relationship found between computer-mediated social support and older adults' psychological well-being (Nahn, Resnick & Mills, 2003). Furthermore a number of experimental studies found no impact of computer and internet training on psychological well-being (Slegers, Van Boxtel, & Jolles, 2008; Woodward et al., 2013), including measures of loneliness and depression (Woodward, Wishart, Bakk, Kobayashi, & Tupper, 2011) and social support (Woodward et al., 2013). Moreover, one study that controlled for trainer effects reported that only the older adults who received support from a trainer demonstrated statistically significant improved self-esteem and decreased depression (Billipp, 2001). Additionally, Dickinson & Gregor (2006) who conducted a literature review of computer use on older adults' psychological well-being claimed that many of the existing studies are methodologically flawed, primarily due to the failure to distinguish, within experimental studies, between the effects of the support received with the computer training and the computer use. The authors further discuss how many studies misattribute causality within correlational studies. Therefore they note that many of the studies do not provide sufficient evidence for supporting the proposition that the use of computers by older adults enhances their psychological well-being.

It is noteworthy that the inconsistent results within the literature may be due to the internet being examined in its entirety, which includes various different functions of the internet. However, the internet's different functions are likely to impact upon older adults' psychological well-being in different ways. Indeed, it has been found in one study that use of internet communicative functions was associated with decreased depressive symptoms, while use of non-communicative aspects of the internet was associated with increased depressive symptoms (Bessière, Pressman, Kiesler, & Kraut, 2010). Although the direction of causality of this study cannot be specified, the authors suggest that the increased depression associated with non-communicative aspects of the internet may be due to individuals using the internet for information, for example health information, which results in rumination and over-attention to health problems, whereas they note that the decreased depressive symptoms associated with using the internet to communicate with family or friends may be due to the increased social support that they may have received. Even various internet communicative functions have been found to impact upon older adults' psychological well-being differently; for example, in one study, using the internet to communicate with friends or family was found to be associated with decreased levels of loneliness, whereas using it to communicate with unknown people was associated with greater levels of loneliness (Sum et al., 2008). Furthermore, Xie (2008) found that different modes of internet-mediated communication were used in different ways and affected the type of social support exchanged between persons. For example, voice chat rooms were used for seeking companionship, online fora were used for exchanging information and exchanging informational support, and instant messaging was used for exchanging emotional support and was used for more intimate conversations. These findings demonstrate the importance of investigating specific modes of internet-mediated communication. By exploring the internet as one entity it appears that it has resulted in the literature producing inconsistent findings, which pose difficulties for

interpretation and generalisation. Furthermore there is little guidance in government policies as to which aspect of the internet may help to reduce loneliness or enhance psychological well-being. This makes it very difficult for internet trainers to direct their attention towards teaching older adults functions of the internet that are most likely to benefit them. It therefore seems that ongoing research is required to explore the different functions of the internet.

Of interest to the current study is the potential of video-communication to maintain relationships, by keeping in touch with significant others and to reconnect with friends and relatives, and thus enhance psychological well-being. Video-communication enables face-to-face communication in real-time, in which individuals see one another's gestures, physical appearance, facial expressions and their surrounding environment. It has been asserted that the more communication cues technology facilitates in enhancing visual presence between individuals, the more enhanced the intimacy and quality of the communication: an idea that has been labelled the social presence theory (Short, Williams, & Christie, 1976). This theory has since been extended to explain how different technological mediums influence the processes and mental representations in social interactions (Biocca & Harms, 2002). It is proposed that there exists three different levels of social presence; the first level is awareness of the other's presence, the second level involves a sense of the other's attentional engagement, emotional state and behavioural intentions, and the third level is a dynamic process where each individual in the communication both share a sense that they are both aware of each other. It is noted that when there is a higher level of social presence between individuals when they are communicating it helps to reduce uncertainty in relationships and thus strengthens relationships.

The social presence theory has received empirical support; it has been found that video-communication increased social presence and enhanced communication between parents of children with cystic fibrosis, compared to regular telephone conversations (Adachi

& Miyasaka, 1996), whereas it has been reported that email limits the sharing of emotional support due to the lack of physical presence and the inability to see body language (Pfeil, Zaphiris, & Wilson, 2009). Furthermore, a qualitative study noted that participants from their research reported that physical presence and body language were important when supporting someone emotionally (Eleni, Antigoni, & Panayiotis, 2015). The current study therefore hypothesised that video-communication may present as a promising intervention in enhancing older adults' supportive relationships and subsequently their psychological well-being. The use of video-communication in health services for older adults has proliferated within the academic field (Demiris et al., 2012; Peel, Russel, & Gray, 2011). However, the impact of video-communication on older adults' communication with their friends and relatives is only beginning to emerge within the literature.

Literature Search: Video-communication, Older Adults and Psychological Well-Being

Given the importance of seeking interventions to reduce older adults' feelings of loneliness, and to enhance their overall psychological well-being, a systematic literature review was conducted.

Literature review research question. The following review aimed to answer what impact video-communication has on older adults' existing relationships and their psychological well-being, when it is used to communicate with friends and relatives. A systematic search was conducted, followed by a narrative synthesis to amalgamate the findings.

Inclusion and exclusion criteria. Studies were selected for the review based upon the following inclusion and exclusion criteria.

Participants. Initially the inclusion was limited to participants aged sixty-five and above, due to this being the age, until recently, at which individuals were eligible to retire in the UK and when they are likely to be at risk of becoming socially isolated. However, from screening the articles, it became apparent that some relevant articles included individuals in their late fifties and early sixties. Exclusion of these articles would have therefore resulted in the rejection of many relevant studies. The inclusion criteria were therefore revised to include individuals aged fifty-five and above, of any ethnicity, marital or social living status.

Intervention. Articles were included in the review if any technological device was used that enabled the participants to communicate with their friends or relatives via video in real-time, so that they could hear and see each other when talking. Articles were excluded if the video-communication was not used by participants for communicating with their friends or relatives. The focus was on the use of video-communication with older adults friends or relatives, as opposed to individuals they did not know, because it has been noted within the literature that as individuals age into older adulthood they become more selective with their relationships, often reducing the number of people within their network and sustaining only those relationships with whom they have a close relationship with (Carstensen, 1992).

Outcomes. Lastly, it was required that the articles investigated the impact of video-communication on any dimension of psychological well-being, including: perceived social isolation; social connectedness; relationship quality; social support; loneliness; sense of

belonging; stress; self-esteem; satisfaction with life; anxiety; or depression. Both qualitative and quantitative research designs were permitted within the review.

Search Strategy. The following electronic databases were searched for articles that met the inclusion criteria: PsycARTICLES (1984 to 2015), CINAHL (1985 to 2015), Library, Information Science & Technology (1960 to 2015) and MEDLINE (1968 to 2015). The search was not limited by publication date or language, and both non-peer and peer-reviewed articles were included. The limiter ‘abstract only’ and the expander ‘apply related words’ were used in the database search. This search strategy, along with the results, is depicted in Table 1.

Table 1

Search Terms and Results of the Search Strategy

Search No.	Search Terms	Results
1	Computer-mediated communication* OR internet OR online OR Skype OR Facetime OR video communicat* OR video-conferenc* OR human-computer interaction OR videotelephon* OR Google hangout OR video call* OR videocall* OR videocommunicat* OR video conferenc* OR videoconferenc* OR videophon* OR Videophon* OR video chat OR videochat OR web conferenc* OR webconferenc* OR web call OR televist* OR video telephony	324,674
2	Older adult* OR senior citizen* OR retir* OR geriatric* OR senior* OR elder* OR older people* OR nursing resident*	569,866
3	Psychosocial OR belong* OR stress* OR quality of life OR connect* OR depression* OR anxiety OR well-being OR well being OR wellness OR psychological OR self-esteem OR lone* OR social support OR self esteem OR social isolation	1,817,786
4	#1 & #2 & #3	1,635

Search Results. Of the 1,635 articles initially retrieved from the combined electronic database search, 338 were removed due to being duplicates. The titles and abstracts of the remaining 1,297 articles were reviewed by the author, and a further 1,216 were excluded due to the articles not having anything to do with video-communication on older adults' psychological well-being; for example, many of these articles were focused on telehealth. After reviewing the full-text of the remaining 81 articles, 71 studies were further excluded due to them not meeting the inclusion criteria; 1 study was not in English, 1 study did not use video-communication with friends or family, and 69 studies did not specifically explore the impact of video-communication on psychological well-being. Ten studies from this search were therefore included in the review.

To identify additional relevant research the search was further supplemented by contacting the authors of reviewed research and screening the reference lists of reviewed articles. Four relevant studies (Fujimura et al., 2007; Milliken, 2012; Tsai & Tsai, 2010) were identified from screening reference lists and one article was retrieved (Hensel, Oliver, Demiris, & Willis, 2006) from an author of another study. The four studies identified from screening the reference lists met the inclusion criteria and were included in the review; however, the article retrieved from the author of another study did not meet the criteria and thus it was excluded. In total 14 research studies were included in this review. Figure 1 illustrates the search process.

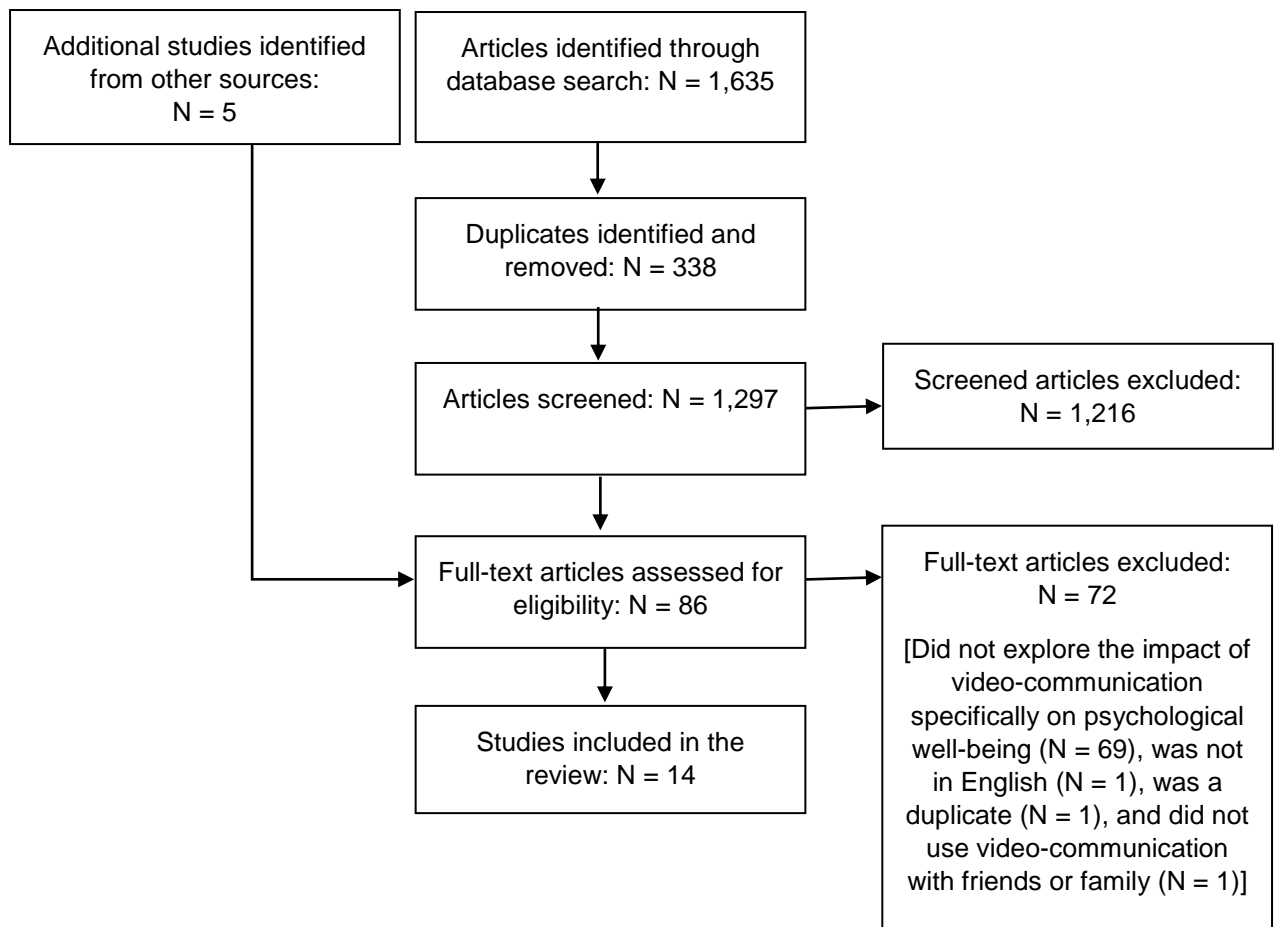


Figure 1. Search process illustrating studies included and excluded from the systematic review.

Data extraction. Data was extracted from the articles by the author and included: country in which the research was conducted; study design; participants' characteristics; sample size; analysis used; and research results and interpretations.

Quality appraisal. All reviewed studies that met the inclusion criteria were subjected to a methodological quality assessment, to assess the risk of bias with the research findings. Although many systematic reviews employ a scoring system to assess the quality of research, it has been posited that it is an ambiguous (Sanderson, Tatt, & Higgins, 2007) and unreliable method for assessing the quality of the evidence-base (Jüni, Witschi, Bloch, & Egger, 1999). It is advocated that it is more meaningful and reliable to assess the quality of the individual

components of a study (Jüni, Altman, & Egger, 2001; Pawson, Greenhalgh, Harvey, & Walshe, 2005) and evaluate this within the context of the research design (Dixon-Woods, Shaw, Agarwal, & Smith, 2004). Separate appraisal tools for specific research designs were therefore used to assess the quality of the different research studies included in the review.

The qualitative studies were appraised using the Critical Appraisal Skills Programme (Public Health Resource Unit, 2006) guideline for qualitative research and Lincoln and Guba's (1985, cited in Polit & Beck, 2008) framework for assessing the trustworthiness of qualitative research, and the Critical Appraisal Guideline for Single Case Research (Atkins & Sampson, 2002) was used to assess the quality of the case study. Given there is no agreed appraisal tool for assessing quasi-experimental designs (Katrak, Bialocerkowski, Massy-Westropp, Kumar, & Grimmer, 2004), Greenhalgh's (1997) appraisal checklist guided the appraisal of the quantitative studies. No studies were excluded based on the methodological assessment; however, their strengths and limitations are discussed in the review.

Data synthesis. It is argued that all research, regardless of its design, helps in the understanding of an aspect of a phenomenon and therefore synthesis of research findings from different research designs can aid greater understanding of phenomena than a single approach could yield (Mays, Pope, & Popay, 2005). Although there is no single agreed method for synthesising qualitative and quantitative data (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005; Mays et al., 2005), a narrative synthesis, which presents both qualitative and quantitative findings in a narrative approach (Snilstveita, Oliver, & Vojtkova, 2012) was adopted as this method seemed the most appropriate given the limited and diverse range of studies that has explored the impact of video-communication on older adults' psychological well-being. Synthesis of the findings involved a three step process. The quantitative findings were compared by narrative analysis. The qualitative data was then

subjected to thematic synthesis (Thomas & Harden, 2008): data was coded, line by line and compared and contrasted to identify descriptive themes, followed by generating higher-order analytical themes. The themes were guided by the research question and the literature explored. The quantitative and qualitative data were then presented in a narrative account to help answer the review question.

Synthesis of findings.

Study Design. The review comprised of three quantitative studies (Schwindenhammer, 2014; Tsai & Tsai, 2011; Tsai, Tsai, Wang, Chang, & Chu, 2010), five qualitative studies (Aguilar et al., 2010; Hensel, Parker-Oliver, & Demiris, 2007; Seelye et al., 2012; Tsai, Shillair, Cotten, Winstead, & Yost, 2015; Tsai & Tsai, 2010) and six mixed-method studies (Demiris et al., 2008; Mickus & Luz, 2002; Milliken, O'Donnell, Gibson, & Daniels, 2012; van der Heide, Willems, Spreeuwenberg, Rietman, & de Witte, 2012), two of which were reported within one article (Fujimura et al., 2007). However the quantitative data of five of the mixed-method studies (Demiris et al., 2008; Fujimura et al., 2007; Mickus & Luz, 2002; Milliken, 2012) and the qualitative data of the other mixed-method study (van der Heide et al., 2012) did not pertain to psychological well-being. This information was therefore not included in the review. For simplicity of this review the mixed-methods studies are therefore referred to, and included with, the quantitative or qualitative studies, which totals four quantitative studies and ten qualitative studies.

All of the quantitative studies employed a quasi-experimental repeated measures design to evaluate the effectiveness of older adults' use of video-communication on their psychological well-being. Three of these included a control group who received care as usual and did not receive any intervention (Tsai & Tsai, 2011; Tsai et al., 2010;

Schwindenhammer, 2013), while the other study did not include a control group (van der Heide et al., 2012).

Six of the ten qualitative studies conducted semi-structured interviews to ascertain participants' experiences with using the technological device, one of which recruited pre-existing users of computers (Tsai et al., 2015), while the other five studies introduced and supported older adults with the technology for three months prior to interviewing them (Demiris et al., 2008; Fujimura et al., 2007; Hensel et al., 2007; Tsai & Tsai, 2010). Three other qualitative studies administered surveys to older adults to ascertain their opinions of using video-communication: two of these studies exposed older adults to video-communication, either for two days (Seelye et al., 2012), or six months (Mickus & Luz, 2002), while the other study recruited pre-existing users of video-communication (Milliken, 2012). The remaining qualitative study conducted online focus groups to pre-existing internet users (Aguilar et al., 2010). The characteristics and the results of the studies included in the review are described below and a table summarising this information and their findings can be found in Appendix A.

Participants. The studies reviewed recruited individuals living in supported living accommodations in America (Tsai et al., 2015), residential nursing care accommodations, in America (Demiris et al., 2008; Hensel et al., 2007; Mickus & Luz, 2002; Schwindenhammer, 2014), and Taiwan (Tsai et al., 2010; Tsai & Tsai, 2010; Tsai & Tsai, 2011), and individuals living in the community in their own homes, in America (Seelye, 2012), Canada (Milliken, 2012), Japan (Fujimura et al., 2007), or the Netherlands (Van der Heide et al., 2012). One study that recruited participants from Australia did not report where the participants were living (Aguilar et al., 2010). All participants were recruited from a convenience sample.

Most of the studies recruited participants who were living alone (Demiris et al., 2008; Hensel et al., 2007; Mickus & Luz, 2002; Schwindenhammer, 2014; Seelye, 2012; Tsai et al., 2010; Tsai & Tsai, 2010; Tsai & Tsai, 2011), with the exception of one study that recruited participants who were either living alone or with someone (Van der Heide et al., 2012), and five studies did not report the participants' living status (Aguilar et al., 2010; Fujimura et al., 2007; Milliken, 2012; Tsai et al., 2015).

Most of the studies, except two, involved individuals who were aged fifty-five and over. The other two studies (Mickus & Luz, 2002; Van der Heide et al., 2012) included a few individuals who were younger, whose data could not be separated from those who were aged fifty-five and above and therefore their data is included in the study's overall findings.

The numbers of participants recruited to the qualitative studies were: one (Hensel et al., 2007), two (Demiris et al., 2008), four (Mickus & Luz, 2002), six (Milliken, 2012), eight (Fujimura et al., 2007; Seelye et al., 2012), nineteen (Fujimura et al., 2007), twenty-one (Tsai et al., 2015) and thirty-four (Tsai & Tsai, 2010). The quantitative studies recruited twenty-four (Tsai et al., 2010), forty (Schwindenhammer, 2014; Tsai & Tsai, 2011) and eighty-five (Van de Heide et al., 2012) participants to their intervention group.

The quantitative studies that used a control group (Tsai & Tsai, 2011; Tsai et al., 2010; Schwindenhammer, 2013) reported that the control and experimental groups did not differ at baseline on demographics or their scores on the measures of psychological well-being.

Video-communication device explored. Three studies exposed the older adults to using a video-phone to communicate with their relatives, which was comprised of a phone with a small video screen connected through a telephone line (Demiris et al., 2008; Hensel et al., 2007; Mickus & Luz, 2002). Four studies used a technological device that included other

functions in addition to video-communication; one study employed a remote controlled video-communication robot, operated through broadband (Seelye et al., 2012), two studies used a touch screen internet communication computer system, which included a camera and microphone (Fujimura et al., 2007), and the other study developed a system which was accessed through a television and enabled older adults to video-call relatives, via a microphone and a camera (Van der Heide et al., 2012). Four other studies used either the video-communication application Skype or Windows Live messenger, accessed through broadband and operated via a computer (Schwindenhammer, 2014; Tsai et al., 2010; Tsai & Tsai 2010; Tsai & Tsai 2011). The three studies that recruited older adults who already used video-communication explored their views of using any video-communication software accessed via the internet (Aguilar et al., 2010), or mobile touch screen tablets which had access to the internet (Tsai et al., 2015).

Intervention. Eleven studies exposed older adults to video-communication who had no prior experience of using it to explore the impact that it had on their psychological well-being (Demiris et al., 2008; Fujimura et al., 2007; Hensel et al., 2007; Mickus & Luz, 2002; Schwindenhammer, 2014; Seelye et al., 2012; Tsai et al., 2010; Tsai & Tsai, 2010; Tsai & Tsai, 2011; Van der Heide et al., 2012). Four of these studies provided participants with support to help them make video-calls once per week, for either five minutes (Tsai et al., 2010; Tsai & Tsai, 2010; Tsai & Tsai 2011), or between ten to thirty minutes depending on how long the participant wished to spend talking to their relatives (Schwindenhammer, 2014). Another study (Seelye et al., 2012) trained participants to allow them to use it on their own for two days and they received two calls from relatives or friends, and two calls from the research team. Six of the studies reported that they enabled participants to make video-calls weekly for three months (Demiris et al., 2008; Fujimura et al., 2007; Hensel et al., 2007), six

months (Mickus & Luz, 2002) or a year (Van de Heide et al., 2012). For two of these studies, participants were instructed to make regular contact (Mickus & Luz, 2002), or asked specifically to make weekly video-calls to relatives (Demiris et al., 2008). It is unclear for some of these studies (Fujimura et al., 2007; Hensel et al., 2007; Van de Heide et al., 2012) whether similar instructions were provided or how much support participants received with using the video-communication device.

Data Collection and analysis. Most of the qualitative studies that conducted interviews were based on an interview schedule that was reportedly developed and reviewed by several members of the research team. Only three studies (Fujimura et al., 2007; Seelye et al., 2012) did not do this. However with four studies (Demiris et al., 2008; Fujimura et al., 2007; Hensel et al., 2007), the researcher's role was not explicated and it was unclear who conducted the interview, making it difficult to assess how the relationship between the researcher and the participants may have influenced the results.

In terms of analysis, several studies reported transcribing and performing a qualitative analysis on the data to generate themes (Aguilar et al., 2010; Demiris et al., 2008; Tsai et al., 2015; Tsai & Tsai, 2010), and with two studies (Aguilar et al., 2010; Hensel et al., 2007), the validity of their findings was enhanced by the authors checking their findings with the participants. Although one study (Hensel et al., 2007) provided detailed analysis of the data, which was supported by raw data, one study (Demiris et al., 2008) reported little interpretation of the data, presenting a lot of the raw data, whilst another two other studies (Fujimura et al., 2007) reported little data and no raw data. Furthermore for the studies which recruited older adults along with younger adults it is unclear to whom the results pertain as the findings were merged (Fujimura et al., 2007; Hensel et al., 2007; Mickus & Luz, 2002). For two of the three qualitative studies that used a survey (Milliken et al., 2012; Seelye et al.,

2012), it is unclear if the surveys were completed by participants alone or whether a member of the research team completed them with the participants. Not being provided with this information makes it difficult to assess whether any bias may have occurred with the data collection process. It is also not clear with three of the studies whether the results pertain specifically to the video-communication used or to any other functions of the technological system (Fujimura et al., 2007; Seelye et al., 2012; Tsai et al., 2015).

For two of the quantitative studies, participants in both the experimental and comparison groups completed measures for depressive symptoms, loneliness and social support, measured at baseline and again at one week and three months (Tsai et al., 2010) and three, six and twelve months (Tsai & Tsai, 2011). For both these studies, the differences in scores between the groups and across the different time points were analysed using multiple linear regression. Repeated measures ANOVA statistical tests were conducted on one of the other quantitative studies to determine whether there were changes in depressive and loneliness scores in the intervention and control group (Schwindenhammer, 2014). The quantitative study which did not include a control group (Van der Heide et al., 2012) completed measures of loneliness at baseline and one year after instalment of the technological device, and the results were analysed by repeated measures t-tests.

Study's Findings. The main themes identified from the qualitative and quantitative findings of the articles were that video-communication increased participants' sense of closeness with whom they were communicating, made them feel more involved with their relatives, enhanced positive feelings and reduced negative feelings and enhanced the social support they received.

Being physically and emotionally closer. Although there were some participants across the studies that did not feel the video-communication impacted upon the quality of their conversations (Demiris et al., 2008) or face-to-face visits (Mickus & Luz, 2002), the most dominant theme from most of the qualitative studies that emerged within and across the qualitative studies was how the video-communication made the older adults feel physically and emotionally closer to those with whom they were communicating. It was found that it increased their perception of social presence; older adults felt as if they were physically together with those that they were communicating with, rather than being miles apart from each other (Demiris et al., 2008; Fujimura et al., 2007; Hensel et al., 2007; Milliken, 2012). The visual information that was transmitted enabled the older adults in the studies to develop a deeper connection and feel emotionally closer with those they were communicating with (Milliken, 2012). It was also reported that as a result of using video-communication the conversations felt more personal (Demiris et al., 2008) and social interactions (Aguilar et al., 2010) and social visits (Mickus & Luz, 2002) were improved. Another study also talked about how the video-communication enhanced their social connectedness; however, in this study, it is unclear whether they meant physically or emotionally more connected (Seelye et al., 2012).

Being included. Feeling included with family or friends, as a result of using the video-communication, appeared to arise as a theme across the qualitative studies. When the older adults communicated with their family members, the live video enabled the older adults to be included in the family interactions and made them feel as if they continued to be part of their family (Aguilar et al., 2008; Demiris et al., 2008; Hensel et al., 2007; Tsai et al., 2015). It was found that older adults valued how the video-communication enabled them to visually share things or others (Demiris et al., 2008; Hensel et al., 2007) and share information with each

other (Milliken, 2012). This suggests that perhaps the video aspect which enabled this resulted in the older adults feeling included.

Enhanced positive feelings and reduced negative feelings. A recurring theme that emerged from the qualitative studies (Demiris et al., 2008; Mickus & Luz, 2002; Tsai & Tsai, 2010) was that following using the video-communication some participants described experiencing positive feelings, for example enjoyment (Milliken, 2012; Seelye et al., 2012; Tsai et al., 2015) and excitement (Tsai & Tsai, 2010), while other studies implied positive feelings may have occurred, by reporting that the video-communication brought about a lot of fun (Hensel et al., 2007; Tsai & Tsai, 2010) and was a positive experience (Mickus & Luz, 2002; Seelye et al., 2012). One study reported that the participants felt better about themselves and felt more current for using technology and the authors suggested that this may be one of the reasons to account for the positive feelings experienced with using it (Tsai et al., 2015). A reduction in psychological distress was also experienced from using the video-communication, with one study reporting that participants spoke about feeling less isolated and lonely (Demiris et al., 2008) and, although not discussed by the authors, the study also includes raw data illustrating an individual reporting that the video-call helped in reducing depression (Demiris et al., 2008). It was further noted that video-communication reduced participants' anxieties and provided them with "peace of mind" (Tsai & Tsai, 2010, p.1542), because they were able to see how family members were managing. Other studies either discussed how the video-communication enabled the older adults to check up on their family and evaluate how they were doing (Demiris et al., 2008; Hensel et al., 2007), or they presented raw data that illustrated and concurred with this theme (Seelye et al., 2012).

The data from the quantitative studies support the qualitative data in finding that the video-communication reduced psychological distress. From baseline, compared to the control

groups, video-communication significantly reduced feelings of loneliness at one week (Tsai et al., 2010) and three months (Schwindenhammer, 2014; Tsai et al., 2010; Tsai & Tsai, 2011) and depressive status at three months (Schwindenhammer, 2014; Tsai et al., 2010; Tsai & Tsai, 2011), and these were maintained at six and twelve months (Tsai & Tsai, 2011). It was also found to reduce feelings of both social and emotional loneliness from baseline to twelve months following use of the technological device (Van der Heide et al., 2012).

Although most of the qualitative studies reported that the video-communication produced positive feelings or reduced negative feelings for many participants, some studies' findings suggest that the video-communication aroused negative feelings in some participants. Some participants initially experienced anxiety regarding their competence with using the video-communication and not knowing what to say during conversations (Tsai et al., 2010). Although technical difficulties (Hensel et al., 2007; Mickus & Luz, 2002) and cognitive impairments (Mickus & Luz, 2002) did not generally impact negatively upon the participants' overall experience with the video-communication, some studies reported that technical issues or difficulty with operating the video-communication made participants feel annoyed (Fujimura et al., 2007), interfered with enjoyment (Milliken, 2012), and made the experience confusing (Demiris et al., 2008; Seeyle et al., 2012), distressing (Tsai & Tasi, 2010) and frustrating. One author speculated that the negative emotions elicited due to using the video-communication may have been due to an intolerance to technical difficulties (Mickus & Luz, 2002), whilst another study reported that the benefits of the video-communication for some participants may have counterbalanced any frustration that may have been caused by technical difficulties (Milliken, 2012). Furthermore another study found that those reporting that the video-communication enhanced the quality of their communications were those who experienced the highest level of technical quality (Demiris et al., 2008).

Enhanced social support. The video-communication enhanced social interactions, improved social visits (Mickus & Luz, 2002), made it easier to communicate when visiting in person was restricted (Milliken, 2012; Tsai & Tsai, 2010), helped to convey factual information (Milliken, 2012; Demiris et al., 2008) and facilitated affect-orientated conversations (Hensel et al., 2007), suggesting that the video-communication may have enhanced social support. The findings from the quantitative data further support the claim that video-communication has an impact on social support. From baseline scores, changes in emotional social support scores at one week (Tsai et al., 2010), three months (Tsai et al., 2010; Tsai et al., 2011) and twelve months (Tsai & Tsai, 2011), and appraisal support scores at one week (Tsai et al., 2010), and three months (Tsai et al., 2010; Tsai & Tsai, 2011) were found to be significantly higher in the experimental groups compared to the changes in the control groups.

Although social support received by the older adults appeared to be generally enhanced from using video-communication, significant differences in appraisal social support were not maintained between the experimental and control group at six months and twelve months (Tsai & Tsai 2011). Moreover, although one study found that using video-communication did not have any effect on instrumental social support (Tsai et al., 2010), which is support offered in a tangible or physical way, another study reported that instrumental support scores significantly decreased at six and twelve months following the intervention (Tsai & Tsai 2011). It was also found that the video-communication did not change the frequency of in person visits (Demiris et al., 2008; Mickus & Luz, 2002; Tsai & Tsai, 2011), suggesting that the video-communication may not have had an impact on face-to-face social support received.

Discussion. The systematic review aimed to identify and review the existing literature that explored the impact of video-communication on older adults' psychological well-being when it was used to communicate with relatives or friends. The findings of the reviewed studies suggest that the video-communication generally had a positive impact on older adults' psychological well-being. The video-communication appeared to result in participants feeling closer to those they were communicating with and they gained an enhanced sense of being included in family interactions. For many of the participants it also appeared to enhance positive emotions, such as enjoyment and excitement, and reduce negative feelings of anxiety, loneliness and depression. Additionally it resulted in participants' conversations being enhanced and them receiving additional social support, particularly emotional support. There were some studies, however, which noted that some older adults reported that the video-communication had no effect on their sense of closeness to others, and for a few participants using the video-communication aroused negative feelings, such as frustration, when technical difficulties occurred, or anxiety, from being worried about their competence in using the technology or what to say to those who they were communicating with. Moreover instrumental support received by family or friends was found to be either unaffected or decreased with the use of video-communication.

The findings of the results did not identify any clear factors, such as age or living accommodation, which could distinguish between those participants whose psychological well-being appeared to be enhanced by using the video-communication compared to those participants who did not gain such benefits.

Although the reviewed studies provide some insight into addressing what impact video-communication has on older adults' psychological well-being the methodological rigour of some of the studies was not sufficient for fully answering this question. All four of the experimental studies did not include an adequate control group that could account for the

increased contact with the researcher or the sense of accomplishment that may have occurred with learning something new. It is also notable that some of the studies' technological devices included other functions other than just video-communication (Fujimura et al., 2007; Van der Heide et al., 2012). These studies' methodology therefore makes it difficult to attribute the results to the video-communication per se.

Furthermore, whilst two of the experimental studies (Tsai et al., 2010; Tsai & Tsai., 2011) used video-communication software connected by broadband connection, it cannot be fully inferred that the video-communication reduced the participants' feelings of depression, because the Geriatric Depression Scale used in the study is reported to be an inappropriate measure for nursing home residents (Montoria & Izal, 1996).

Moreover, two of the studies' results were merged with other individuals than just older adults, such as their relatives, social workers, or individuals younger than fifty-five. For these studies it is therefore unclear whether the results always pertained to the older adults or whether they represented the views of the other individuals in the study.

Although some of the studies seemed to imply that positive feelings occurred as a result of the video-communication this cannot be concluded. For example, while some studies reported that the participants found the using the video-communication was a positive experience or was fun, it does not necessarily mean that using the technology impacted upon the participants' emotional state in making them feel better in mood. Furthermore although the quantitative studies measured participants' depressive symptoms and feelings of loneliness, no measure exploring positive emotional states was used; therefore, the quantitative studies do not explore the effectiveness of video-communication for enhancing older adults' positive emotions.

It is also noteworthy that the qualitative studies which recruited participants who were already using video-communication were more likely to elicit positive views of using video-

communication (Milliken, 2012) and therefore this provides a biased perspective.

Furthermore, most of the qualitative studies were based on small sample sizes, from specific populations, and therefore the findings cannot be easily generalised.

A significant disadvantage of the review is that it included any device that enabled participants to communicate with family and friends by video, which makes it hard to compare and synthesise the results from the different studies as other factors relating to the technological device employed may have influenced the findings. For example, the majority of the qualitative studies used either a video-phone, accessed through dial-up connection, which resulted in some technical difficulties, or they used an innovative technological device, neither of which are commercial devices used by the general population. It is likely that communicating via dial-up connection would result in a different experience to video-communication connected via broadband, because the speed and quality of the visual and audio components would be of a lower quality compared to being connected via broadband. This may have therefore resulted in the technical difficulties and subsequently the participants feeling frustrated. Furthermore the participants' interaction with the novel technological devices, such as the robot, may be of a different experience to commercial devices and therefore the results may not generalise to more popular software programmes such as Skype, accessed through more conventional devices, such as computers, laptops or tablets.

Three of the quantitative studies included in the review recruited older adults who were living in residential nursing homes. The characteristics of this population may have yielded different findings to an older adult population who are not residing in a nursing home. For example, it has been found that older adults residing in residential nursing homes often experience higher levels of depression compared to older adults living in the community (Jongenelis, et al., 2004). It is therefore possible that either the increased social interactions

with those providing the training support, or the increased activity of using the video-communication, may have resulted in a decrease in the older adults' depressive symptoms and feelings of loneliness. Older adults who are in better physical health and are more engaged in various social and recreational activities may therefore not benefit as much from the video-communication.

None of the studies explored the impact of video-communication with a UK population of older adults and therefore it is unclear whether the results of the studies can be generalised to a UK population.

Furthermore, although some of the qualitative studies suggested that the participants may have felt closer to family and friends as a result of using the video-communication, no study explored the effectiveness of video-communication in enhancing older adults' sense of belonging, which is how they feel they fit in with their family.

Another notable disadvantage of the review is that although effort was taken to identify all studies which explored the impact of video-communication on older adults' psychological well-being, articles failing to produce findings that show any benefits of video-communication are unlikely to have been published and therefore may not have been identified and included in this review. Lastly less methodologically sound studies were included in the review. Therefore, while the review provides some indication about the potential impact of video-communication on older adults' psychological well-being, the findings have to be treated with caution.

Aims and Objectives

The current research aims to address the methodological limitations in the literature, and gain further insight, by exploring the following aims with a UK sample:

1. What impact video-communication, when used to communicate with family or friends, has on older adults': (a) sense of belonging; (b) perceived social support; (c) loneliness; (d) self-esteem; (e) depression; (f) anxiety; and (g) satisfaction with life.
2. What are older adults' experiences of using video-communication with their relatives or friends.

To achieve these aims, the proposed research has two main objectives:

1. To explore any statistical differences of the psychological well-being measure scores across time and between the conditions.
2. To explore the participants' perspectives on: (a) The advantages and disadvantages of using video-communication to communicate with their family or friends; (b) their understanding of the reasons for the advantages and disadvantages of the video-communication; (c) the impact that using video-communication has on their sense of belonging, social support, loneliness, self-esteem, depression and anxiety, and satisfaction with life.

Method

The study begins with an explanation of the study's epistemological positioning and is followed by an in-depth description of the research method employed, including: the research design; sampling procedure; materials utilised; research procedure; and quantitative and qualitative analyses. Ethical implications of the study are also discussed.

Epistemological Positioning

Research develops from the desire to make sense of the world; it is based on certain sets of assumptions about how we understand what knowledge is and how it can be acquired (Hamlyn & Hamlyn, 1970). Traditionally the philosophy of social sciences was dominated by positivism, whereby knowledge about the world was considered to be objective, quantifiable and universal (Blaikie, 2007). However an alternative position of interpretivism emerged, as a number of theorists rejected the positivistic position for neglecting individuals' subjective experiences to understand social phenomena (Berger & Luckmann, 1967; Blumer, 1969; Cicourel, 1964). Whilst there are varying perspectives on interpretivism there is consensus that it views reality as socially constructed by and between individuals who experience it (Evans & Hardy, 2010).

Critical realism is a more recent philosophical perspective, albeit one that is concerned more with ontology, the exploration of what constitutes reality, than with epistemology, which is the theory of knowledge (Cruickshank, 2007). It has arisen out of a perception that both the positivistic and interpretivist positions are overly simplified and do not fully capture the complexities of the social world (Danermark, Ekström, Jakobsen, & Karlsson, 2002). Although critical realists share the stance of positivists in seeking patterns and causalities that can be generalised, they reject the notion that knowledge of the social

world can be reduced to observable cause and effect statistical relationships (Danermark, 2002; McEvoy & Richards, 2006; Nairn, 2012; Sayer, 2002). Their argument is that social processes are often influenced by contextual conditions, which can risk misattribution of causality. Furthermore, whilst they acknowledge the influence of societal context in influencing reality and it is accepted that the lived experience of phenomena provides another dimension to reality, they purport that self-reported accounts may be misguided, due to unconscious processes operating. Reality is thus considered multi-dimensional within the critical realist paradigm. A combination of empirical investigations is therefore required to identify relationships between patterns, and anomalies that occur, between what is experienced, what is observed, and the underlying mechanisms (Sayer, 2002). Only through investigation of the interplay between the mechanisms of these different realities can knowledge of phenomena be acquired.

This research adopts the critical realist position; it assumes that there are multiple realities to understanding the impact of video-communication on older adults' emotional well-being and thus it appreciates that different methodologies can address this inquiry.

Study Design

Although randomised controlled trials are considered the gold standard, and most robust way, for evaluating the effectiveness of health interventions, (Humphris, 2005) (Solomon, Cavanaugh, & Draine, 2009), they are not always feasible, or even appropriate, for answering particular social research questions (Craig, et al., 2013). One reason for this is that social interventions are influenced more by unsystematic variation than medical interventions (Campbell, et al., 2000), and this can result in cause and effect relationships being obfuscated by confounding variables, making it difficult to identify the actual effect of an intervention on

a given outcome (Craig et al., 2013). The Medical Research Council's (2000) framework for randomised controlled trials of complex interventions therefore highlights the importance of preliminary research prior to conducting randomised controlled trials. The report asserts that prior to a randomised controlled trial, research should undergo an exploratory trial to help to define the key 'active' components of the intervention which are related to the treatment effect and those which are not, and to delineate which participants are most likely to benefit from the intervention and those who it may not be suitable for. Given the lack of research exploring the effectiveness of video-communication on older adults' psychological well-being, conducting a randomised controlled trial would thus be inappropriate. Therefore, the current study utilised a quasi-experimental, mixed-methods explanatory sequential design; this was congruent with the research aims, the need to pilot the study and the epistemological positioning of the research.

This mixed-methods explanatory sequential design (Creswell, Plano Clark, Gutmann, & Hanson, 2003), otherwise known as the qualitative follow-up approach (Morgan, 1998), began with the collection of quantitative data and analysis, to evaluate the effectiveness of the video-communication on older adults' psychological well-being, followed by a qualitative phase of exploring participants' experiences with the video-communication, to further elucidate the quantitative findings. It is argued that the advantages of this design are that it: permits a greater range of enquiry to comprehensively address the research question; enables exploration of the quantitative results; helps explain unexpected findings (Greene, 2007; Johnson & Onwuegbuzie, 2004); and enhances the credibility of the findings, through seeking convergence of the data (Clark & Creswell, 2011; Greene, Caracelli, & Graham, 1989), all of which cannot be achieved with the qualitative or quantitative approach alone.

Given that the aims of the current research are to identify whether the use of video-communication may present as a potential means for enhancing psychological well-being in

older adults who live alone, it was important that the research planned ways of maximising the quality and usefulness of the results. Due to the lack of a shared vocabulary with assessing qualitative and quantitative research Tashakkori and Teddlie (2008) developed a framework for assessing the quality of mixed-methods research. They coined the term ‘inference quality’ to refer to ‘internal validity’ in quantitative research and ‘credibility’ in qualitative research. The ‘inference quality’ is divided into ‘design quality’, which pertains to the methodological rigor of the research, and ‘interpretative rigor’ which concerns the validity of the research conclusions. They also speak of the term ‘inference transferability’, which is otherwise known as external validity in quantitative research or transferability in qualitative research. Onwuegbuzie and Johnson (2006) further introduced the concept of ‘validity legitimation’ and defined different types of legitimation, which is more concerned with how the qualitative and quantitative aspects of the research are integrated and how this impacts upon the validity of the research conclusions. All of these factors pertaining to the quality of the research were considered at each stage of the research process, which is further explained throughout the methods section of this study.

To increase the inference quality of the study it was considered important to control for both the participants’ sense of achievement from learning how to use the video-communication and the participant-research interactions that would arise from delivering the video-communication training. This is because it has been found that individuals’ psychological well-being increases when they experience a sense of achievement (Aguilar et al., 2012; Gatto & Tak, 2008) and interact with others (Billip, 2001). This was therefore achieved by including a control group who received basic computer skills training only. To further increase the inference quality of identifying whether any changes in the video-communication were a result of the video-communication and not simply due to general internet communication, a comparison internet communication control group was also

included in the study. The research design therefore consisted of three conditions: (1) an intervention group, who were offered training and support with using video-communication to communicate with either their relatives or friends; (2) a comparison group, who received training and support with using email to communicate with either their relatives or friends and; (3) a control group who received basic computer skills training and support.

Sampling Procedure

It is proposed that 9 or more single case studies are required to demonstrate the effectiveness of an intervention (Chambless & Hollon, 1998). The current study therefore aimed to recruit 12 - 15 participants to each condition, to allow for attrition. To enhance the inference quality of the results the selection of participants' characteristics was aimed to be as homogenous as possible, to limit the results being obscured by potential confounding variables, such as differences in age or living status. Furthermore, within Onwuegbuzie and Johnson's (2006) legitimization framework they highlight the importance of, 'sample integration legitimization', which refers to the need for the same participants being involved in both the quantitative and qualitative phase of the research in order to draw valid meta-inferences from integrating both methods. The same participants were therefore engaged in both the qualitative and quantitative phases of the study.

The inclusion criteria for all groups included males or females who were aged 55 years or above, living alone and who were available to participate in the study for two months. For the intervention and comparison group further inclusion criteria included having at least one friend or relative that they could communicate with via video-communication or email on a weekly basis and none of the participants could not be pre-existing users of email or video-communication. Although the aim was for all participants to be living alone, two participants were not living alone; these participants, who were in the email condition, lived

with their partner. The exclusion criteria included: (1) no individuals with a physical impairment that would affect their use of computers; (2) no anticipated or recent medication changes; (3) no excessive consumption of alcohol or any use of illicit drugs; and (4) not currently receiving any psychological intervention. Physical ability and alcohol and illegal drug intake were screened for by a questionnaire.

The participants were recruited from four different older age supported-living accommodation providers, within the county of Essex, totalling thirteen separate residential premises. Three of these providers were private and one was provided by social services. All accommodation sites had an on-site manager to support the residents during working hours, and the one accommodation site, which was provided by social services, included twenty-four hour support. The size of the individual accommodation premises varied, ranging from seven flats to fifty-eight flats. All the supported-living accommodations comprised of individual flats containing a private bedroom, living room, bathroom and kitchen. Additionally, they all had access to shared laundry facilities and a shared communal room where residents had the opportunity to engage in social activities and had access to a shared computer. One of the supported living sites, from which four of the participants in the video-communication condition were recruited from, had a shared laptop that residents borrowed to use in their flat.

All participants in the video-communication condition either used a borrowed laptop from their accommodation, or used their own computer. All but one of the participants in the basic computer skills training condition used the shared computer in the communal room. The other participant used his own computer, which had recently been bought for him. Similarly, all but one of the participants in the email condition used a shared computer in a communal space.

Participants allocated to the video-communication condition were recruited from four different residential sites. Seven participants were from three different residential sites of a private supported-living housing association, and two participants were from one residential site provided by social services. Participants allocated to the email condition were recruited from six different residential sites. Two participants were recruited from one residential site provided by social services, while seven participants were recruited from five private residential sites. Participants allocated to the basic computer skills training condition were recruited from six different residential sites. One participant was recruited from one residential site provided by social services, while eight participants were recruited from five private residential sites.

It was not possible to randomise participants to the different conditions, but to prevent the results being impacted upon by participants knowing about other participants' involvement in the other conditions the aim was to recruit participants to the different conditions from different residential sites. Different residential sites were therefore selected for different conditions, and thus participants were only invited to participate in one recruitment condition. Although this was achieved for many of the residential sites, two of the residential sites recruited participants to more than one condition. One of these sites recruited one participant to an email condition and two participants to a basic computer skills training condition, and the other residential site recruited two participants to the video condition, two participants to the email condition and one participant to the basic computer skills training condition. This was due to the participants specifically asking to learn email or basic computer skills training. The possible impact of this and the non-randomised sample is discussed in the discussion section.

Procedure

To increase the ‘design quality’ of the research and to maximise the inference quality, the research procedure, recruitment, data collection and administration of the intervention, was standardised as best as could be achieved, so that all participants encountered the same process.

Participants for the intervention and control groups were recruited via advertisement and announcements; posters were displayed on notice boards and were distributed within communal areas of the accommodation facilities (see Appendix B), and in some of the supported-living accommodations the research study was announced at the residents’ monthly meetings, in newsletters and during coffee mornings.

All participants who expressed interest in participating in the study were provided with a participant information sheet (see Appendix C), a screening questionnaire (see Appendix D), and a consent form to be contacted by telephone (see Appendix E), which they either returned in the post to the lead researcher, or which were completed and collected by the lead researcher during visits to the accommodations. For all participants who met the inclusion criteria for the conditions, as assessed by the screening questionnaire, the researcher contacted the participants by telephone to further explain the research and to provide them with the opportunity to ask questions. Prior to the participants commencing the training sessions, all participants completed a consent form (see Appendix F) to participate in the study.

The video-communication intervention group received one hour weekly individual training sessions of computer and video-communication skills by the lead researcher. Various free video-communication software applications were used; ‘Skype’, ‘Google Hangouts’ and ‘Facetime’. This depended on what software was accessible to the participants. Training

sessions were provided for four weeks, were arranged at times that were convenient for the participants and were facilitated in the participants' residential site, in either their private flat or in a communal area. Participants were asked to communicate with their family via this medium at least once a week. The email condition and the basic computer skills only training condition were also provided with one hour weekly training sessions for four weeks. The video-communication and email condition were asked to continue communicating online for a further month following the end of the training sessions. Participants in the conditions were provided with session handouts (see Appendix G). All participants in the three conditions completed all measures, except the initial demographic and screening questionnaire, at baseline pre-training, following receiving the four training sessions and again four weeks later following the end of training; this was to ensure that the researcher could evaluate trends over time. Questionnaire packets (see Appendix H) were given to the participants following the training sessions, which were either completed with the researcher, or were completed alone and returned in the post to the lead researcher.

Individual in-depth semi-structured interviews were conducted face-to-face, by the researcher, with the participants in the video-communication condition, a week following the collection of the third questionnaire packet. This timeframe was chosen so that the researcher had time to explore the trends of the participants' quantitative data over the two months. The interviews lasted between 20 and 50 minutes, and they were digitally recorded and transcribed.

In-depth interviews were chosen because they enable a greater depth of information than other research instruments can achieve (Marshall & Rossman, 2006; Willis, 2006), whilst limiting socially desirable answers that can often be elicited in focus groups (Ritchie & Lewis, 2003). Furthermore, a semi-structured format allowed for exploration of pre-determined topics, whilst also allowing the flexibility to generate new insights (Miles &

Gilbert, 2005). To enhance the credibility of the data from the interviews, by aiming to authentically capture the lived experiences of participants' use of the video-communication, the researcher took steps to ensure that the participants felt at ease and comfortable with the research process so that they could talk freely and openly about their experiences. This involved: building a good rapport with participants; interviewing participants in their own homes; advising participants throughout the interview that there were no right or wrong answers; avoiding imposing any preconceived ideas about how the participants should respond.

Materials

Self-report measures. In addition to a form collecting demographic information and information screening for participants' eligibility, a number of psychometric questionnaires measuring psychological well-being, with good psychometric properties, were used to increase the reliability, or in Tashakkori and Teddlie's (2008) term, 'within-design consistency', of the research. Use of the HADS was purchased and permission to use the Sense of Belonging Instrument was provided by the author. All other measures were free to use.

The Sense of Belonging Instrument – Psychological (SOBI-P). Considering previous qualitative research suggested that video-communication enhanced older adults' sense of belonging, and no previous research has quantitatively explored older adults' sense of belonging in relation to using video-communication, a scale measuring an individual's sense of belonging was included in the study. The Sense of Belonging Instrument – Psychological (Hagerty & Patusky, 1995) was chosen over the Social Connectedness Scale

(SCS; Lee & Robbins, 1995) as the SCS contained all negatively worded items and therefore the response distribution was reported to be negatively skewed (Lee, Draper, & Lee, 2001) . The SOBI-P was also deemed more appropriate than the Social Connectedness Scale – Revised (SCC-R; Lee et al., 2001) as the SCC-R is conceptualised as an enduring experience, containing items related to an individual’s disposition (e.g. ‘I find myself actively involved in people’s lives’, ‘I fit in well in new situations’), which means it is less likely to capture an individual’s momentary experience of feeling a sense of belonging and may not be sensitive to change. It was for this reason that the SCC-R was considered inappropriate for the current study.

The Sense of Belonging Instrument – Psychological questionnaire is an 18-item subscale of The Sense of Belonging Instrument that assesses an individual’s experience of feeling that they are part of their environment, including feeling valued, needed or accepted (e.g. “In general, I don’t feel a part of the mainstream of society”). The measure is scored on a 4-point Likert scale (1 = strongly disagree; 4 = strongly agree) and the sum of the scores produces a total score, with scores ranging from 18 – 72. A high score on the SOBI-P indicates that the individual feels valued, needed, and accepted. Within a retired older adult Australian population, the SOBI-P has demonstrated good internal consistency, with Cronbach’s alpha coefficient being reported at .90 (McLaren et al., 2007) and .92 (Bailey & McLaren, 2005; Kissane & McLaren, 2006). The scale has also shown good stability over eight weeks, supported by a test-retest reliability correlation of .84, and it has shown evidence of good construct and content validity (Hagerty & Patusky, 1995). The mean SOBI-P score for a non-clinical sample of 166 adults, aged sixty-five and above, living in assisted living facilities in Australia was 53.08 (SD = 9.22; Kissane & McLaren, 2006). The mean SOBI-P score for a sample of 51 adults living in Australia and who had a diagnosis of major

depressive disorder, as classified by the DSM-IV, was 49.14 (SD = 12.71; Choenarom et al., 2005).

Perceived Stress Scale (PSS). It was considered important to include a subjective measure of stress, because research has found that positive relationships can buffer against the effect of stress by an individual changing their appraisal of the stress-inducing situation (Cobb, 1976). The Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) is one of the most widely used questionnaires of perceived stress (Starkweather, 2007), which consists of ten items measuring the degree to which an individual's life is appraised as stressful. Items include statements such as: 'In the last month, how often have you felt that you were unable to control the important things in your life?' Items are scored on a 4-point Likert scale and the sum of the scores produces a total score. Scores range from 0 to 40, with higher scores indicating greater perceived stress. This scale has demonstrated good internal reliability in a sample of middle and older age adults, with Cronbach coefficient alpha reported as .91 (Robinson-Whelen, Kim, MacCallum, & Kiecolt-Glaser, 1997), .82 in adults aged 70 years and over (Ezzati, et al., 2014) and .82 in individuals aged 65 to 80 years (Morgan, Umberson, & Hertzog, 2014). The mean scores for a sample of 63 older adults recruited from community-based organisations and 183 inpatient and outpatient adults (mean age 40 years, SD = 12), with a diagnosis of depression, recruited from a psychiatric service in Canada were 17.89 (SD = 6.64; Hamarat, et al., 2001), and 26.3 (SD = 7; Baetz & Bowen, 2011), respectively. Test-retest correlations were found to be higher when the test was administered two days apart, compared to six weeks apart, yielding a correlation of .85 and .55, respectively (Cohen et al., 1983). Although the test-retest correlations provide an indication of how reliable a questionnaire is over time, these results may demonstrate that the

questionnaire is sensitive to detecting changes in how stressful an individual appraises their current situation to be over time.

Social Provision Scale (SPS). It was also considered important to include a measure of social support due to the abundance of literature which has found that social support impacts upon older adults' psychological well-being (Newsom & Schulz, 1996). The current study therefore wanted to explore whether communicating via video impacted upon an individual's perception of the social support received. A number of social support measures exist; however, the study used five constructs of the Social Provision Scale (Russell & Cutrona, 1984). The SPS conceptualises social support as a multi-dimensional construct and assesses different functions of perceived social support. The study used five of the six subscales of the SPS, which included 20-items measuring: (a) attachment, how emotionally close one felt to others; (b) social integration, how one felt their interests and concerns were shared by others; (c) reliable alliance, how much one felt they can rely on others for assistance; (d) guidance, how much one felt they could access advice or information from others; (e) and opportunity for nurturance, how much one felt they were responsible for the well-being of another. The subscale 'reassurance of worth', measuring how much an individual's skills were valued, was excluded due to a measure of self-esteem already being included within the study. Items are rated on a 4-point scale with responses ranging from 1 (strongly disagree) to 4 (strongly agree). Following reversal of negatively worded items, items pertaining to their relevant construct were added together to arrive at a subscale score. Higher scores indicate greater levels of perceived social support. The subscales of the SPS have shown acceptable internal reliability, with Cronbach alpha ranging from .64 to .76, and a test-retest reliability coefficient ranging from .37 to .66 (Cutrona, Russell & Rose, 1984).

Several studies have supported the construct validity of the SPS and its subscales (Cutrona & Russell, 1987)

Mean scores of fifty American older adults recruited from senior citizen centres were reported as 12.7 (SD = 2.2), 13 (SD = 1.7), 13.7 (SD = 1.6), 13 (SD = 1.9) and 12.3 (SD = 2.4), for the subscales of attachment, social integration, reliable alliance, guidance and opportunity for nurturance, respectively (Cutrona, Russell, & Rose, 1986).

Satisfaction with Life Scale (SWLS). Consistent with the conceptualisation of psychological well-being as a multi-dimensional construct, the study sought to capture positive dimensions of psychological well-being as well as a lack of negative states, and cognitive judgements as well as emotional states. The Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) satisfies the study's requirement of measuring cognitive judgements as it assesses an individual's judgement of life satisfaction. This measure was chosen over other similar measures, due to it being an easy and quick measure to complete, and it demonstrating good psychometric properties across different populations (Pavot & Diener, 1993). Furthermore, because the items do not refer to any specific domains within an individual's life, participants choose which life domains they feel contribute to their evaluation of their life satisfaction (Diener et al., 1985; Pavot & Diener, 1993).

The SWLS includes 5 items, asking respondents to rate their general satisfaction with life on a 7-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). Items are added together to produce a global rating, with higher scores indicating greater satisfaction with life. This scale has shown good internal reliability in an older adult population (Cronbach alpha = .83), test re-test reliability correlation coefficient of .82 two months later (Pavot, Diener, Colvin, & Sandvik, 1991) and sensitivity to detecting changes following clinical interventions (Pavot & Diener, 1993). Moreover, it has demonstrated good

convergent validity, as evidenced by it being moderately to highly correlated with similar measures (Diener et al., 1985) and it producing lower normative scores in populations where lower life satisfaction would be expected (Pavot & Diener, 1993). The mean score of 50 older adults living in Germany who were considered to be depressed was 18.76 (SD = 6.79; Konradt, Hirsch, Jonitz, & Junglas, 2013), while the mean score of 288 adults, between the age of 60 and 94, living in the USA was 26.04 (5.94; Siedlecki, Tucker-Drob, Oishi, & Salthouse, 2008).

The Rosenberg Self-Esteem Scale (RSES). A measure of self-esteem was used as positive relationships have previously shown to enhance an individual's self-esteem and the study therefore aimed to explore whether communicating via video-communication helped to foster this. Furthermore, the study wanted to capture aspects of positive growth, considered part of the eudaimonic well-being perspective. The Rosenberg Self-Esteem Scale (Rosenberg, 1965) was chosen for measuring self-esteem, because it has been the most widely used measure of self-esteem (Sinclair, et al., 2010), receiving more empirical validation than other measures of self-esteem (Gray-Little, Williams, & Hancock, 1997).

The Rosenberg Self-Esteem Scale consists of 10 items, which provides a global measure of an individual's feelings of self-worth. Items are rated on a 4-point Likert scale, ranging from strongly agree to strongly disagree. Following reversing the scores of five items, the items were added to produce a total score, with higher scores indicating higher self-esteem. Scores range from 0 – 30. The mean score of 52 individuals who were recruited from a community mental health team in England was 23.75 (SD = 3.94) and the mean score of 52 individuals from a non-clinical sample in England was 18.87 (SD = 4.22; Murphy & Murphy, 2006).

The scale has shown excellent internal consistency in older adult community samples, with Cronbach's alpha of .87 (Benyamini, Leventhal, & Leventhal, 2004), .84 (Sinclair et al., 2010) and .87 (Sherman & Cotter, 2013). Furthermore, it has demonstrated good re-test reliability and it has been found to have good convergent and discriminant validity (Sinclair et al., 2010)

University of California Los Angeles (UCLA) Loneliness Scale - Version 3. The UCLA Loneliness Scale - Version 3 (Russell, 1996) was used in the present study for two main reasons. Based on previous research findings that report a link between supportive relationships and decreased levels of loneliness, the current study sought to identify whether using video-communication impacted on individuals' levels of loneliness. Moreover, this scale has been used extensively in research and has demonstrated good psychometric properties in an older adult population.

The UCLA Loneliness scale (Version 3) includes 20-items, which are rated on a 4-point Likert scale, ranging from never (1) to always (4). Following reversal of 9 items, the items are summed to produce a single score, with scores ranging from 20 to 80. Higher scores indicate greater severity of loneliness. With an older adult population, the scale has shown good internal reliability, with Cronbach's alpha ranging from .86 to .89 (Adams, Sanders, & Auth, 2004; Russell, 1996), test-retest reliability ($r = .73$) over a one year period, and convergent and construct validity has also been demonstrated (Russell, 1996). The mean score of 284 American older adults, over the age of sixty-five years, was reported as 31.51 (SD = 6.92; Russell, 1996).

Hospital Anxiety and Depression Scale (HADS). Given that an absence of depression and anxiety are considered to contribute towards psychological well-being, the present study

wanted to assess these two constructs to assess whether use of the video-communication impacted on these variables. The Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983), a measure of anxiety and depression, was considered an appropriate measure for the study for a number of reasons. It was initially developed as a screening tool to be used in hospital settings to detect anxiety and depression in patients with physical illnesses so that symptoms of physical illness did not inflate scores, or affect their validity. It is therefore appropriate to use with older adults who often have physical illnesses. In a review of measures of mood for use with older adults in the UK, the HADS was considered one of the recommended measures, due to its practicality, feasibility, UK relevance, and good psychometric properties (Sperlinger, Clare, Bradbury, & Culverwell, 2004). Additionally, due to the study already employing several different measures of psychological well-being, and thus issues of tiredness potentially compromising the validity of the scores of the measures, the relatively short completion time to answer the HADS was especially favourable for the study.

The HADS consists of 14 items measuring two separate constructs; anxiety and depression. This two-factor structure has been supported by a number of studies (Olsson, Mykletun, & Dahl, 2005; Spinhoven, et al., 1997). Items are scored between 0 and 3 and can range from 0 and 21, with higher scores indicating higher levels of severity. Scores between 0 and 7, 8 and 10 and 11 and over are considered to indicate 'noncase', 'possible case' and 'probable case' of anxiety and depression, respectively (Zigmond & Snaith, 1983). The mean score of a clinical sample of 213 individuals aged sixty and over, living in Canada, and with a diagnosis of depression was 13.8 (SD = 4.1) for the depression subscale and 12.6 (SD = 4.5) for the anxiety subscale (Flint & Rifat, 2002). The mean score of a non-clinical sample of 3293 Dutch older adults aged sixty-six and over was 3.9 (SD = 3.6) for the anxiety subscale and 4.6 (SD = 3.6) for the depression subscale (Spinhoven et al., 1997).

The HADS anxiety (Cronbach's alpha = .77) and depression (Cronbach's alpha = .76) subscales have shown acceptable internal reliability in an older adult population (Flint & Rifat, 2002), demonstrated good concurrent validity with other measures of anxiety and depression (Bjelland, Dahl, Haug, & Neckelmann, 2002) and good test-retest reliability (Spinhoven, et al., 1997).

Interview schedule. A semi-structured interview schedule was used to guide the interviews (see Appendix I); it created a framework for the discussions, provided prompts to responses and helped monitor the progress of the interviews to ensure that the research satisfied its aims.

Researcher's Role within the Study

Since in qualitative inquiry the researcher is considered the instrument in interviews (Patton, 1999), information about the researcher who interviewed the participants is included to enhance the transparency of the research. The researcher, white British female, aged in her late 20's, undertook the study as an assignment for the Doctorate in Clinical Psychology for which she was studying. All participants were aware that the researcher was training to be a Clinical Psychologist. The idea generated for the project emerged as the researcher heard older adult family relations report that using video-communication to keep in touch with relatives had improved their psychological well-being. The researcher therefore further explored the potential of video-communication within the academic literature and noticed that, as documented in the introduction, certain studies and psychological theories appeared to indicate that video-communication may promote psychological well-being. Is it noteworthy therefore that prior to the research commencing, the researcher held preconceived ideas that video-communication may be a valuable means for enhancing psychological well-

being. Aware of these assumptions, the researcher made a conscious effort not to transmit these hypotheses onto the participants, in order to avoid biasing the participants' responses and threatening the internal validity of the study. The researcher therefore stated to the participants in all conditions that due to a lack of research, she was unsure about the impact that using computers would have on their psychological well-being and thus it was the aim of the research to explore this further. Additional reflections about the researcher's role in the research process is referred to in the discussion.

Data Analysis

Quantitative analysis. Statistically significant change for all the outcome measures was analysed, along with reliable and clinically significant change for the measures of PSS, SOBI-P, UCLA Loneliness Scale, SWLS, RSES, HADS-A and HADS-D. These analyses were carried out with all three conditions. Given the small sample size for each group, non-parametric statistical tests were planned to be the most appropriate to investigate the between-group and within-group differences of the conditions.

Reliable and clinically significant change scores were calculated because there is growing recognition that statistically significant differences do not necessarily indicate that the findings are of clinical significance (Speer, 1992). There is mounting agreement for the use of analysing clinically significant change in psychological well-being measures to address whether individuals make a change that is meaningful in moving from the 'clinical' population, those with low psychological well-being, to the 'non-clinical' population, those with psychological well-being that is considered to be the norm (Evans, Margison, & Barkham, 1998; Speer, 1992). The clinical significance of change was calculated using the Jacobson-Traux method, to determine whether participants' changes in scores were clinically meaningful (Jacobson & Truax, 1991). According to this method a score is considered

clinically significant if the change in score between two time points has made enough change to be deemed reliable, as measured by the reliable change index, and if the score has moved from the 'clinical' range to the 'non-clinical' range, as determined by the clinical significance change statistic.

To identify whether an individual's scores between two time points moved from the 'clinical' to the 'non-clinical' range a cut-off score for the psychometric measure was required. Jacobson and Traux (1991) proposed three methods, termed A, B and C, for calculating the cut-off scores to signify 'recovery', that is moving from the 'clinical' range to the 'non-clinical' range. Criterion A indicates recovery as a change in the scores that is more than two standard deviations away from the 'clinical' mean, criterion B is where the change in the scores moves within two standard deviations of the 'non-clinical' mean, and criterion C is where there is greater likelihood of the score being in the 'non-clinical' range than the 'clinical' range. Jacobson and Traux (1991) acknowledge that Criterion C is considered the best method when norms of psychometric measures for both the 'clinical' and 'non-clinical' populations exist, as criterion A can be too stringent and criterion B is lenient. The criterion C method was therefore used in this study for all the outcome measures, except for the UCLA Loneliness Scale where clinical means were not obtained. For the UCLA Loneliness Scale measure criterion B was used. To calculate criterion C cut-off scores, the norms from a 'clinical' and 'non-clinical' group were retrieved from published articles for each of the psychometric measures.

Reliable and clinically significant change scores were calculated for all three conditions between the scores at baseline and post-intervention and baseline and follow-up, using an Excel programme (Morley & Dowzer, 2014). The programme generates a graph to illustrate the participants' change in scores in relation to the cut-off score of the 'clinical' and 'non-clinical' range.

Qualitative Analysis. The interviews were subjected to Thematic Analysis, as guided by Braun and Clarke's (2006) six step guide. This method was adopted due its flexibility of being able to be applied across a range of epistemological or theoretical positions. This approach is therefore a good fit for the current study, which adopts the critical realism epistemological stance and it is well-suited to answering this study's qualitative research question. This method identified and analysed patterns within participants' responses during the interviews, by extracting the meaning participants assigned to their experiences of using the video-communication. However, in accordance with the critical realist position, it is acknowledged that the knowledge or insight individuals possess may be different to reality (McEvoy & Richards, 2006). Therefore, the analysis proceeded one step further than simply describing the participants' responses; the data was also interpreted, guided and influenced by the researcher's set of assumptions, to provide another perspective.

The process of analysis included: (1) becoming familiar with the data set, which involved transcribing the data, and repeatedly reading the transcripts while making notes about possible meanings of participants' responses; (2) coding the data, by manually extracting the key meaning of sections of the data which was consistent with the research question, and transferring these codes into a database, along with the corresponding raw data; (3) searching for patterns across the data set, by grouping the codes into potential themes; (4) reviewing the themes, examining whether the themes captured the participants' responses, answered the research question and fitted with the other themes; (5) defining the themes, which involved providing the themes with a name which closely captured the experiences of the participants; and (6) writing up the results of the themes.

To enhance the rigor of the qualitative analysis the researcher considered Lincoln and Guba's (1985) framework of achieving credibility (assurance in the accuracy of the findings), transferability (confidence that the results are applicable in other contexts), dependability

(showing consistency in the results) and confirmability (results which reflect participants' experiences and are not influenced by researcher bias). This was achieved by building a good rapport with participants to enable them to speak openly about their experiences and conducting the interviews in the participants' homes to ensure that they felt at ease and comfortable. Furthermore, during the thematic analysis, the researcher continued to be aware of her pre-conceived ideas about the research and, in order to resist seeking out evidence that supported these hypotheses, the researcher sought evidence that contradicted her assumptions, in addition to searching for contradictory findings to any emergent themes. However, to enhance the dependability of the findings, the researcher also examined the consistency of the themes between the participants.

Ethical Issues

Ethical approval for the research was gained from the University of Essex Faculty Ethics Sub-Committee (see Appendix J). The research was conducted in accordance with the BPS code of ethics and conduct (2009) and was guided by Hammersley and Atkinson's (2007) research ethical principles, by: obtaining informed consent from participants prior to their inclusion into the study; informing participants of their right to withdraw from the research at any time without incurring any negative consequences; handling all confidential information and data with care; and maintaining participants' anonymity. To ensure anonymity, participants were assigned a reference number, which was applied to all data collected. Access to the data was restricted to the researcher only. Additionally, the audio-recordings were listened to only by the researcher and following transcription of the recordings the recordings were deleted. Consent was not gained from the relatives or friends with whom the older adults chose to communicate.

Although previous studies have reported that a few participants experienced the video-communication to be overwhelming (Seeyle et al., 2012) and frustrating (Demiris et al., 2008), the potential emotional distress experienced from using video-communication was considered to be low. However, as a precautionary, it was planned that if any individuals experienced any emotional distress from using the computers they would be advised to cease engagement with using it. Furthermore, support was offered to participants who had difficulties completing the questionnaires to avoid discrimination against individuals who had cognitive difficulties or physical difficulties with writing being included in the research. Given the many losses that older adults are confronted with in later adulthood it was considered unethical to introduce older adults to using computers, which could potentially enhance their psychological well-being, and then remove it following their participation in the project. Therefore, only participants who had access, and the opportunity, to continue using the computers following the end of the research were recruited. All participants in the control groups were offered the opportunity to receive video-communication training, following their participation in the study. Any participants who presented with possible mental health difficulties, as identified from conversations with them, or from their questionnaire scores, were informed that they could seek further support via their GP.

Results

This chapter presents the analyses of the quantitative and qualitative data collected during the research. The completion rates and participants' characteristics for each condition are first described. Between-group and within-group statistical analyses are then reported, followed by reliable and clinically significant change analyses. Lastly, the chapter ends with the analysis of the qualitative data.

Sample

Data completion rates. The number of individuals who initially signed up to take part in the project was forty-seven; thirty-one for the video-communication condition, eight for the email condition and eight for the basic skills condition. One participant within the video-communication condition was already a pre-existing user of video-communication and therefore she was excluded from the study. Another five participants within the video-communication condition could not find anyone to video-call; therefore, based upon their preference, two of these participants were transferred to the email condition and five of the participants were reassigned to the basic computer skills condition. This resulted in twenty-three participants being accepted into the video-communication condition, ten participants into the email condition and thirteen participants into the basic computer skills condition, all of whom completed the pre-intervention questionnaire. Out of the forty-six individuals who were accepted into the study twenty-two participants dropped out, equating to an attrition rate of forty-eight percent. Figure 2 illustrates the data completion and attrition rates.

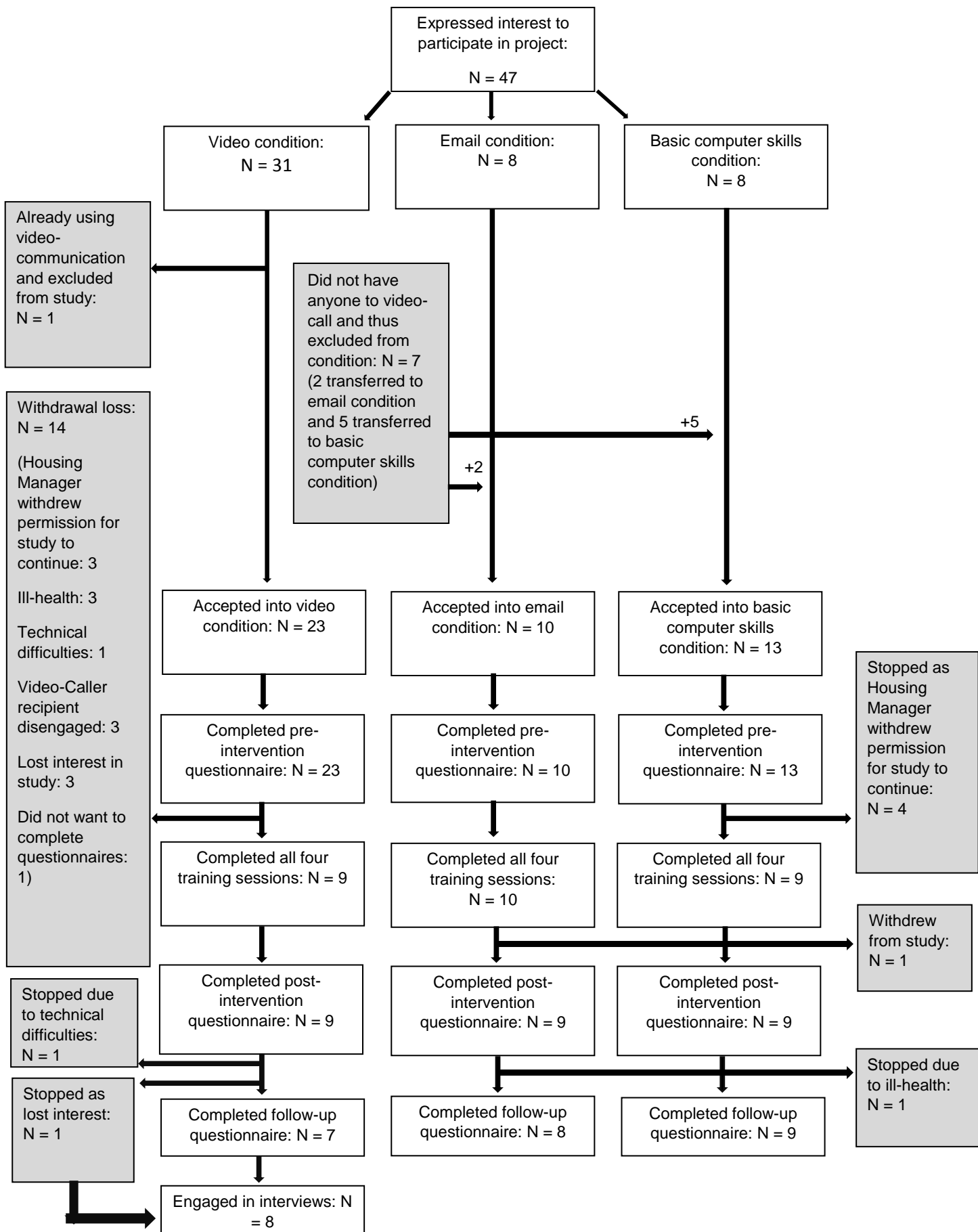


Figure 2. Flow chart of the number of individuals recruited into the different conditions. Note. Numbers refers to the number of participants.

Video-communication condition data completion rates. The video-communication condition had an attrition rate of seventy percent following participants being accepted into the study. Out of the twenty-three participants accepted into the video-communication condition, fourteen participants withdrew before completing either the four training sessions or the post-intervention questionnaire for a variety of reasons: ill health (3 participants); equipment failure (1 participant); family taking on computer trainer role (1 participant); family disengaging from reciprocating the video-calls (3 participants); housing manager of supported living accommodation withdrawing permission for study to continue due to concerns that completing the questionnaires and focusing their attention on their social relationships may decrease the older adults' psychological well-being (3 participants); loss of interest in project prior to starting training (2 participants); and not wanting to complete the questionnaires due to the questions being perceived as too personal (1 participant).

Nine participants received all four training sessions and completed both the pre- and post-intervention questionnaires. One of these participants did not complete the follow-up questionnaire or engage in the interview, due to her having technical difficulties with her computer. Another participant withdrew from the study following completing the post-intervention questionnaire, as she was no longer interested in using the computer. Whilst no follow-up data was collected from this participant, she was interviewed about her experiences with using the video-communication. Following completing the post-intervention questionnaire, the remaining seven participants engaged in using the video-communication for a further four weeks, they completed the follow-up questionnaire and were interviewed about their experiences with using the video-communication.

Email condition data completion rates. The email condition had an attrition rate of ten percent. Of the ten participants accepted into the email condition, one participant withdrew from the study following receiving all four training sessions. His reason for withdrawing was that he did not want to complete the questionnaire packet again as he did not want to disclose personal information. The remaining nine participants completed the post-intervention questionnaire and follow-up data was collected from eight of these participants, with one participant withdrawing due to ill-health.

Basic computer skills condition data completion rates. The basic computer skills condition had an attrition of thirty-one percent. Of the thirteen participants accepted into the condition, four participants stopped because the housing manager of their supported living accommodation withdrew permission for the study to take place due to concerns about the older adults' psychological well-being deteriorating if they completed the questionnaires; two of these participants stopped prior to receiving any training sessions and two stopped following receiving two training sessions. The remaining nine participants received all four training sessions, completed the pre-intervention, post-intervention and follow-up questionnaires.

Participants' Demographic Characteristics

The demographic characteristics of the participants in each condition are displayed in Table 2.

Video-communication condition. The final sample, upon whom the results are based, consisted of nine participants who were all white British and were living alone in a supported living accommodation. At baseline, the mean age of the nine participants was 77 years and 2 months, with a standard deviation of 9 years and 9 months (ages ranging from 62

years to 88 years). Gender distribution was five females (55.6 %) and four males (44.4 %). Six (66.7 %) of the participants were widowed, while the remaining three were either divorced (11.1%), separated (11.1%), or in a relationship (11.1%). None of the participants had a diagnosis of a cognitive impairment.

Email condition. The final sample, upon whom the results are based, consisted of nine participants, eight of whom were white British and one who was white Zimbabwean. All participants were living in supported living accommodation, seven living alone and two living with their partners. At baseline, the mean age of the nine participants was 79 years and 3 months, with a standard deviation of 7 years (ages ranging from 68 years to 89 years). Gender distribution was five females (55.6 %) and four males (44.4 %). Six (66.7 %) of the participants were widowed, two were married (22.2%), and one was divorced (11.1%). Eight of the participants did not have a diagnosis of a cognitive impairment, whilst one participant had a diagnosis of a mild cognitive impairment.

Basic computer skills condition. The final sample, upon whom the results are based, consisted of nine participants, all of whom were white British and were living alone in supported living accommodations. At baseline, the mean age of the nine participants was 76 years and 8 months, with a standard deviation of 10 years and 8 months (ages ranging from 58 years to 91 years). Gender distribution was three females (33.3 %) and six males (66.7 %). Five (55.6 %) of the participants were widowed, two were divorced (22.2%), one was separated (11.1%) and one was single (11.1%). Eight of the participants did not have a diagnosis of a cognitive impairment, whilst one participant had a diagnosis of a mild learning disability.

Table 2

The age, gender, marital and living status of the participants in each condition

Participants by Conditions	Age	Gender	Marital Status	Living Status	
Video-communication	Participant 1	88	Female	Widowed	Living alone
	Participant 2	85	Male	Widowed	Living alone
	Participant 3	63	Female	Widowed	Living alone
	Participant 4	62	Male	Separated	Living alone
	Participant 5	85	Male	Widowed	Living alone
	Participant 6	81	Male	Widowed	Living alone
	Participant 7	71	Female	In a relationship	Living alone
	Participant 8	75	Female	Divorced	Living alone
	Participant 9	85	Female	Widowed	Living alone
Email	Participant 1	75	Female	Widowed	Living alone
	Participant 2	88	Male	Married	Living with wife
	Participant 3	83	Female	Widowed	Living alone
	Participant 4	68	Male	Divorced	Living alone
	Participant 5	89	Female	Widowed	Living alone
	Participant 6	82	Female	Widowed	Living alone
	Participant 7	72	Female	Widowed	Living alone
	Participant 8	79	Male	Married	Living with wife
	Participant 9	80	Female	Widowed	Living alone
Basic computer skills training	Participant 1	78	Male	Separated	Living alone
	Participant 2	91	Male	Widowed	Living alone
	Participant 3	58	Female	Single	Living alone
	Participant 4	68	Male	Divorced	Living alone
	Participant 5	68	Male	Divorced	Living alone
	Participant 6	83	Female	Widowed	Living alone
	Participant 7	86	Female	Widowed	Living alone
	Participant 8	73	Male	Widowed	Living alone
	Participant 9	86	Female	Widowed	Living alone

Quantitative Results

Based on the research design a two-way Analysis of Variance (ANOVA) would have been the most appropriate statistical test to analyse between-group and within-group statistical changes. However, visual inspection of the histograms and the normal Q-Q plots of the outcome measures for the different conditions illustrated that all the measures were non-normally distributed, demonstrating either skew or kurtosis. This meant that the assumptions for a two-way ANOVA were violated and thus could not be conducted. This was expected as the study has a small sample size and therefore non-parametric tests were considered most appropriate to analyse the data. Although it is acknowledged that conducting a series of statistical significant tests can increase the familywise error, thus affecting the validity of the findings, a series of non-parametric tests were performed to explore the between-group and within-group differences separately. Additionally, effect sizes for the differences between the conditions were also conducted, regardless of whether a statistical difference was found, as statistical significance tests are not a direct indicator of the size of an effect and statistical tests are at risk of a Type II error when sample sizes are small. A large effect that is non-significant may highlight that further research with more power may be conducive. The following formula was used to work out the effect size estimate (Rosenthal, 1991): $r = z\text{-score} / \sqrt{N}$. Cohen's (1998) guide was used to interpret the meaning of the effect sizes, with an effect size of .10, .30 and .50, indicating a small, medium and large effect, respectively. Table 3 shows a list of the abbreviations of the outcomes measures, which will be referred to throughout the results section of the quantitative results. Table 4 shows the median score and the range of each outcome measure for the three conditions at each time point.

Table 3

Abbreviations of the outcome measures

Outcome Measure Abbreviation	Outcome Measure
SPS	Social Provision Scale
Attachment	Attachment Subscale of the SPS
Social	Social Integration Subscale of the SPS
Alliance	Reliable Alliance Subscale of the SPS
Nurturance	Opportunity for Nurturance Subscale of the SPS
PSS	Perceived Stress Scale
SWLS	Satisfaction with Life Scale
HADS-A	The Hospital and Anxiety Depression Scale – Anxiety Subscale
HADS-D	The Hospital and Anxiety Depression Scale – Depression Subscale
RSES	Rosenberg Self-Esteem Scale
Loneliness	UCLA Loneliness Scale – Version 3
SOBI-P	Sense of Belonging Instrument – Psychological Subscale

Table 4

Median and range scores of each outcome measure for each condition at each time point

Measure	Pre-intervention			Post-intervention			Follow-up		
	median scores			median scores			median scores		
	Video	Email	Basic	Video	Email	Basic	Video	Email	Basic
Attachment*	11 (4)	12 (5)	12 (8)	12 (4)	12 (6)	12 (7)	12 (8)	14 (7)	12 (10)
Social*	12 (6)	12 (4)	14 (9)	11 (6)	12 (6)	12 (6)	12 (9)	13 (4)	12 (8)
Alliance*	14 (5)	12 (5)	14 (9)	12 (5)	12 (6)	13 (8)	13 (6)	14.5 (4)	12 (8)
Guidance*	12 (6)	13 (4)	14 (8)	12 (7)	12 (6)	12 (8)	12 (6)	15 (4)	12 (8)
Nurturance*	11 (7)	11 (2)	12 (8)	10 (5)	12 (7)	10 (7)	10 (4)	11 (7)	11 (5)
PSS	21 (17)	16 (29)	11 (29)	15 (19)	14 (20)	7 (33)	14 (20)	7.5 (16)	9 (29)
SWLS*	25 (21)	27 (20)	26 (24)	22 (21)	25 (18)	26 (20)	21 (15)	26 (35)	27 (26)
HADS-A	9 (14)	6 (10)	6 (16)	4 (13)	4 (6)	6 (18)	6 (13)	3.5 (7)	4 (20)
HADS-D	8 (13)	5 (8)	5 (12)	3 (10)	4 (8)	5 (15)	7 (8)	4 (11)	4 (17)
RSES*	18 (21)	21 (10)	17 (14)	19 (17)	21 (10)	19 (14)	20 (14)	21.5 (14)	20 (15)
Loneliness	38 (25)	34 (27)	25 (41)	37 (36)	26 (26)	41 (41)	31 (32)	30 (32)	31 (71)
SOBI-P*	54 (41)	54 (18)	58 (41)	57 (28)	60 (19)	56 (35)	54 (31)	62.5 (20)	54 (38)

Note. * Higher scores indicate higher psychological well-being. Numbers in parentheses refer to the range scores.

Between-group analyses. Between-group analyses were conducted to explore whether there was a difference in psychological well-being, as measured by the outcome measures, between the three conditions, video-communication, email or basic computer training skills, at both post-intervention and follow-up. These analyses aimed to provide some suggestion as to whether the use of video-communication resulted in higher psychological well-being than use of email or learning basic computer skills. Both Kruskal-Wallis analyses, the non-parametric equivalence test to the one-way ANOVA, and the Mann-Whitney test, the non-parametric alternative to the independent t-test, were used to achieve this aim. Both tests were used as the Kruskal-Wallis test has lower statistically power than the Mann-Whitney test to detect significant difference. Given the small sample size and the exploratory nature of the study it was thus considered important to conduct both the Mann-Whitney tests in addition to the Kruskal-Wallis test.

In order to test whether the conditions were statistically different at post-intervention and follow-up time points, it was important to establish whether the scores of the outcome measures were statistically different between the conditions at baseline. Any statistically different scores between the conditions at baseline would invalidate the post-intervention and follow-up results. Although none of the psychometric measures were shown to be significantly different across the conditions at baseline ($p > .05$) with the Kruskal-Wallis test, the Mann-Whitney tests revealed that a number of measures were statistically different at baseline. These were for the measures of the depression subscale of the HADS, the RSES and the UCLA Loneliness Scale between the video-communication condition and the email condition, and the PSS between the video-communication condition and the basic computer skills condition. These differences showed that the video-communication condition had lower psychological well-being median scores than the other conditions and the magnitude of these differences were found to be of a medium or large effect. These measures were

therefore excluded from subsequent between-group analyses, between these conditions. Table 5 shows the z-scores, p-values and effect sizes of the differences between the conditions at baseline.

Table 5

Mann-Whitney test results for all the measures between the different conditions at baseline

Outcomes Measures	Comparisons between video-communication condition and email condition			Comparisons between video-communication condition and basic computer skills condition			Comparisons between email condition and basic computer skills condition		
	Z-score	P-value	Effect size	Z-score	p-value	Effect size	Z-score	P-value	Effect size
Attachment	-1.34	.11	.32	-.13	.45	.03	-1.03	.16	.24
Social	-.99	.19	.23	-.63	.28	.15	-1.60	.06	.38
Alliance	-.09	.47	.02	-.09	.47	.02	-.05	.50	.01
Guidance	-.10	.17	.23	-.67	.27	.16	.00	.52	0
Nurturance	-.54	.31	.13	-.58	.30	.14	-.68	.26	.16
PSS	-1.11	.14	.26	-2.30	.01*	.54	-1.20	.12	.28
SWLS	-.58	.30	.14	-.18	.44	.04	-1.02	.16	.24
HADS-A	-1.24								
HADS-D		.11	.27	-1.47	.08	.35	-.68	.26	.16
HADS-D	-1.65	.05*	.39	-1.20	.12	.28	-.05	.50	.01
RSES	-2.09	.02*	.50	-.04	.49	.01	-1.87	.03	.44
Loneliness	-1.68	.05*	.40	-1.42	.08	.33	-.53	.31	.13
SOBI-P	-.932	.19	.22	-.88	.20	.20	-.27	.40	.06

Note. * $p < .05$. Effect size estimates in bold indicate either a medium or large effect size.

Although the Kruskal-Wallis test did not show any significant differences of the outcome measures between the conditions at either post-intervention or follow-up, the Mann-Whitney comparison tests showed significant differences on several of the outcomes measures. There was a statistical difference at follow-up between the video-communication condition and the email condition on the PSS, with the email condition showing a lower stress median score than the video-communication condition. Furthermore, there were statistical differences between the email condition and the basic computer skills condition at

post-intervention on the UCLA Loneliness scale, and at follow-up on the SOBI-P, the RSES and the guidance subscale of the SPS, with the email condition showing higher psychological well-being median scores. Results that indicated either a 'medium' or 'large' effect size are reported in more detail. See Table 6 for the results of the Kruskal-Wallis and Mann-Whitney tests, including reporting's of the z-scores and effect sizes for each of the condition comparisons, and the p-values of the significant differences between the conditions, of all outcome measures analysed at post-intervention and follow-up.

Post-intervention effect sizes. An effect size that was close to or exceeded a medium effect was found on the RSES between the email and the basic computer skills training condition, and on the SOBI-P between the email and the basic computer skills training condition and the video-communication and the email condition, with the email condition showing higher self-esteem and sense of belonging than the other conditions.

Follow-up effect sizes. At follow-up an effect size which was large or close to large was found for the guidance subscale of the SPS between the email and basic computer skills training condition, with the email condition showing higher guidance support, and the PSS between the video-communication and email condition, with the email condition showing lower levels of stress. An effect size that was close to or exceeded a medium effect was found on the following subscales of the SPS: attachment subscale between the video-communication and email condition, and the email and basic computer skills training condition; social subscale between the video-communication and email condition; alliance subscale between the email and basic skills condition; guidance subscale between the video and email condition; nurturance subscale between the video and email condition, with the email condition showing higher levels of social provision compared to the other conditions. A

medium effect size or value close to it was also found for the: the anxiety subscale of the HADS between the video-communication and email condition, with the email condition showing lower levels of anxiety; the RSES between the email and basic computer skills training condition, with the email condition showing higher self-esteem; and the SOBI-P between the video-communication and email condition, and the email and basic computer skills training conditions, with the email condition showing higher levels of sense of belonging than the other conditions.

Summary of between-group analyses. Contrary to predictions the participants in the video-communication condition did not show significantly higher scores in psychological well-being, compared to the participants in the email or basic computer skills condition, at either post-intervention or follow-up. The only psychological gain that the participants in the video-communication condition achieved above the other conditions was on the measure of social integration; a medium effect size was found on this measure between the scores of the video and email conditions, where participants reported feeling that their interests and concerns were shared by others, more than those in the email condition.

The participants in the email condition showed the highest psychological well-being at both the post-intervention and follow-up time points, compared to the participants in the other conditions. In comparison to the video-communication condition, participants in the email condition reported significantly lower stress levels at follow-up, and in comparison to the participants in the basic-computer skills condition the email condition were found to have significantly higher sense of belonging at post-intervention and follow-up.

Furthermore, although not statistically significant, at post-intervention they had a higher sense of belonging, and at follow-up they showed a higher sense of belonging, felt emotionally closer to others and felt less anxious compared to those in the video-communication condition. These differences were found to be a medium effect size as

measured by the effect size. Additionally, compared to the participants in the basic-computer skills condition, the participants in the email condition showed a higher sense of belonging at post-intervention and at follow-up they reported feeling emotionally closer to others and showed a higher score of feeling their interests and concerns were shared by others. These differences were also found to be of a medium effect.

The participants in the basic computer skills condition were not found to have higher scores on any psychological well-being outcome measure in comparison to the other conditions.

Table 6

Results from the Mann-Whitney and Kruskal-Wallis tests for all the measures between the different conditions

Outcome measures	Results from the Mann-Whitney U test comparisons of each condition																		Kruskal-Wallis test results	
	Video-communication vs Email						Video-communication vs Basic computer skills						Email vs Basic computer skills						P-value for difference between the conditions at post-intervention	P-value for difference between the conditions at follow-up
	post-intervention			follow-up			post-intervention			follow-up			post-intervention			follow-up				
	Z-score	P-value	Effect size	Z-score	P-value	Effect size	Z-score	P-value	Effect size	Z-score	P-value	Effect size	Z-score	P-value	Effect size	Z-score	P-value	Effect size		
SPS																				
Attachment	-.10	.17	-.02	-1.20	.133	-.30	-.10	.49	-.02	.00	.52	.00	-.78	.23	-.18	-1.43	.08	-.35	.58	.30
Social	-1.21	.13	-.29	-1.40	.095	-.36	-.36	.37	-.08	-.60	.30	-.15	-.79	.22	-.19	-.84	.22	-.20	.48	.38
Alliance	.00	.54	.00	-.36	.361	-.09	-.09	.48	-.02	-.71	.26	.18	-.09	.48	-.02	-1.49	.08	-.36	.99	.37
Guidance	-.05	.49	-.01	-1.14	.160	-.29	-.49	.33	-.19	-.34	.39	-.09	-.54	.31	-.13	-1.76	.05*	-.44	.83	.27
Nurturance	-1.07	.16	-.25	-1.65	.053	-.43	-.63	.28	-.12	-1.03	.16	-.26	-.53	.31	-.13	-1.08	.14	-.26	.54	.21
PSS	-1.02	.16	-.24	-1.91	.029	.49	-1.82	.04	-.43	-1.27	.11	-.33	-.62	.28	-.15	-.82	.22	-.20	.20	.53
SWLS	-.71	.41	-.17	1.04	.160	-.27	-.13	.46	-.03	-.90	.20	-.23	-.67	.27	-.16	-.24	.42	-.06	.72	.59
HADS																				
HADS-A	-.27	.41	-.06	-1.11	.150	-.29	-.36	.37	-.08	-.37	.37	-.09	-.85	.21	-.20	-.54	.32	-.13	.74	.59
HADS-D	-.59	.31	-.14	-1.06	.156	-.27	-.45	.34	-.11	-.80	.22	-.20	-.13	.46	-.03	-.05	.50	-.01	.84	.57
RSES	-.98	.18	-.23	-1.75	.044	-.45	-.29	.40	-.07	-.27	.41	.07	-1.51	.09	-.37	-1.70	.05*	-.41	.36	.13
Loneliness	-2.13	.02*	-.50	-1.62	.057	-.42	-.19	.45	-.05	-.69	.26	-.17	-.93	.03	-.23	-.63	.28	-.15	.06	.32
SOBI-P	-1.24	.12	-.29	-1.51	.072	-.39	-.19	.44	-.05	-.43	.35	.11	-1.35	.10	-.33	-1.88	.00*	-.45	.31	.13

Note. * $p < .05$. Effect sizes highlighted in bold indicate either a medium or large effect size. Cells highlighted in grey denote the measures which were found to be statistically significant between conditions at baseline.

Within-group analyses. Within-group analyses were also conducted in addition to the between-group analyses, to investigate whether engagement in either of the three conditions, video-communication, email or basic computer skills, resulted in differences on the outcome measures over time. This was considered important given that participants were not randomly assigned to the different conditions, and thus the between-group analyses may have been affected by individual variability existing between the conditions, which would have affected the validity of the results.

The Friedman's ANOVA, the non-parametric equivalent to the repeated-measures ANOVA, was conducted to explore differences within each condition across the three time points of baseline and post-intervention and baseline and follow-up. The Friedman's test showed that there was a statistical difference across the three time periods within the video-communication condition for the scores of the anxiety subscale, $X^2(2) = 6.23$, $p = .04$, and depression subscale, $X^2(2) = 5.83$, $p = .05$, of the HADS, and within the email condition for the scores of the Perceived Stress Scale, $X^2(2) = 9.75$, $p = .01$. With the Friedman's ANOVA all other outcome measures showed no statistical difference across the time-points ($p > .05$).

Post-hoc analyses using the Wilcoxon Signed-Ranks test indicated that within the video-communication condition the scores of the anxiety subscale of the HADS at post-intervention (median = 4, range = 13) were statistically significantly lower than at baseline (median = 9, range = 14), $z = 2.41$, $p = .05$, $r = .57$. The scores of the depression subscale of the HADS at post-intervention (median = 3, range = 10) were also statistically significantly lower than the scores at baseline (median = 8, range = 13), $z = -2.21$, $p = .03$, $r = -.52$. These results therefore show a decrease in anxiety and depression over this time period and the effect sizes demonstrate that the magnitude of these differences were large. Within the email condition the scores of the Perceived Stress Scale at follow-up (median = 7.5, range = 16) were statistically significantly lower than the scores at baseline (median = 14, range = 20), $z = -$

2.52, $p = .01$, $r = -.61$, which shows a decrease in stress over this time period. The effect size score indicates that the magnitude of this difference was large.

Wilcoxon Signed-Ranks tests were also conducted with the other measures because due to the small sample size it is likely that the Friedman's test had low statistical power, which increases the likelihood of Type II errors. Given the exploratory nature of the study it was therefore considered important to also conduct Wilcoxon Signed-Ranks tests to investigate possible significant differences that may exist.

Within the video-communication condition, using the Wilcoxon Signed-Ranks, it was found that the scores of the UCLA loneliness scale were statistically significantly lower at follow-up (median = 31, range = 32) than at baseline (median = 38, range = 25), $z = 2.37$, $p = .05$, $r = .50$, which shows a decrease in loneliness over this time period. The effect size score indicates that the magnitude of this difference was large. The SWLS score was, however, statistically significantly lower at follow-up (median = 21, range = 15) than at baseline (median = 25, range = 21), $z = 2.37$, $p = .02$, $r = .59$, which shows a decrease in satisfaction with life over this period. The effect size score shows that the magnitude of this difference was large.

Within the email condition, it was found that the scores of the anxiety subscale of the HADS were lower at post-intervention (median = 4, range = 6) than at baseline (median = 6, range = 10), $z = -2.03$, $p = .04$, $r = -.45$. It was further found that the scores of the loneliness scale were statistically significantly lower at post-intervention (median = 26, range = 26) than at baseline (median = 34, range = 27), $z = -2.04$, $p = .04$, $r = -.47$. These results show a decrease in anxiety and loneliness over this time period, and the effect sizes for these differences indicate a medium effect. No significant differences were found between the basic computer skills training condition across the time points.

As previously mentioned, in addition to statistical significance testing, it was considered important to also calculate the effect sizes for the results that were not found to be statistically significant. Effect sizes were therefore calculated with the scores between baseline and the scores at post-intervention and follow-up. Results that indicated either a 'medium' or 'large' effect size are reported in more detail. See Table 7 for the p-values, z-scores and effect sizes of the differences between the time-points of all the outcome measures, for each of the conditions.

Table 7

Results from the Wilcoxon Signed-Ranks for the differences between the time-points within each of the conditions

Outcomes Measures	Video-communication condition						Email condition						Basic computer skills condition					
	Baseline –post-intervention			Baseline-follow-up			Baseline –post-intervention			Baseline-follow-up			Baseline –post-intervention			Baseline-follow-up		
	p-value	z-score	Effect size	p-value	z-score	Effect size	p-value	z-score	Effect size	p-value	z-score	Effect size	p-value	z-score	Effect size	p-value	z-score	Effect size
Attachment	.55	-.60	-.14	.52	-.65	-.16	.55	-.60	-.14	.89	.34	.08	.80	.26	.06	.45	-.75	.18
Social	.40	-.86	.20	.69	-.41	-.10	.40	-.85	-.20	.69	-.41	-.01	.93	.07	.02	.13	1.51	.36
Alliance	.57	-.73	-.17	.46	.74	.19	.67	-.46	-.11	.25	1.16	.28	.33	-.97	.23	.29	-1.06	.25
Guidance	.71	.38	.09	.71	-.38	-.10	.34	-.95	-.22	.18	1.34	.33	.06	-1.90	.45	.34	-.95	.22
Nurturance	.11	-1.58	-.37	.17	-1.38	-.35	.86	-.17	-.04	1.00	.00	.00	.73	.34	.08	.87	.17	.04
PSS	.06	-1.90	-.45	.24	-1.19	-.30	.07	-1.84	-.43	.01*	-2.52	-.61	.48	-.71	.35	.59	-.54	.13
SWLS	.87	.17	.04	.02*	2.37	.59	.95	.06	.01	.60	.53	.13	.53	.63	.15	.07	1.84	.43
HADS-A	.05*	2.41	.57	.69	1.20	.30	.04*	-2.03	-.45	.10	-1.63	-.40	.35	.94	.22	.18	1.35	.32
HADS-D	.03*	-2.21	-.52	.06	-1.90	-.48	.06	-1.90	-.45	.80	.26	.06	.80	-.26	.06	.83	-.21	.05
RSES	.37	.89	.21	.80	.25	.06	.73	-.34	-.08	.56	.53	.13	.13	1.51	.37	.67	.42	.10
Loneliness	.08	-1.74	-.41	.05*	1.99	.50	.04*	-2.04	-.47	.07	1.80	.44	.21	1.26	.31	.55	.59	.14
SOBI-P	.11	1.61	.38	.14	1.48	.37	.09	1.68	.42	.05*	1.97	.48	.36	-.91	.22	.31	-1.01	.24

Note. * $p < .05$. Effect sizes highlighted in bold indicate either a medium or large effect size.

Video-communication condition effect sizes. Medium effect sizes were found for the differences between the decrease in scores on the loneliness scale, PSS and the nurturance subscale of the SPS between baseline and post-intervention, and the anxiety subscale of the HADS, PSS and nurturance subscale scores of the SPS from baseline to follow-up. A medium effect was also found for the increase of scores of the SOBI-P between baseline and post-intervention, and baseline and follow-up.

Email condition effect sizes. Medium effect sizes were found for the differences in the reduction of scores on the depression subscale of the HADS and the PSS between baseline and post-intervention, and the anxiety subscale of the HADS, the Loneliness scale and the guidance subscale of the SPS between baseline and follow-up. A medium effect was also found for the difference in the increase of scores on the SOBI-P between baseline and post-intervention.

Basic computer skills effect sizes. Medium effect sizes were found for the decrease in the scores on the PSS and the guidance subscale of the SPS between baseline and post-intervention, and the social subscale of the SPS between baseline and follow-up. Medium effect sizes were also found for the increase in scores on the loneliness scale and the RSES between baseline and post-intervention, and the SWLS between baseline and follow-up.

Summary of within-group analyses. Although the participants in the video-communication condition did not show statistically better psychological well-being, compared to the other conditions, following the intervention, the within-group analyses demonstrated that they felt significantly less anxious and depressed at post-intervention, and significantly less lonely at follow-up than at baseline, and the differences in the scores

between these two time points were shown as large. Additionally, although not found as significant, the scores of the participants in the video-communication condition suggested that they felt less stressed and lonely, and had gained a higher sense of belonging from baseline to post-intervention, and the magnitude of these differences were found to be either medium or large. Although not significant, they also showed reduced anxiety at follow-up compared to baseline, and their reduced stress levels and enhanced sense of belonging appeared to be maintained at follow-up, as indicated by medium effect sizes from baseline to follow-up.

Within the email condition the scores suggested that participants felt significantly less lonely and anxious at post-intervention and significantly less stressed at follow-up following communicating with their friends or family. The magnitude of these differences were either medium or large. Additionally, although not found to be significant, the scores of the participants in the email condition suggested that they felt less depressed and stressed, and gained a higher sense of belonging at post-intervention following emailing their friends or family, and these differences in scores were found to be a medium effect size. The scores of the participants in the email condition also suggested that they felt less anxious and lonely and they felt they had higher support in terms of advice and information from others at follow-up compared to how they felt prior to using email. These results also did not achieve statistical significance, but the differences in the scores between the time points showed the magnitude of the difference was a medium effect size.

There was a trend for the participants in the basic computer skills condition to feel less stressed and to have higher self-esteem at post-intervention, and to have an increased sense of satisfaction with life at follow-up following learning the basic computer skills. The magnitude of the differences in these scores between these times yielded a medium effect size. Despite this, however, no significant differences between the time points were found for

the outcomes measures within the basic skills condition. Furthermore, there was a trend for participants in the basic computer skills condition to show decreased support of advice and information, and increased loneliness at post-intervention, and decreased perception of their interests and concerns being shared by others at follow-up. The differences between these scores at the different time-points were shown to be a medium effect size.

Reliable Change Index and Clinically Significant Change. Clinically significant change statistics were considered important to calculate for several reasons. The reliability of the between-group and within-group results are limited by the small sample size and the multiple statistical tests that were conducted without correcting for the familywise error. Furthermore, although the group analyses provide some suggestion about the significant differences of the outcome measures between conditions and across the time-points of the study within the conditions, the clinically significance tests identify the effectiveness of whether participants moved out of the ‘clinical’ range to the ‘non-clinical’ range. Reliable change index and clinically significant change scores were calculated for each condition for the comparison of participants’ outcome scores from baseline to post intervention and baseline to follow-up.

A table for each of the outcome measures are presented to signify whether the participants made clinically significant change following use of the video-communication, email or basic computer skills. Jacobson and Traux’s (1991) categorical ratings were used for interpretation of these results. See Table 8 for the definitions of these categorical ratings. A graphical representation of the clinically significant change scores are presented in Appendix K.

Table 8

Jacobson and Traux's (1991) Categorical Ratings and Definitions

Categorical rating	Definition
Recovered	The change in the participant's scores was statistically reliable and the scores moved from the 'clinical' to the 'non-clinical' population
Improved	The change in the participant's scores was statistically reliable but the scores did not move from the 'clinical' to the 'non-clinical' population
No change	The change in the participant's scores was not statistically reliable
Deteriorated	The change in the participant's scores was statistically reliable, but moved in the opposite direction to that indicative of improvement.

Note. Where participant data is missing and reliable change index and clinically significant change statistics could not be calculated the text 'no data available' is replaced instead of the categorical ratings.

Sense of Belonging Instrument – Psychological (SOBI-P). For the video-communication condition from baseline to post-intervention one participant recovered, one participant improved, but remained within the 'clinical' range, and seven participants remained unchanged, two of whom scored within the 'clinical' range and five who were within the 'non-clinical' range at baseline. Follow-up data of the SOBI-P was received by seven participants in the video-communication condition, all of whom remained unchanged from baseline to follow-up. Table 9 shows the categorical ratings for the participants' change in scores between baseline and post-intervention and baseline and follow-up.

Table 9

Categorical ratings of the participants' change in scores on the SOBI-P in the video-communication condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1	Unchanged	Unchanged
2	Improved	Unchanged
3*	Unchanged	Unchanged
4	Unchanged	Unchanged
5*	Unchanged	Unchanged
6*	Unchanged	Unchanged
7*	Unchanged	No data available
8	Recovered	No data available
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the email condition from baseline to post-intervention three participants improved on the SOBI-P measure, all of whom were within the 'non-clinical' range at baseline, five participants remained unchanged, three of whom were within the 'non-clinical' range at baseline, and one participant deteriorated, but remained within the 'non-clinical' range. No participants therefore made clinically reliable change and 'recovered'. From baseline to follow-up in the email condition four participants showed improvement on the SOBI-P; two participants who were unchanged at post-intervention and two participants who had improved at post-intervention. Furthermore, four participants' scores from baseline to follow-up were unchanged, of which one participant had deteriorated at post-intervention, one participant had improved at post-intervention and two were unchanged at post-intervention. Table 10 shows the categorical ratings for the participants' change in scores.

Table 10

Categorical ratings of the participants' change in scores on the SOBI-P in the email condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Improved
2*	Deteriorated	Unchanged
3*	Unchanged	No data available
4*	Improved	Unchanged
5*	Unchanged	Unchanged
6*	Unchanged	Improved
7*	Improved	Improved
8*	Improved	Improved
9	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the basic computer skills condition from baseline to post-intervention two participants deteriorated on the SOBI-P, one of whom remained in within the 'non-clinical' range and one whom went from the 'non-clinical' range to 'clinical'. Six participants remained unchanged, two participants who remained within the 'clinical' range and four participants who remained within the 'non-clinical' range. No participants therefore made any improvement. Follow-up data of the SOBI-P was received by eight participants in the basic computer skills condition. From baseline to follow-up two participants deteriorated, five remained unchanged and one participant improved. Table 11 shows the categorical ratings for the participants' change in scores.

Table 11

Categorical ratings of the participants' change in scores on the SOBI-P in the basic computer skills condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Deteriorate	Deteriorate
2*	Unchanged	Deteriorate
3	Unchanged	Unchanged
4*	Deteriorate	Unchanged
5	Unchanged	Unchanged
6	No data available	No data available
7	Unchanged	Unchanged
8*	Unchanged	Unchanged
9*	Unchanged	Improved

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

Perceived Stress Scale (PSS). For the video-communication condition from baseline to post-intervention three participants recovered and five participants remained unchanged, four of whom were within the 'non-clinical' range at baseline. From baseline to follow-up two participants recovered on the PSS in the video-communication condition, remaining recovered from post-intervention, one participant improved, who was unchanged from baseline to post-intervention, and three participants who were unchanged at post-intervention, remained unchanged at follow-up. Table 12 shows the categorical ratings for the participants' change in scores.

Table 12

Categorical ratings of the participants' change in scores on the PSS in the video-communication condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3	Recovered	Recovered
4	Unchanged	Unchanged
5	Recovered	Recovered
6	No data available	No data available
7*	Unchanged	No data available
8	Recovered	No data available
9*	Unchanged	Improved

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the email condition from baseline to post-intervention: one participant recovered on the PSS; two participants improved, one of whom was in the 'clinical' range and one who was in the 'non-clinical' range at baseline; five participants remained unchanged, four of whom were within the 'non-clinical' range at baseline; and one participant deteriorated, but remained within the 'non-clinical' range. Seven participants provided follow-up data for the PSS for the email condition. From baseline to follow-up, four participants improved, of which two remained improved at post-intervention and two were unchanged at post-intervention, and three participants, who were unchanged at post-intervention, remained unchanged at follow-up. Table 13 shows the categorical ratings for the participants' change in scores.

Table 13

Categorical ratings of the participants' change in scores on the PSS in the email condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Improved
2*	Improved	Improved
3*	Deteriorate	No data available
4	Unchanged	Improved
5*	Improved	Improved
6	Recovered	No data available
7*	Unchanged	Unchanged
8*	Unchanged	Unchanged
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the basic computer skills condition from baseline to post-intervention, all nine participants remained unchanged on the PSS, eight of whom scored within the 'non-clinical' range and one participant who was within the 'clinical' range at baseline. No participants therefore made any improvement. From baseline to follow-up on the PSS in the basic computer skills condition, similar to post-intervention, all nine participants remained unchanged. Table 14 shows the categorical ratings for the participants' change in scores.

Table 14

Categorical ratings of the participants' change in scores on the PSS in the basic computer skills training condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3*	Unchanged	Unchanged
4*	Unchanged	Unchanged
5	Unchanged	Unchanged
6	Unchanged	Unchanged
7*	Unchanged	Unchanged
8*	Unchanged	Unchanged
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

Rosenberg Self-Esteem Scale (RSES). Within the video-communication condition from baseline to post-intervention one participant recovered and eight remained unchanged, all of whom were within the non-clinical range at baseline. Within the video-communication condition from baseline to follow-up, five participants remained unchanged on the RSES; one improved and one deteriorated, but stayed within the 'non-clinical' range. The participant who recovered at post-intervention was unchanged at follow-up. Table 15 shows the categorical ratings for the participants' change in scores.

Table 15

Categorical ratings of the participants' change in scores on the RSES in the video-communication condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2	Recovered	Unchanged
3*	Unchanged	Improved
4*	Unchanged	Deteriorate
5*	Unchanged	Unchanged
6*	Unchanged	Unchanged
7*	Unchanged	No data available
8*	Unchanged	No data available
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

Within the email condition from baseline to post-intervention one participant improved on the RSES and eight participants remained unchanged, all of whom were within the 'non-clinical' range at baseline. From baseline to follow-up in the email condition all of the participants' scores were unchanged on the RSES. Table 16 shows the categorical ratings for the participants' change in scores.

Table 16

Categorical ratings of the participants' change in scores on the RSES in the email condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3*	Unchanged	No data available
4*	Unchanged	Unchanged
5*	Unchanged	Unchanged
6*	Unchanged	Unchanged
7*	Unchanged	Unchanged
8*	Improved	Unchanged
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

Within the basic computer skills condition from baseline to post-intervention, one participant improved on the RSES, who was in the 'non-clinical' range at baseline, and seven participants' scores were unchanged, of which six of the participants were within the 'non-clinical' range at baseline. From baseline to follow-up seven participants scores in the basic computer skills condition on the RSES were unchanged, six of whom were unchanged at post-intervention, and two participants improved, one participant who was improved at post-intervention and one participant whose scores were unchanged at post-intervention. Table 17 shows the categorical ratings for the participants' change in scores.

Table 17

Categorical ratings of the participants' change in scores on the RSES in the basic computer skills condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3*	Improved	Improved
4*	Unchanged	Unchanged
5	Unchanged	Unchanged
6*	Unchanged	Unchanged
7*	Unchanged	Unchanged
8*	No data available	Unchanged
9*	Unchanged	Improved

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

Satisfaction with Life Scale (SWLS). For the video-communication condition from baseline to post-intervention eight participants remained unchanged, of which four participants were in the 'clinical' range, and one participant deteriorated from the 'non-clinical' to the 'clinical' range. Within the video-communication condition from baseline to follow-up five participants' scores were unchanged on the SWLS, who were unchanged at post-intervention, and two participants deteriorated, one of whom was deteriorated at post-intervention and one participant whose scores were unchanged at post-intervention. Table 18 shows the categorical ratings for the participants' change in scores.

Table 18

Categorical ratings of the participants' change in scores on the SWLS in the video-communication condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Deteriorate	Deteriorate
2	Unchanged	Deteriorate
3	Unchanged	Unchanged
4	Unchanged	Unchanged
5*	Unchanged	Unchanged
6*	Unchanged	Unchanged
7	Unchanged	No data available
8*	Unchanged	No data available
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the email condition from baseline to post-intervention one participant's scores on the SWLS deteriorated from the 'non-clinical' range to the 'clinical' range, and eight participants scores were unchanged, of which six participants scores were within the 'non-clinical' range at baseline. Within the email condition from baseline to follow-up six participants scores on the SWLS remained unchanged, who were unchanged at post-intervention, and one participant who was unchanged at post-intervention improved, but remained within the 'clinical' range. Table 19 shows the categorical ratings for the participants' change in scores.

Table 19

Categorical ratings of the participants' change in scores on the SWLS in the email condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3*	Unchanged	No data available
4	Unchanged	Unchanged
5*	Unchanged	Unchanged
6*	Deteriorate	No data available
7*	Unchanged	Unchanged
8*	Unchanged	Unchanged
9	Unchanged	Improved

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the basic skills condition from baseline to post-intervention one participant deteriorated from the 'non-clinical' range to the 'clinical' range on the SWLS, two participants recovered and six participants scores were unchanged, two of whom were within the 'non-clinical' range at baseline. Within the basic computer skills condition from baseline to follow-up one participant whose scores had deteriorated at post-intervention remained deteriorated at follow-up, one participant whose scores were unchanged at post-intervention recovered at follow-up, and seven participants' scores were unchanged, five of whose scores were unchanged at post-intervention. Table 20 shows the categorical ratings for the participants' change in scores.

Table 20

Categorical ratings of the participants' change in scores on the SWLS in the basic computer skills condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Deteriorate	Deteriorate
2*	Unchanged	Unchanged
3*	Unchanged	Unchanged
4*	Unchanged	Unchanged
5	Unchanged	Unchanged
6	Recovered	Unchanged
7	Recovered	Unchanged
8*	Unchanged	Unchanged
9	Unchanged	Recovered

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

UCLA Loneliness Scale (UCLA). For the video-communication condition from baseline to post-intervention two participants improved, one who was already within the 'non-clinical' range at baseline and one who remained in the 'clinical' range, and seven participants remained unchanged, of which four participants were in the 'non-clinical' range at baseline. Within the video-communication condition from baseline to follow-up one participant improved, who remained improved at post-intervention, and six participants' scores were unchanged, of which five participants remained unchanged at post-intervention and one participant who had improved at post-intervention. Table 21 shows the categorical ratings for the participants' change in scores.

Table 21

Categorical ratings of the participants' change in scores on the UCLA Loneliness Scale in the video-communication condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1	Unchanged	Unchanged
2	Improved	Improved
3*	Improved	Unchanged
4	Unchanged	Unchanged
5*	Unchanged	Unchanged
6*	Unchanged	Unchanged
7*	Unchanged	No data available
8	Unchanged	No data available
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the email condition from baseline to post-intervention two participants improved, whose scores were already within the 'non-clinical' range at baseline, and seven participants scores were unchanged, of which five participants were in the 'non-clinical' range at baseline. Within the email condition from baseline to follow-up seven participants scores were unchanged and remained unchanged from post-intervention and one participant improved, who remained improved from post-intervention. Table 22 shows the categorical ratings for the participants' change in scores.

Table 22

Categorical ratings of the participants' change in scores on the UCLA Loneliness Scale in the email condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Improved	Improved
3	Unchanged	No data available
4*	Unchanged	Unchanged
5*	Improved	Unchanged
6*	Unchanged	Unchanged
7*	Unchanged	Unchanged
8*	Unchanged	Unchanged
9	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the basic computer skills condition from baseline to post-intervention one participant deteriorated on the UCLA Loneliness Scale, from the 'non-clinical' range to the 'clinical' range, and seven participants scores were unchanged, six of whom were within the 'non-clinical' range at baseline. Within the basic computer skills condition from baseline to follow-up one participant's score deteriorated on the UCLA Loneliness Scale, which remained deteriorated from post-intervention, and seven participants' scores remained unchanged. Table 23 shows the categorical ratings for the participants' change in scores.

Table 23

Categorical ratings of the participants' change in scores on the UCLA Loneliness Scale in the basic computer skills condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Deteriorate	Deteriorate
2*	Unchanged	Unchanged
3*	Unchanged	Unchanged
4*	Unchanged	Unchanged
5	Unchanged	Unchanged
6*	No data available	Unchanged
7*	Unchanged	No data available
8*	Unchanged	Unchanged
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

Hospital Anxiety and Depression Scale – Anxiety (HADS-A). For the video-communication condition from baseline to post-intervention three participants recovered and six participants' scores remained unchanged, of which three participants were already within the 'non-clinical' range at baseline. Within the video-communication condition from baseline to follow-up all seven participants' scores were unchanged on the HADS-A. Table 24 shows the categorical ratings for the participants' change in scores.

Table 24

Categorical ratings of the participants' change in scores on HADS-A in the video-communication condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3	Recovered	Unchanged
4	Unchanged	Unchanged
5	Unchanged	Unchanged
6	Recovered	Unchanged
7*	Unchanged	No data available
8*	Unchanged	No data available
9	Recovered	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the email condition from baseline to post-intervention one participant recovered on the HADS-A and eight participants' scores were unchanged, of which seven were already within the 'non-clinical' range at baseline. Within the email condition from baseline to follow-up, one participant recovered on the HADS-A, whose scores were unchanged at post-intervention, and the remaining seven participants' scores were unchanged, seven of whose scores were also unchanged at post-intervention. Table 25 shows the categorical ratings for the participants' change in scores.

Table 25

Categorical ratings of the participants' change in scores on HADS-A in the email condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2	Recovered	Unchanged
3*	Unchanged	No data available
4	Unchanged	Recovered
5*	Unchanged	Unchanged
6*	Unchanged	Unchanged
7*	Unchanged	Unchanged
8*	Unchanged	Unchanged
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the basic computer skills condition all nine participants' scores were unchanged from baseline to post-intervention on the HADS-A, of which seven participants were already within the 'non-clinical' range at baseline. Within the basic skills condition from baseline to follow-up all participants' scores remained unchanged on the HADS-A from post-intervention. Table 26 shows the categorical ratings for the participants' change in scores.

Table 26

Categorical ratings of the participants' change in scores on HADS-A in the basic computer skills condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3*	Unchanged	Unchanged
4*	Unchanged	Unchanged
5	Unchanged	Unchanged
6*	Unchanged	Unchanged
7	Unchanged	Unchanged
8	Unchanged	Unchanged
9	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

Hospital Anxiety and Depression Scale – Depression (HADS-D). For the video-communication condition from baseline to post-intervention two participants improved on the HADS-D, both of whom were already within the 'non-clinical' range at baseline, and seven participants' scores were unchanged, five of whom were within the 'non-clinical' range at baseline. Within the video-communication condition from baseline to follow-up three participants improved on the HADS-D, two of whose scores were improved at post-intervention, and four participants' scores were unchanged, which were also unchanged at post-intervention. Table 27 shows the categorical ratings for the participants' change in scores.

Table 27

Categorical ratings of the participants' change in scores on HADS-D in the video-communication condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1	Unchanged	Unchanged
2	Unchanged	Improved
3*	Improved	Improved
4	Unchanged	Unchanged
5	Unchanged	Unchanged
6*	Improved	Improved
7*	Unchanged	Unchanged
8*	Unchanged	Unchanged
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the email condition from baseline to post-intervention all nine participants' scores were unchanged on the HADS-D, eight of whom were within the 'non-clinical' range at baseline. Within the email condition from baseline to follow-up one participant improved on the HADS-D, two participants scores deteriorated, from the 'non-clinical' range to the 'clinical' range, and five participants scores were unchanged. Table 28 shows the categorical ratings for the participants' change in scores.

Table 28

Categorical ratings of the participants' change in scores on HADS-D in the email condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3	Unchanged	No data available
4*	Unchanged	Unchanged
5*	Unchanged	Deteriorate
6*	Unchanged	Improved
7*	Unchanged	Unchanged
8*	Unchanged	Unchanged
9*	Unchanged	Deteriorate

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

For the basic computer skills condition all nine participants' scores were unchanged on the HADS-D from baseline to post-intervention, seven of whom were within the 'non-clinical' range at baseline. Within the basic computer skills condition from baseline to follow-up all nine participants' scores remained unchanged on the HADS-D. Table 29 shows the categorical ratings for the participants' change in scores.

Table 29

Categorical ratings of the participants' change in scores on HADS-D in the basic computer skills condition between baseline and post-intervention and baseline and follow-up

Participant	Baseline to post-intervention	Baseline to follow-up
1*	Unchanged	Unchanged
2*	Unchanged	Unchanged
3*	Unchanged	Unchanged
4*	Unchanged	Unchanged
5	Unchanged	Unchanged
6*	Unchanged	Unchanged
7	Unchanged	Unchanged
8*	Unchanged	Unchanged
9*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisks

Summary of Reliable Change Index and Clinically Significant Change Analyses.

Video-communication. The reliable and clinically significant change statistics showed that at baseline the one individual who was considered to be in the 'clinical' range with their sense of belonging and the one individual who was in the 'clinical' range with their self-esteem 'recovered' at post-intervention, taking them out of the 'clinical' range into the 'non-clinical range'. Furthermore, out of the five participants who were within the clinical range with their levels of stress at baseline, three 'recovered' at post-intervention, and two of these participants were able to maintain their lower stress levels at follow-up. Additionally, out of the six participants who were in the 'clinical' range for anxiety at baseline, half of them 'recovered' at post-intervention.

Less improvement was, however, shown with the reliable and clinically significant change scores for the measures of depression and loneliness. Although three participants' feelings of depression 'improved' at either post-intervention or follow-up, one of whom was in the 'clinical' range at baseline, the two participants who were in the 'clinical' range at baseline remained in the 'clinical' range. Moreover only one of the five participants who were in the 'clinical' range with their feelings of loneliness at baseline 'recovered'. Additionally, none of the four individuals who were within the 'clinical' range for their satisfaction with life 'recovered', whilst one participant deteriorated at post-intervention from the 'non-clinical' range to the 'clinical' range. Gains were also not maintained at follow-up for those participants who recovered out of the 'clinical' range at post-intervention on the measures of sense of belonging, self-esteem, loneliness and anxiety.

Email. Not as many participants made clinically significant change following using email in comparison to the participants in the video-communication condition. Although several participants showed improvements with regards to their sense of belonging, loneliness and stress from using email, only three participants recovered with either their stress levels, anxiety, or life satisfaction. However it is worth noting that the participants in the video-communication condition had statistically lower psychological well-being on the measures of loneliness and self-esteem at baseline compared to the email condition. The higher psychological well-being for these measures at baseline within the email condition means that there was not as much clinical gain that could be made with some of the participants in the email condition. It is notable, however, that two participants in the email condition deteriorated with regards to their symptoms of depression, from being within the 'non-clinical' range to the 'clinical' range. Similar to the participants in the video-communication condition one participant's scores on the satisfaction with life measure 'deteriorated'.

Basic computer skills. Although some participants gained ‘improvement’ in their psychological well-being following learning the basic computer skills, a number of participants’ scores showed deterioration in their psychological well-being. At post-intervention two participants’ scores on the sense of belonging measure ‘deteriorated’, one participant’s scores with satisfaction with life ‘deteriorated’, and one participant’s scores on the loneliness outcome measure also ‘deteriorated’. The deterioration in these participants’ scores, indicative of deterioration in psychological well-being, remained the same at follow-up.

Qualitative Results

The qualitative analysis identified five main themes and a number of subthemes, as presented in Table 30.

Table 30

Themes and subthemes of the impact of video-communication on older adults’ psychological well-being

Theme	Sub-theme
Being more connected to family	Having more contact with family Having more open conversations when talking via video-communication Sharing more special moments with family Being able to provide and receive more support Feeling emotionally closer to family Increased perception family are physically close
Enhanced emotional well-being	Feeling brighter in mood Feeling less alone Feeling less worried
Increased positive attitude towards self	Feeling more competent Feeling more connected to the younger generation

Being more connected to family. A shared theme that appeared to be pertinent for seven of the participants was how using the video-communication resulted in them being more connected to their family by: having increased contact; having more open conversations when talking via video-communication; being more engaged with family when talking via video-communication; sharing more special moments with family; being able to provide and receive more support; feeling emotionally closer to family; and increased perception family are physically close.

Having more contact with family. Although three participants did not feel the video-communication increased their contact with their family, two of whom already had regular contact with their family, four participants spoke about how they have had more contact with their family since using the video-communication, suggesting that they were more connected with their family. One participant mentioned that he now talks to his daughters more frequently. Similarly, another participant stated that she now speaks to her brothers more often and she also now sees them more in-person, as they invite her out more often, “I speak to them more now... I think they get in touch with me more than they did... we get out more... they take me to *** (name of town) sometimes” (Participant 1). She further reported that as a result of her brothers inviting her out more she feels more wanted, “if *** (brother’s name) gets hold of me on Skype and asks if I want to go out to dinner and erm I feel wanted a bit more”.

Another participant also stated that she now has increased contact with her family; it resulted in her speaking to relatives who she had not spoken to in a while and she mentioned that video-calling one relative has become a ritual, “we (her and her cousin) have made a pact that we do it (video-call) and also my niece... she’s got in touch with me, the one that lives in *** (name of town) and so I’ve seen her” (Participant 8). One participant also spoke about

how video-calls with his family last longer than telephone calls and he stated that he contacts his relatives more frequently now because he likes to be able to see them, “I’ll be doing that (video-calling) more often than picking the phone up... I’ll be doing that because I can see them” (Participant 4).

A further participant, however, stated that she had not increased contact with her family. She stopped using the video-communication because she believed it would result in her family trying to get in contact with her more frequently, “I’m not really greatly interested in it. It could be an invasion of my privacy. It’s okay for people abroad. For wanting to get in touch with people abroad, not family all the time. I think it would be an invasion of my privacy talking on there... I might just want to sit quietly and err, to have them where they want to see you all the time and talk, no I wouldn’t like it” (Participant 6).

Having more open conversations when talking via video-communication. Three participants spoke about how conversations seemed to be more open when talking via video. Two of these participants compared this to talking on the telephone, one of whom attributed this to being able to see each other’s facial expressions, “When you can speak to someone and you can see them, they can see your expressions like I can see yours, you know what I mean, and that to me I think makes it a lot more, erm, sincere” (Participant 4). Another participant made this comparison to in-person visits,

I think seeing them like that they are more natural... they talk about things that they usually don’t talk about. Erm, they have been married a long time and they erm, but they keep all their, what shall I say, they keep a lot of things to themselves. But sometimes when talking on Skype and they let things slip... painting is my brother’s hobby and he’s built a studio to do his paintings in. And he now talks about that on Skype, but he wouldn’t have done if he had come here. (Participant 1)

Similarly, another participant appeared to suggest that his son is also more open when discussing his life when talking via video,

Well like yesterday, *** (name of son) was telling me he is off to Egypt today with his in-laws and his immediate family and so. Fine I didn't know about that but that's great, good. And he's just back from San Francisco which I didn't know about and then he went onto his firm. Apparently it's going to be bought out by Chinese people so how I asked him about his position and so yes it's [the conversation] diverse.

(Participant 5)

Being more engaged with family when talking via video-communication. Four participants seemed to imply that talking via video-communication resulted in them and their family being more engaged with each other, compared to when talking on the telephone. For example, one participant stated,

It's more personal I think that just having a normal telephone conversation... with the telephone I could be walking around the house cooking dinner and I'll be like yeah okay, yeah, but with skype you are actually sitting down... the visual thing is personal. It's a one-to-one conversation. (Participant 3)

Two participants who were partially deaf implied that the video-communication helped facilitate conversations, enabling them to engage with their relatives, because, unlike when talking on the telephone, they could lip-read what the other was saying,

I find it an advantage to use the Skype because of being deaf. When I use my mobile I struggle... but with Skype you get a visual and you can see their mouth moving and it is so much easier. (Participant 3)

Because I can just get on there and talk to people, because as I say I have trouble on the phone and I can't hear them. And I can hear them on Skype. You can see them and lip read. (Participant 1)

Two participants also seemed to imply that the video-communication helped them be more engaged with family interactions, as when they spoke to a relative the rest of the family became involved with the conversation. For example, one participant stated,

With a phone call, its 'err, oh hello' and you can make a joke or whatever but you know it comes to an end doesn't it and they go 'oh alright'... (with video calls) they are all crowding round and then one wants to talk and I cant speak to *****(grandchild) without *****(grandchild) and I can't speak to *****(grandchild) without (grandchild) and (daughter-in-law)... it's far far better than getting a plastic phone and talking. (Participant 4)

Similarly, another participant further mentioned,

It really bring you together. And also as I say, if my cousin is there, her husband will come in and say hello, and then her son will come in and so I see the rest of the family too. (Participant 8)

Sharing more special moments with family. Using video-communication seemed to enable four of the participants to share special moments with their family. One participant spoke about how his grandchildren are playful with him when they are speaking to him via video,

Against the telephone when you call them up on the video call it's a happier conversation. Just because you can see their faces, you know. Because when you

speak to them, you know kids, they are all making faces you know and it makes it a much more pleasant conversation. (Participant 4)

Furthermore one of these participants also appeared to share special moments with a family member by sharing things with each other on video-communication. For example, she stated,

If I've done anything, like I've knitted something for her family and I can hold it up and she can see how I'm progressing with it... her granddaughter was there on Sunday and she showed me a book she was making because she's very clever with embroidery and stuff and she was able to show me things which she could describe on the phone, but it's not the same as actually seeing it. Yeah, it's a wonderful invention...he (brother) took me into the garage to show me his new car and I've seen his new bungalow, and because his marriage had broken up and I was thinking for a bachelor pad how well he had decorated it you know. (Participant 8)

For three of the female participants the video-communication appeared to enable them to share visual special moments which helped them feel a part of their grandchildren's lives and development, so that they were not missing out on seeing them grow up when they were unable to visit in-person,

"It's nice to see them in the evenings, it is and at bathtime you know. Its good fun... I saw him in the bath and I saw him getting dressed on his table... He does recognise me. It takes him a while... He does this (participant screws up face) because I think I'm very wrinkly to him and because he goes (participant screws up face) like that. It's like a special look, you know. Oh yeah it's lovely. (Participant 8)

Another participant stated,

You see their little quirkiess... if you don't see them for a fortnight and they come to visit, you notice so many different changes about them. Their height and their

demeanour, how they walk along and them acting more grown up and I think you miss out if you don't see them. (Participant 7)

Additionally, two of the participants spoke about how they shared photos via the video-communication and this resulted in them sharing either information about their lives or past memories; for example, one participant stated, “ *** (friend's name) in Spain Skyped me a slideshow of old photographs which brought my wife back to life when she was younger and beautiful” (Participant 2). For one participant the sharing of photos also seemed to provide a talking point with other individuals whom he sees in-person. For example, this participant stated,

I've seen their photos and she's (granddaughter) won big prizes because she has just come back from America because she is in the *** (name of school) and so I've seen her photo with the prize, the award they got... but I had to turn it around to show *** (name of friend), my friend. And I showed *** (housing manager) and she said ohh god isn't it a big trophy. (Participant 4)

Being able to provide and receive more support. Five participants appeared to be more connected with their family members, from using video-communication with them, by being able to provide or receive more support. Exchanging video-calls with relatives resulted in four participants being able to receive more support from them. One participant spoke about how it was easier to ask for support because he felt closer to his daughters from using the video-communication, “I guess it makes it easier to ask *** (daughter) if I need anything” (Participant 2). Another participant talked about her family looking after her more since using the video-communication, “Well they care more, how can I put it, they make sure that I am being looked after properly and... they do little things for me” (Participant 1), while the other

two participants talked about either receiving emotional support, in terms of love and care, or instrumental support, in terms of advice.

Three participants also appeared to be more connected with their family, from using the video-communication, by being able to provide their relatives with more support. One participant spoke about how because he felt closer to his daughters from seeing them on video, he could therefore feel their problems more easily and this therefore helped him offer advice to his daughters, “it helps me offer some further advice” (Participant 2). Similarly, another participant spoke about how the video-communication resulted in her relatives sharing problems and this enabled her to offer advice to her sister, “My cousin isn’t a very well person, she going to be 80 in June so you know there are things she will ask me and me being that much older I can from experience answer things” (Participant 8). When another participant was asked explicitly whether the video-communication impacted upon the support he could give to his family he was unsure, but he implied that perhaps he provided his family with emotional support when he talks to them via video, “All I know is that they go mad when I go on there, ello granddad and I get all that. You’ll have to get one [laptop], you’ll have to get one.” (Participant 4)

Although five participants spoke about how the video-communication impacted upon the support they could give, or receive from relatives, two participants stated that it did not have any impact. One participant stated that this was due to her family already supporting each other.

Feeling emotionally closer to family. Although one participant stated that the video-communication did not have any impact on how close she felt with her family members who she communicated with via video, because she already felt close to them prior to using video-communication, four participants either explicitly stated or implied that they felt emotionally

closer to their family as a result of speaking to them via video-communication. One participant spoke about feeling closer to her family because she was using technology in which her family was interested, whilst another participant spoke about feeling emotionally closer to her cousin because the video-communication enabled her to catch up on gossip. Two other participants talked about how the video enabled them to see their family and this made them feel emotionally closer to them. For example, one participant stated, “With *** (son) and *** (daughter) it just seems to make the bond that much stronger. It’s strong anyway between us three, but it just makes the bond stronger... I just feel that I’m that much closer again” (Participant 5).

It is noteworthy that four of the six participants who felt closer to their family recognised that their sense of feeling closer was reciprocated by their family members. For example, one participant mentioned, “it made us feel closer to each other”, while another stated,

I can come over here and do the google hangouts and if I haven’t seen them for several weeks, which I don’t. I don’t sometimes see them for a couple of months, but then that has brought me closer to them, I think. I think. And I think they feel the same. (Participant 4).

Increased perception family are physically close. Although one participant acknowledged that one of the disadvantages of video-communication was that you could not physically touch the people you are talking to, four participants implied that they felt physically closer to those to whom they were talking via video. One participant described that when he spoke to his daughters via video-communication it felt to him as if he could almost touch them, while another stated that talking via video to his son was similar to seeing him

in-person, “It’s like talking to you now. You know, if I was looking at him I’d be like seeing him” (Participant 5). Similarly, another participant also stated that when talking to her partner via video it was as if he were physically with her, “It was rather nice in a way that I could talk to him and he was there” (Participant 6). A further participant explained that when she was telling someone about speaking to her brother, via video-communication, she had described it to her friend as if she were visiting him in-person.

It’s as if they are in the same room as you, it’s lovely. You can reach out and touch them sort of thing. You feel that. And the funny thing was, the first time I ever did it, someone rang the bell in my brother’s home, as in New Zealand, and when I was relating it back to someone, I said somebody called whilst I was there. I was so engrossed I really thought I was in the kitchen waiting for him to open the door. It was wonderful. It really is darling. It’s just like being there. (Participant 8)

Enhanced emotional well-being. Six participants reported a change in mood as a result of video-calling their family members; five participants appeared to feel brighter in mood, four participants were less worried and four participants seemed to feel less alone. Despite this, however, one participant reported that the video calls had no impact on her mood. Moreover, another participant mentioned she felt a little stressed when technical difficulties arose and she also found it somewhat frustrating seeing her children’s house untidy on video. Additionally, one of the six participants who reported feeling better following video-calling stated that he imagined that if he were talking to his children and he saw them upset on video he believed he would feel upset.

Felt brighter in mood after video-calling family. Five participants appeared to feel better in mood after a video call with their family. Two of these participants spoke about feeling better in mood immediately after speaking with their relatives. For example one of the participants mentioned, “If you feel a bit, don’t get me wrong, I do get sad. If you do feel that way inclined, and then you phone them, you feel much more elated afterwards” (Participant 4), whereas other participants spoke about generally feeling brighter in mood. For example, one participant stated, “it (video-communication) certainly makes me feel brighter” (Participant 2). One participant even spoke about how prior to using video-communication with her family she felt depressed and experienced thoughts about ending her life, but she acknowledged that since video-calling her family she does not continue to experience these thoughts and she now feels better in mood. This participant acknowledged that the video-communication helped her realise that her family care about her. For example, she stated, “Well it makes you feel that there is someone there that cares and erm, someone you can talk to. And it’s made a lot of difference really” (Participant 1).

Felt less alone. Although two participants stated that using video-communication did not impact upon their feelings of loneliness, four participants appeared to feel less alone as a result of video-calling their family. One participant mentioned that it helped her to feel less alone because being partially deaf, unlike when on the telephone, she was able to lip-read what they were saying and this made it easier to have a conversation with them. Another participant also spoke about feeling less alone, since using video-communication to talk to his family, stating that he felt the least alone when talking online with his family; he did, however, talk about how he felt ‘estranged’ when he was not in contact with them. The other participant also implied that she felt less alone from video-calling her family, stating, “There’s nothing like seeing them, especially if you are lonely” (Participant 8). She explained

that her family are now easily accessible and the video-calls have resulted in her days no longer being 'endless and empty'.

Felt less worried after video-calling them. Four participants appeared to feel less worried following using video-communication, either due to feeling less concerned about their families' well-being or due to being reassured that their family wanted contact with them. When talking about the advantages of video-communication one participant implied he felt less worried about his family by stating that seeing his adult children on video enabled him to judge how they were managing. For example, he stated,

I like seeing my son and I like seeing my daughter. I like to know if they are well. Alright they can tell me by text, yeah I'm alright dad and this and the other, but you just don't know. At least I can see my daughter. I can see my son and I can know if something is not right... you don't know what they are going through, whereas if I can see her through my phone, she's in her living room, maybe she has a glass of wine by her side and I can't see any tears in her eyes or anything like that then I'll accept her saying I'm fine dad. (Participant 5)

Similarly, another participant spoke about how seeing her relatives via video enabled her to see how they were doing physically. For example, she mentioned,

It (video-communication) is wonderful being able to see, actually being able to see. Because when someone says to you they are fine you can tell, can't you, by looking at them, whether they are really and as I say I could see the difference in *** (great nephew) this week. He looked so much better. His dark rings had gone... someone can say oh yeah he's fine aunty, but to actually see, and as I say to actually see my brother, because he had been poorly one of the times I rang him and when I saw him

he looked well. His blood pressure went up, but then he looked much better... my sister was very poorly, but seeing her was a real relief to me to see her look much better. (Participant 8)

Three participants talked about how the video-communication enabled them to see their relatives' facial expressions when talking to them and this enabled them to judge their interest in communicating with them, which resulted in them feeling reassured that their family wanted contact with them. For example, one participant stated, "you can see the expressions on their face. How they feel when they are talking to you... you can see whether they are elated, interested or disinterested" (Participant 4). Similarly another participant mentioned, "I can see that persons facial expressions. Whether they are enjoying the conversation or whether they would rather be doing something else" (Participant 5).

Although four participants stated that using the video-communication did not impact on their stress levels, it is noteworthy that two participants spoke about how video-calling their relatives led them to feel less stressed. Both participants spoke about how they felt less stressed, as they knew they could get in touch with their family if they needed to. One participant seemed to feel less stressed because she could easily get in touch with her family for support, while the other participant seemed to feel less stressed as the video-communication enabled her to check up on her family if she was worried about them. As an example, one participant stated, "Well in a way it's alleviated some of it (stress) because knowing that he (brother) is there and if I wanted to see him I could get in touch with him" (Participant 8).

Increased positive attitude towards self. Five participants appeared to be pleased with themselves with learning how to use video-communication; while one participant talked about feeling generally pleased with herself for learning how to use video-communication, the other four participants appeared to be pleased with themselves as a result of feeling either more competent or feeling more connected to the younger generation.

Feeling more competent. Since using the video-communication, three participants implied that they were feeling more competent with using computers. For example, one participant stated, “Yeah I thought I was quite clever” (Participant 7), while another mentioned, “I’d have never thought in my wildest dreams that I would get on with a computer like I have done... it makes you feel more confident” (Participant 4). Another participant also explained how she now feels more competent at using the computer and she seemed to feel pleased about this,

I find I’m not so frightened to try different things. Before I would wait for my daughter to come down and do it (help with the computer) whereas now I turn it on and I get all flash with it... I was like yeah hey, I’ve done something and I was quite chuffed about that... It gives you a little bit of a kick, I’m not so dumb as I make out... I was pleased with myself actually that it wasn’t so scary as I thought it would be. (Participant 3)

Feeling connected to the younger generation. Two participants seemed to imply that they felt more connected to the younger generation as a result of using video-communication and engaging in technology, and this appeared to make them feel good about themselves. For example, one participant mentioned,

It makes me feel younger as well. I mean my kids are saying, hey, look my Dad's facetimeing me, you know, so that sort of thing, he moving up with technology, so yeah I really like. I really enjoy it... yeah dad's up with the 21st century so yeah it's cool. (Participant 5)

Similarly, another participant mentioned that prior to using video-communication she thought technology was for the younger generation,

It's like we had a christening and there was three, my nieces and nephews children. They were four or five and they were all on these tablets. And I'm thinking, I'm looking at them and they are not even at school yet and they have been brought up with it. (Participant 3).

However, following using video-communication she seemed to feel pleased with herself with using the technology, "I showed my daughter that and she was like ohh look at you... you realise you are never too old to learn", implying that perhaps it made her feel more connected to younger generations. It is noteworthy that for both of these participants comments made from family members appeared to contribute to them feeling more connected to the younger generation.

Summary of qualitative findings

Three main themes emerged from the qualitative findings; as a result of using the video-communication participants appeared to be more connected to family, had enhanced emotional well-being and an increased positive attitude towards themselves. The participants seemed to be more connected to their family in a number of ways, which included: having more contact with their family; having more open conversations when talking via video-communication; sharing special moments with their family; being able to provide and receive more support with their families; feeling emotionally closer to their family; and having an increased sense of being physically close to their family. Participants also appeared to feel emotionally better following using the video-communication, which included feeling brighter in mood, feeling less alone, and feeling less worried about their families well-being and feeling reassured that their family wanted contact with them. The participants also seemed to gain an increased positive attitude towards themselves, including feeling more competent and feeling more connected to the younger generation. Overall participants expressed a number of positive benefits of using video-communication.

Individual profiles for each participant within the video-communication condition, consisting of an amalgamation of their quantitative and qualitative results, can be found in Appendix K.

Discussion

The aim of the study was to explore the impact of video-communication on older adults' psychological well-being. This chapter begins by discussing the main findings, drawing together the qualitative and quantitative data, in relation to the literature. The limitations and strengths of the study are subsequently highlighted, followed by a discussion of the clinical implications of the findings. The chapter closes with a reflection of my learning experience with conducting this research.

Discussion of Findings

Although there is some disparity between the qualitative and quantitative data within the current study, the results largely converge and many of the findings are consistent with previous research.

The within-group analyses showed that participants in the video-communication condition reported feeling significantly less anxious, depressed and lonely at either post-intervention or follow-up, compared to baseline. Prior to this study the author was aware of only three studies that previously used psychometric measures to investigate whether video-communication enhanced older adults' psychological well-being. These studies found that, compared to baseline, video-communication significantly reduced self-reported feelings of loneliness at one week (Tsai et al., 2010) and three months (Schwindenhammer, 2014; Tsai et al., 2010; Tsai & Tsai, 2011), and self-reported depression status at three months (Schwindenhammer, 2014; Tsai et al., 2010; Tsai & Tsai, 2011). The current study's results therefore provide support for this previous literature. The current study also extends the literature by utilising psychometric questionnaires to measure the impact of participants' feelings of anxiety, stress, self-esteem, and sense of belonging. Although no significant differences across time within the video-communication condition were found with these

measures, except for the measure of anxiety, the clinically significant change analyses showed that at least half of the participants who were clinically stressed, anxious, or had low sense of belonging, recovered following use of the video-communication. Somewhat supporting these results, the qualitative analysis showed that the participants in the video-communication condition appeared to feel emotionally better following using the video-communication, which included feeling brighter in mood, feeling less alone, feeling less worried about their families well-being and feeling reassured that their family wanted contact with them. The participants also seemed to gain an increased positive attitude towards themselves and they appeared to be more connected to their family.

The qualitative findings of the current study help support the quantitative findings and they help extend the literature by providing possible explanations for the quantitative results. The participants attributed several reasons as to why the video-communication increased their psychological well-being. This included sensing family were more accessible by being able to see them on video, having more open conversations with family and, as reported by one participant, conversations being easier, due to being able to lip read what others were saying; something which was previously found difficult via the telephone as a result of hearing difficulties.

Furthermore, the subtheme from the qualitative data that participants felt physically closer to their relatives suggests that the video-communication enhanced the social presence of the interactions between the older adults and the individuals with whom they were speaking. This finding is thus consistent with Short et al.,'s (1976) social presence theory and shows that the visual cues displayed through the video-communication enabled participants to gain some sense that they were visiting their friends or relatives in-person. This finding supports previous studies that also found older adults felt physically closer when

talking via video, compared to when communicating on the telephone (Demiris et al., 2008; Fujimura et al., 2007; Hensel et al., 2007; Milliken, 2012).

Furthermore, consistent with Biocca and Harms's (2002) explanation of the social presence theory that communicating through video better helps individuals understand each other than if the visual information was not present, and also in line with the wide body of literature that acknowledges that non-verbal communication helps convey meaning (Mehrabian, 1977; Knapp, Hall, & Horgan, 2013; Wild, Erb, & Bartels, 2001), the visual cues that were transmitted with the video-communication in the current study reassured participants that their relatives wanted contact with them and it helped them feel less worried about their families' well-being. This demonstrates that the video-communication, which facilitated the expression of non-verbal communication, helped some of the participants read the intentions and emotional states of the individuals they were communicating with, thus reducing uncertainty about how their families were feeling or what they were thinking. This may also, in part, have had an impact on their level of anxiety as anxiety levels decreased following use of the video-communication.

The reporting from a participant that he would feel upset if he saw his daughter upset on video and the comment made by another participant that he felt he could feel his daughter's problems from seeing them on video, highlights how 'seeing' the other when communicating helps lead to a transfer of emotions. Within the literature, feeling what someone else is feeling is termed emotional contagion (Hatfield, Cacioppo, & Rapson, 1994) and it is argued that non-verbal cues help to increase this (Hatfield, Rapson, & Le, 2011), which helps elicit empathy, and helps individuals feel in tune with each other (Guerrero, 2014). It therefore appears that in addition to individuals feeling physically closer to each other, this research suggests that video-communication may also facilitate this emotional connection in the same way as face-to-face in-person contact. This corroborates earlier

findings that found video-communication helped individuals feel emotionally closer to those whom they were talking with (Milliken, 2012) and it better facilitated affect-orientated conversations (Hensel et al., 2007). However, this study extends this knowledge further, by providing possible insight into the interpersonal processes by which video-communication can impact upon older adults' psychological well-being.

The finding from the qualitative data that participants felt more connected with their relatives, and the results from the quantitative data that showed an increase in participants' sense of belonging following using the video-communication, is similar to previous qualitative studies that found when older adults spoke to their relatives via video it made them feel more connected with their family (Demiris et al., 2008; Hensel et al., 2007; Tsai et al., 2015; Auguilar et al., 2010), through showing things to each other (Demiris et al., 2008; Hensel et al., 2007) or sharing information (Milliken, 2012). This study therefore provides further support for this and contributes to the literature base by showing with quantitative data that video-communication may for some older adults be effective in helping them feel more part of the family.

The results of the qualitative data of the current study, which show that following video-communication, participants were provided with more love and care, more advice, and were taken out to recreational activities more frequently, is congruent with what has been termed in the literature as emotional support, informational support and instrumental support, respectively (House & Kahn, 1985). Previous quantitative studies that measured levels of social support following use of video-communication also found that older adults received more emotional support (Tsai et al., 2010; Tsai & Tsai, 2011), and previous qualitative studies implied that social support may have been increased from using video-communication, by noting that in-person visits improved (Mickus & Luz, 2002) and

conversations, which required discussing information or were affect-orientated, were easier (Demiris et al., 2008; Milliken, 2012).

A finding from the qualitative analysis in the present study provides some insight into one possible explanation that may have resulted in the participants reporting that they gained more social support. One participant spoke about how he felt closer to his relatives as a result of seeing them face-to-face more frequently via video, and this made it easier for him to ask for support. It is therefore possible that as a result of the video-communication making some of the participants feel closer to those they were speaking with, both physically and emotionally, it may have helped them ask for support more easily and this in turn may have assisted with more support being provided. Furthermore it could be speculated that being reassured about families' well-being and knowing relatives want contact, facilitated by seeing them on video, may help individuals feel more comfortable asking for support. When individuals are more direct in asking for support it is also likely to impact upon their psychological well-being; research has found that passive coping styles, of avoiding confronting problems and accepting the situation as it is, rather than turning to support from others, may exacerbate low mood (Choi, Hegel, Sirrianni, Marinucci, & Bruce, 2012). Whilst the amount of social support received via the video-communication may be dependent to some degree on the dispositional factors of older adults, such as their ability and willingness to express their needs to others and ask for support when it is required, video-communication may help individuals receive support by enabling them to ask for support as a result of feeling closer. It is also noteworthy that the finding that video-communication not only helped participants receive support, but it helped some participants offer support to others, is something that has not previously been reported within the literature on video-communication. It is possible that by the older adults offering more support to their friends or relatives it may elicit more caring and supportive behaviours from those whom they talk to

and this may help to strengthen their relationship. The reciprocal nature of social support between individuals has not been widely acknowledged in the literature and deserves greater attention, with future research specifically exploring how these mechanisms operate when individuals communicate via video.

Although the current study found from the qualitative data that information and instrumental support increased for some participants, previous experimental studies reported that video-communication did not have any effect on informational or instrumental social support (Tsai et al., 2010), with one study even finding that instrumental support scores significantly decreased at six and twelve months following using video-communication (Tsai & Tsai 2011). There could be many possible reasons to account for this discrepancy between the findings of the current study and previous studies. For example, one tentative suggestion is that it is possible these differences were due to the current study and previous studies recruiting participants who were drawn from different populations; the quantitative studies recruited participants who were living in nursing homes and were from Taiwan, and therefore the characteristics and social context of these participants may be quite different to the participants in the current study. As an example, there may have been cultural differences in asking for and receiving informational and instrumental support. It is also possible that the participants in these previous studies were already receiving adequate informational and instrumental support and therefore the video-communication did not result in this type of support increasing. It is also noteworthy that the decrease in instrumental support may have been a result of participants being empowered to better manage difficulties themselves and thus not requiring as much instrumental support.

The finding from the qualitative data in the current study that some participants' self-esteem increased following using the video-communication, which included feeling more competent and more connected to younger generations, is somewhat consistent with one

other qualitative study which reported that the older adults felt better about themselves and felt more up-to-date in today's society for using video-communication (Tsai et al., 2015). Previous studies which have explored the impact of older adults using computers and the internet generally have, however, also found that using the internet has resulted in enhanced self-esteem and confidence (Aguilar, Boerema & Harrison, 2012; Blit-Cohen & Litwin, 2004; Cark, 2002; Dow et al., 2008; Fokkema & Knipscheer, 2007; Nahm & Resnick, 2001; Shapira, Barak & Gal, 2007) and increased positive identity (Aguilar, Boerema & Harrison, 2012; Shapira, Barak & Gal, 2007; Xie, 2007). Moreover, in the current study, the scores on the measure of self-esteem were shown to improve in the desired direction for the participants within the basic computer skills condition. The increased self-esteem reported from the participants in the video-communication condition in the current study may therefore not be a direct result of communicating via video, but rather it may be due to learning something new or using technology which is current in today's society. Future studies would need to explore whether the increased confidence and sense of self-satisfaction reported by some participants would be sustained over time, or whether these feelings would diminish over time. It is important to acknowledge, however, that the participants' scores on the self-esteem measure in the video-communication condition did not significantly increase following use of the video-communication. This may indicate therefore that although the participants felt more competent with using computers and this gave them a sense of satisfaction, this confidence may not have impacted upon their self-judgment of their worth and general abilities.

In the current study many of the participants spoke about their joy at the video-communication enabling them to interact with their grandchildren more frequently, in particular by seeing them develop and by sharing special moments with them. These results are somewhat similar to a study which found that grandparent roles provide older adults with one of the highest levels of satisfaction, with many older adults mentioning that some of the

best features of being a grandparent are watching their grandchildren grow up and being with them (Peterson, 1999). The current research illustrates therefore that older adults can to some extent gain this joy and be involved in their grandchildren's lives when communicating via video. It is noteworthy, however, that the within-group analyses showed a significant decrease in the participants' satisfaction with life scores following use of the video-communication.

A measure of stress was included in the research because the stress-buffering hypothesis posits that supportive relationships can increase individuals' coping resources and it can decrease an individual's appraisal of a stressful situation, thus decreasing an individual's stress levels. Although the participants' stress was found to decrease from baseline to post-intervention, only two participants in the interview acknowledged that the video-communication helped them feel less stressed. These two individuals attributed this to the video-communication providing an easy means of being able to get hold of their relatives, either if they needed support or if they wanted to check up on the well-being of their relatives. It is not clear, however, whether this perception that others are within easy reach altered participants' appraisal of stressful situations, as this study did not explicitly ask participants in the interview about stressful events. The results of the study therefore do not provide clear support for the stress-buffering hypothesis. The present study does however seem to provide support for the direct-effects hypothesis, as the results show that from using the video-communication participants reported a number of ways that their psychological well-being increased. Video-communication therefore seems to be able to support many of the functions of a positive and supportive relationship that contribute to increased psychological well-being, and it may present as a means for reconnecting and maintaining relationships, particularly when barriers to visiting exist.

Although many participants reported psychological benefits of using video-communication, the qualitative analysis showed that some individuals did not report such benefits following using the video-communication. For example, one person who did not report any improvement in her psychological well-being during the interview following using the video-communication stated that she did not want increased contact with others. This highlights that for an individual to be more connected with their friends or relatives they have to have an interest in engaging. This is congruent with previous literature that reports that in order for an individual to experience a sense of belonging they must have the energy, interest and capacity for developing a sense of belonging and connection to others (Hagerty et al., 1992). Video-communication may therefore only be of benefit if both parties, the older adult and their family or friends, are willing to engage with each other. Furthermore, results from the qualitative strand of the research highlighted that the video-communication did not enhance aspects of participants' psychological well-being if their psychological well-being was already high; for example, if they already felt connected and belonging to their family. It therefore appears that the video-communication did not impact upon participants' psychological well-being, or some aspect of it, if they already had close supportive relationships with their relatives whom they frequently saw face-to-face, they did not want further contact with their relatives, or their psychological well-being was already positive.

The findings from the quantitative data that some of the outcome measures did not show an improvement in the desired direction, despite the qualitative data suggesting otherwise, may have been due to a number of reasons. Over half of the participants in the video-communication condition scored within the non-clinical range on the measures assessing sense of belonging, self-esteem, satisfaction with life, loneliness and depressive status. Only for the measures of stress and anxiety were more than half of the participants scoring in the clinical range. This means that if participants were already demonstrating high

psychological well-being the outcome measures would not have been able to detect any further increases in psychological well-being.

The finding that the increased psychological well-being at post-intervention was not maintained at follow-up is not congruent with previous studies; reductions in depression and loneliness with using video-communication were maintained past three months in two previous studies (Tsai et al., 2010; Tasi & Tsai, 2011). There are many possible reasons to account for this. For example the frequency of participants use of the video-communication may have declined, perhaps due to the novelty wearing off. Furthermore one participant acknowledged that she felt more comfortable answering the questionnaires with the researcher at follow-up and thus she may have been more open to disclosing her psychological difficulties than she was at baseline. This could have also been the same for other participants. If the participant did not report the true extent of her psychological difficulties at baseline then the change in scores would not be representative of the change in her psychological well-being following use of the video-communication.

It is notable that a number of participants who expressed interest in participating in the video-communication condition spoke about either not having anyone to video-call, or they did not want to ask family members about video-calling them because they did not want to burden their families. This highlights the importance of older adults having pre-existing relationships. Furthermore, it also shows that, due to certain personality types, perhaps it is not only the older adults who have to initiate new communication modes, but it may be advantageous for family members to also initiate and maintain these communication channels if barriers to in-person visits exist. Further research would need to explore whether these views are similar for other older adults. If so, it would be fruitless to teach older adults video-communication skills if individuals did not feel they could invite family or friends to engage in this communication mode.

Similar to the video-communication condition, the within-group analyses showed that the participants in the email condition reported feeling significantly less anxious, lonely, and stressed, at either post-intervention or follow-up, compared to baseline. This shows that the use of email may also have the potential to enhance older adults' psychological well-being. Furthermore, whilst no significant differences on any of the measures were found within the basic computer skills condition, clinically significant change analyses showed that three participants recovered with regards to their satisfaction with life and a number of participants showed some improvement in their psychological well-being. The finding that some psychological improvement was also found with the control conditions demonstrates that the improvement in psychological well-being over time in the video-communication condition may, in part, also be due to other variables, such as increased time spent with the researcher or sense of achievement with learning something new, rather than the effects of using the video-communication per se.

Although not as many participants made clinically significant change following using email in comparison to the participants in the video-communication condition, the between-group analyses showed the email condition to have the highest psychological well-being on a number of measures at either post-intervention or follow-up time points compared to the other conditions. Participants in the email condition may not have demonstrated as much clinical gain in their psychological well-being compared to the video-communication condition due to participants in the email condition having statistically higher self-esteem and lower loneliness at baseline than the video-communication condition. The higher psychological well-being within the email condition at baseline means that not as much clinical gain could be achieved for these participants. The discrepancy between the group analyses and clinically significant change analyses is likely due to the inherent differences with what these tests assess; the statistically significant group tests measure whether the

change in scores is statistically different, whereas the clinically significant change tests measure if the change is clinically meaningful. Therefore a small change in an individual's score, moving the individual from the 'clinical' range to the 'non-clinical' range can show someone has recovered, whilst a larger change will often be required for a subset of individuals to show statistically significant change. This change, albeit statistically significant, may not indicate that the intervention was useful in helping individuals to recover into the 'non-clinical' range on the psychological well-being measures. The basic computer skills condition demonstrated the least improvement in psychological well-being; no significant differences on the outcomes measures were found across time for the participants in the basic computer skills condition. Qualitative data would have been fruitful to collect from the control conditions to provide further insight into the impact of these conditions on older adults' psychological well-being.

It is notable that across all three conditions some deterioration in psychological well-being on some measures were identified with the quantitative analysis. Within the video-communication condition the within-group analyses showed a significant decrease in participants' satisfaction with life from baseline to follow-up, and the clinically significant change scores showed that two individuals' scores on this measure deteriorated, at either post-intervention or follow-up. Within the email condition the clinically significant change analyses showed that two participants' symptoms of depression increased and one individual's scores on the satisfaction with life measure deteriorated, and within the basic computer skills condition two participants showed deterioration in their psychological well-being, with regards to decreased satisfaction with life, sense of belonging, or increased feelings of loneliness. The results of the deterioration in life satisfaction from the video-communication condition are however inconsistent with the qualitative findings, which found that participants generally reported enhanced psychological well-being following using the

video-communication. The discrepancy between the qualitative and quantitative results may be due to some of the methodological limitations of the study, which is discussed in the limitations section.

It is important to note that this study is only an exploratory study, investigating the possible impact of video-communication on older adults' psychological well-being. There are many methodological limitations of the study and therefore the findings must be treated with caution.

Limitations of Study

Although the findings of the study provide insight into the impact of video-communication on older adults' psychological well-being, the study had many limitations which are notable.

Design quality. One of the key limitations of the design of the study is the lack of randomisation of participants to the three conditions, in addition to participants being recruited to the separate conditions from different supported living accommodations. The consequence of this is that it is possible that other factors may be responsible for the findings from the quantitative strand of the study, rather than the intervention itself. Moreover, the study did not include a control group that did not receive any intervention. It would have been useful to also compare a no-intervention control group against the other conditions to explore whether older adults' psychological well-being deteriorated over time if no intervention was provided.

Researcher's role. The researcher provided the computer and internet training sessions, supported participants with completing the questionnaires and conducted the

interviews with the participants. Although this level of engagement with the participants may have helped to develop rapport with the participants and it may have helped them speak more openly about a topic, it may have resulted in the participants providing responses which they felt were expected by the researcher and it may have resulted in some participants feeling uncomfortable discussing their psychological well-being with the researcher. Moreover, whilst every attempt was made to avoid influencing the participants' responses the interviewer may have subtly and unconsciously influenced the participants' responses, for example by nodding to answers that provided support to the researchers' hypotheses. The researcher's role within the study may have therefore impacted upon the results of the study. Future studies may overcome this by having an individual who is blind to the research hypotheses collect the data.

Sample. The sample of participants in the study is unlikely to be representative of the older adult population, which limits the inference quality and inference transferability of the results. The study only recruited participants from supported living accommodations within one county of the country. The extent to which these findings can be generalised to other older adults residing elsewhere is unknown. Results may be very different for individuals living in their own homes, as they may be more independent and be in better health. Participants within this study, and the previous quantitative studies that investigated this topic with a sample of nursing home residents, are likely to be less healthy than individuals living in their own homes. Future studies may therefore consider exploring the impact of video-communication on older adults' psychological well-being who live in their own homes.

It is also notable that two participants were recruited to the email condition who should have been excluded, as they were not living alone. These participants were included in the study due to the difficulty recruiting participants and the time constraints on the research

project. The inclusion of these participants, however, may have biased the between-group findings.

The study's small sample size and the fact that the participants were recruited from a convenience sample also limit the ability to generalise the findings. The small sample size further impacts upon the statistical analyses and makes the reliability of the results less robust. It further limits the transferability of the qualitative findings. Furthermore similar to other studies (Tsai et al., 2010; Tsai & Tsai, 2011), there was a high attrition rate for the video-communication condition, which was due to a number of factors. It is impossible to know whether those who participated differed from those who did not and those who withdrew, which further threatens the inference quality and transferability of the results. Moreover, although the sample of older adults within the video-communication condition were all residents of supported-living accommodations, there may have been wide variations between the participants with regards to the level of face-to-face in-person contact they had with their friends or relatives. The researcher did not collect information about the frequency of participants' social relationships either at baseline or throughout their participation in the study. The consequence of this is that this makes it difficult to draw valid inferences from the quantitative results as unsystematic variations, such as the frequency of face-to-face in-person contact, between and within conditions, may have resulted in non-significant findings of the statistical tests, due to such confounding variable affecting the cause and effect relationship. Future research studies may therefore consider recruiting a more homogenous sample of participants who have similar face-to-face in-person contact with others. It would also be fruitful to explore some of the differences in individuals' social context and the impact that this variable has on older adults' psychological well-being when they use video-communication.

Intervention. The researcher was unable to control the participants' use of the computers and the internet. The participants in the email and video-communication conditions may have therefore learnt how to use other functions of the internet which was not controlled for in the experiment. This variable may have therefore also impacted upon the validity of the results. Additionally, although the study initially aimed to keep an accurate record of participants' time spent using the video-communication or the number of emails exchanged, by requesting that the participants recorded their usage on a record sheet, most of the participants did not keep an up-to-date record. The researcher, however, did not stress the importance of this at the beginning of the study, as she was concerned that, due to comments made by participants about the effort required to complete the questionnaires, participants may have withdrawn from the study if this was enforced as a requisite of participating in the study. Future studies may therefore consider either discussing the importance and rationale of this at the beginning of the study to gain a higher completion rate, or, if possible, they may consider asking permission to gain access to the participants' usage history from the video-communication software programme.

Data collection. Many of the participants reported that they found completing the questionnaire packs arduous due to the number of questionnaires included. Completing a large number of questions may have therefore resulted in fatigue or boredom. Furthermore it was noticed that many of the participants became confused at answering the questionnaires that included both negative and positive worded items, and one participant also stated that he found it difficult to answer questions which were about his emotional state. Additionally, many biases may have occurred during the interviews; the interviewer may have asked leading questions or, as already noted, the participant may have provided answers they

thought the interviewer was expecting. All these factors may have led to inaccurate responses, potentially threatening the inference quality of the results.

Measurement issues with the psychological constructs assessed may in part account for the discrepancy between the quantitative and qualitative results. For example even though some of the participants reported feeling brighter in mood following using the video-communication no significant result was found with the quantitative results to reflect this. The depression subscale of the Hospital Anxiety and Depression Scale (HADS), used to measure symptoms suggestive of depression, is unlikely to capture fleeting momentary changes in positive emotional states that were reported in the interviews. Future studies may therefore consider finding a way to measure brief changes in emotional states. Furthermore as the depression subscale of the HADS only had adequate reliability, as measured in previous studies, participants had to achieve greater improvement on this measure to show clinically significant change. Future studies may therefore consider using other measures demonstrating better reliability.

Although all post-intervention questionnaires were collected following the participant receiving their fourth computer training session, there were differences in the length of the time between collection of the post-intervention and follow-up questionnaires. This was due to participants being unwell or busy and computer training sessions being delayed or rescheduled. The consequence of this is that some participants may have had longer with using the computers, which may have allowed for greater changes in psychological well-being, thus biasing the results. The data collection procedure could have therefore been better standardised to ensure that the time between the data collection points were the same for all participants.

It is also noteworthy that the Sense of Belonging Instrument – Psychological (SOBI-P) and the Social Provision Scale (SPS) questionnaires used in the present study do not assess

for negative social interactions. Considering that one of the participants spoke about how she felt frustrated at seeing her children's house untidy and another participant explained she did not want increased contact with her family, the video-communication may have the potential for creating negative social interactions. Therefore given relationships can also be destructive to an individual's psychological well-being, it may be interesting for future research to administer a relationship questionnaire which measures negative social interactions.

Data analyses and interpretations of results. As a consequence of statistical differences between the conditions on some of the psychological well-being measures at baseline these measures had to be excluded from between-group analyses. Comparisons between the video-communication and email conditions were not conducted for the measures assessing depression, self-esteem and loneliness, or for stress between the video-communication and the basic computer skills conditions. This therefore reduced the number of measures that were analysed across the conditions.

Due to the data not meeting the assumptions for parametric tests, a robust statistical measure such as a two-way ANOVA could not be conducted. As a result a series of individual non-parametric tests were conducted, without adjusting the probability level to account for these multiple analyses. It is therefore possible that some of the findings could have been the result of a Type I error. Furthermore, the small sample size may have biased the effect sizes, resulting in larger effects being shown than was the case. The results therefore need to be treated with caution.

Methodological Difficulties Encountered. The current study found it difficult to recruit participants; many individuals showed ambivalence about whether they wanted to participate and a number of older adults mentioned that they expected that using a computer

would be too difficult for them, or they thought their families would not be interested or would not have the time to video-call or email them. The older adults' beliefs about their families' interest in engaging and their anxieties about their ability to use technology therefore appeared to present as barriers to older adults participating. To aid recruitment of participants to future projects researchers may find it beneficial to ask housing managers to advertise the research project to family members of the older adults. Furthermore they may provide a demonstration of the intervention, to give older adults a better expectation about what the intervention involves and offers.

The current study also experienced a high attrition rate, predominantly due to ill health, family disengaging from participating, participants losing interest in participating, and a housing manager being concerned about the detrimental consequences of older adults participating, which resulted in the project being stopped in some accommodations. To minimise the high attrition rate it may be fruitful for future research investigators to build good relationships with all housing managers, clearly discussing the research and enquiring about any concerns they may have. If this was executed in the current study this would have provided an opportunity to dispel one of the housing managers myths about how asking about emotional well-being can be detrimental to an individual's well-being. Providing the computer training sessions shortly following the recruitment phase may also prevent participants losing interest in participating; in the current study there was often a few weeks wait between recruitment and delivery of the intervention.

Many older adults in the study made comments that some of the questionnaires were confusing and they stated that they found completing them a timely and arduous process. Although questionnaires that include both positive and negative item are often seen as more reliable, many older adults often became confused with these reversed items. This therefore posed a threat to the validity of the data collected. Future research may therefore consider

limiting the number of outcome measures, or using shorter questionnaires, and using questionnaires that do not contain reversed items.

Strengths of Study

Despite the limitations of the current study it had many strengths.

Based in the UK. The current study explored the impact of video-communication on older adults' psychological well-being with a UK population, which had not previously been investigated. These results therefore provide insight into the potential impact of video-communication with a UK population. In a climate where older adults are given increasing opportunities to access the internet in the UK, this study helps highlight the potential benefits of older adults engaging in video-communication to communicate with friends or family.

Design quality. One of the main strengths of the study is the methodological design employed. The literature review highlighted that a major flaw of the other studies in evaluating the efficacy of video-communication for enhancing older adults' psychological well-being was the lack of an appropriate control group, which meant that the increased contact with the individual providing the computer training sessions or participants' sense of achievement that they may have gained from learning something new could not be accounted for. The inclusion of a control group in the current study, who were taught basic computer skills, enables the researcher to explore whether any psychological well-being achieved was due to using the video-communication and not due to the increased contact with the researcher or due to an increased sense of accomplishment gained with learning a new task.

The mixed methods design further permitted the researcher to evaluate the effectiveness of video-communication on older adults' psychological well-being, while also

exploring participants' experiences to provide clarification and meaning to the quantitative results. This is the first study to date that the author is aware of that has explored both quantitative and qualitative data in relation to older adults' psychological well-being when they use video-communication for speaking to their friends or relatives. Utilising a mixed-methods design enables the quantitative data to be corroborated with the qualitative data, enhancing the inference quality of the findings.

Intervention. Every attempt was made to standardize the video-communication condition, email condition and the basic computer skills condition as best as possible. This involved ensuring that each participant received the same number of sessions, which lasted the same length of time and covered the same set of skills relevant to the condition to which the participant was assigned. The same individual also provided all the sessions to each participant to try to achieve consistency.

Data collection. To maximise the inference quality of the findings: all self-report questionnaires used had good psychometric properties in previous research; all conditions completed the same questionnaires; support was provided to participants with the psychometric questionnaires to ensure that they understood the questions and the questionnaires were being completed accurately; and the researcher reassured participants that their data would remain anonymous so they could feel at ease in providing honest responses to the questionnaires and interview. Furthermore, the use of a semi-structured interview schedule was used to help guide the interview in a way that enabled the research question to be addressed, whilst at the same time allowing for new insights to be discovered.

Analysis and reporting of data. A range of analyses was employed to help enhance the credibility of the findings. The qualitative analysis adopted thematic analysis, which included a step-by-step systematic method of analysing the data and this process was reported in detail in the study. Furthermore to minimise the qualitative results being biased by the researcher's assumptions, the researcher continually re-evaluated the themes that were identified. The quantitative and qualitative data were amalgamated to maximise credibility and to enhance clarity. Furthermore, this is the first study, to date, that has explored the clinical usefulness of older adults using video-communication, by examining whether participants' scores moved from the 'clinical' range to the 'non-clinical' range.

Focus of work. This study extends the literature that has focused on the impact of video-communication on older adults' psychological well-being by gaining further insight into this topic. Not only has it attempted to address the methodological limitations in the literature, but the study has also explored more aspects of psychological well-being, with standardised psychometric measures, than had been previously explored, including measuring an individual's stress levels, anxiety, satisfaction with life, self-esteem and sense of belonging. Furthermore, it is the first study to date, that the author is aware of, that has shown that video conversations, in comparison to telephone conversations, may help to better facilitate the transfer of emotions between individuals through non-verbal cues, which can enhance feelings of empathy and result in individuals feeling emotionally closer to another. Although other studies have shown video-communication can result in older adults receiving more social support, this study also shows how video-communication can help older adults to provide support to others as a result of feeling more emotionally in tune with those whom they are speaking with. The study has also highlighted the dynamic process of social support, in relation to communicating via video, and it illustrated that that an individual's disposition

can impact upon how much support is received. The findings of the work therefore contribute to the evidence base and provide important insight that is of clinical relevance to older adults living in the UK.

Clinical Implications

Despite the limitations of the study, the findings of the current study are worthy of further investigation due to the importance of their clinical implications. As previously noted in the introduction to this report, the increase in life expectancy of older adults has been reported to increase the risk of social isolation, and consequently feelings of loneliness, within the older adult population. Furthermore, although there are mixed findings about whether individuals' psychological well-being deteriorates or increases during their older adult years, there is some consensus that older adults who live alone are at risk of their psychological well-being deteriorating. It has therefore been widely acknowledged that it is paramount to find ways to enhance, and prevent deterioration of, the psychological well-being of older adults who live alone in the UK. There are many computer and internet training schemes across the country helping the older adult generation to 'get digital'. There is however little guidance for trainers as to which functions of the internet may be most helpful and useful for older adults. The findings from this study therefore highlight that for some older adults, particularly those who find it difficult to visit their friends or relatives in-person and those individuals with hearing difficulties, video-communication may present as a tool for keeping in contact with their loved ones, which may also have the potential to enhance their psychological well-being. However, it is important to acknowledge that some participants did not gain any psychological benefits.

Given that the email condition also showed enhanced psychological well-being the results of increased psychological well-being following using the video-communication may

also be due to other variables than simply the video-communication per se. Considering the participants in the email condition appeared to gain some benefits in their psychological well-being, the use of email may also be beneficial for improving psychological well-being. It is important to highlight that video-communication requires an individual to have someone to communicate with and thus it is not an appropriate intervention for every older adult. Indeed three participants had to withdraw from the study as they did not have anyone to communicate with.

Conclusion

This study provides tentative findings that video-communication may present as a promising means for supporting older adults to reconnect, or maintain relationships, with friends or relatives and consequently enhance their psychological well-being. However, given the methodological limitations of the study the quantitative results have to be treated with caution. Furthermore, the results of the qualitative data were based upon a small sample, which limits the generalisability of the results. This study also suggests that the use of email may also enhance psychological well-being for some individuals and therefore it is unclear whether the use of video-communication is superior to individuals communicating via email. This study has, however, supported existing research in finding that using video-communication with relatives can enhance older adults' psychological well-being, strengthen relationships and increase social support. Furthermore the current study extends the literature by: providing insight into the possible interpersonal processes at play when older adults use video-communication with others; showing that video-communication can be a valuable resource for individuals with hearing difficulties; demonstrating that video-communication may reduce older adults' anxiety and heighten their sense of belonging, something which has

not previously been explored; and highlighting that video-communication may not be beneficial to all older adults. Future research is required to support these claims.

Researcher's Reflections

This research was an ambitious endeavour to conduct as a research project for the degree of Professional Doctorate in Clinical Psychology. The process of: recruiting participants; delivering individual computer training sessions across a whole county to many older adults; collecting both qualitative and quantitative data; analysing the data; and trying to amalgamate the findings to answer the research question was both physically and mentally taxing, albeit enjoyable at the same time. Whilst I felt that carrying out these tasks myself enabled me to gain greater insight into some of the difficulties and barriers with conducting the research, such as recruiting participants and providing older adults with computer training sessions, I feel that perhaps if I had delegated some of these tasks to others I may have been able to have conducted a better piece of research. For example, to explore whether the video-communication condition achieved any benefits above participants not receiving any intervention, I initially intended to include a control group who would have completed the questionnaires only and would not have received any intervention. However, due to the time it took to recruit and deliver the training session to the three conditions within this study I did not have enough time to include this other condition. If I had spent some time initially recruiting assistance to help with delivering the computer training sessions, this would have given me time to recruit individuals to the no-intervention condition, which would have strengthened the research design. With future research projects that I conduct I will therefore consider delegating tasks where possible to maximise the potential of the research, while also remaining close to the research to not lose sight of the research processes.

Conducting this research has reinforced the idea that establishing and maintaining relationships within the research context is key. This included building good relationships with housing managers and staff from the supported living accommodations, participants, and research supervisors. Building good relationships with housing managers and staff at the supported living accommodations helped with recruitment and enabled this research study to be conducted.

The qualitative analysis presented some challenges for me. During the thematic analysis I found myself searching for themes that supported my hypotheses. However, being aware of this, when I noticed this was happening I asked myself, 'what else could the participant have meant and what would be the alternative perspective?'. I also tried to look for themes that contradicted the themes identified to ensure that I was not biasing my results by my pre-conceived ideas.

To help me with my organisation of my thematic analysis I used an Excel spreadsheet and I extracted my codes and inserted them into the spreadsheet along with the raw data, in the same way one would do with a computer software programme like MAXQDA. However, I found that when I began to group my codes to generate themes the data that I had in my spreadsheet was removed from the context in which it was spoken about and this resulted in the true meanings of the participants' experience being lost. This process therefore appeared to distance me from the participants' experiences. Therefore with all my themes I revisited the transcripts to ensure that I was not distorting the participants' experiences and trying to fit them within a theme. Having gained insight into how easy it is to decontextualize patients' experiences and impose my own biases onto the data I would in the future enlist the support from another individual to independently review my codes and themes in order to enhance the validity of the findings. To further enhance the credibility of the findings, I would also

consider sharing my themes with participants who I interviewed to cross-validate the results to ensure that the themes accurately captured their experiences.

Overall conducting this piece of research has been a challenging, but enjoyable, experience. It has increased my confidence and competence in conducting research and I look forward to further enhancing these research skills in future research projects.

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Appendix A: Table summarising the characteristics of the studies included in the literature review

Study and Country	Research design	Participants (sample size, age, living status)	Intervention	Data collection and analysis	Findings
Aguilar, Boerema, & Harrison (2010)	Qualitative	N = 9; Age range 65 years to 82 years. Living status not reported.	No intervention. Participants were existing users of video-communication.	Qualitative data collected via online focus groups and data was analysed by interpretive phenomenology	Video-communication helped participants keep up-to-date and have meaningful conversations with family and friends. Also helped participants to feel closer to family.
Australia					
Demiris et al., (2008) USA	Qualitative	N = 4; Age = 65 years and above. Nursing home residents.	Participants supported to use videophone for three months, so participants could talk to their relatives via video.	Interviews were conducted following intervention phase and thematic analysis was used to analyse the data.	Themes reported included; participants being included into family interactions and feeling part of the family; participants valuing seeing the other person's facial expressions; video-communication reduced feelings of loneliness; video found better than the telephone for emotional conversations; and concerns with using the technology.
Fujimura et al., (2007) Japan	Two Qualitative studies	N = 8 and 19 for the two studies. Participants lived in their own homes. Participants' marital status was not reported.	Participants were provided with a touch screen internet communication computer system to use for three months, which included a camera and microphone.	Interviews were conducted following intervention phase. Qualitative analyses not reported.	Findings stated that participants felt physically closer to whom they were speaking with and they enjoyed the experience.

Hensel, Parker-Oliver, & Demiris (2007) USA	Qualitative: Case study	N = 1. Age = 78 years old. Nursing home resident.	Participant supported with using a videophone for three months so she could contact her niece.	Data collected via interviews. Qualitative data reported to have been analysed 'inductively'	Themes reported included; 'it was almost like being in the same room'; 'I could see how she's doing'; 'I shared more of her life'; 'we had a lot of fun'; video better for emotional conversations than regular telephone.
Mickus & Luz (2002) USA	Qualitative	N = 10. Age range = 41 to 97. Nursing home residents.	Videophone provided for six months so the participants could talk their relatives.	Qualitative data collected via open-ended surveys Analysis not reported.	Findings included: technical difficulties with the videophone; no impact on frequency of face-to-face visits; enhanced social interactions; and enhanced social visits.
Milliken, O'Donnell, Gibson, & Daniels (2012) Canada	Qualitative	N = 6. Age range = 55 to 64. Participants resided in their own homes and were pre-existing of video-communication	No intervention.	Qualitative data collected via open-ended surveys. Analysis not reported	Findings included: easier to share information with each other online; felt physically and emotionally closer; enjoyable experience; technical difficulties interfered with enjoyment; improved in-person visits.
Schwindenhamer (2013) USA	Quantitative: Pre- post quasi-experimental design.	Intervention condition: N = 40. Control condition: N = 40. Participants aged 65 and above. Nursing home residents.	Intervention group spoke to their relatives or friends via video weekly for three months. Control group received care as usual and did not receive any intervention.	Depressive symptoms and loneliness measured at pre- and post-intervention. Within-between repeated measures ANOVA between baseline and post-intervention	Depressive symptoms and loneliness scores were significantly reduced after the intervention.
Seelye et al., (2012)	Qualitative	N = 8. Age range = 64 to 92. Nursing home resident.	Participants communicated with their family for two	Qualitative data collected via open-ended surveys. Analysis not reported	Participants reported it was a positive and fun experience; however, when technical difficulties

USA			days via a remote controlled robot that enabled one to conduct video-calls.		arose it was confusing.
Tsai, Shillair, Cotten, Winstead, & Yost (2015) USA	Qualitative	N = 21. Aged above 65 years. Participants resided in supported living accommodations and were pre-existing of video-communication.	No intervention.	Data collected from in-depth interviews and analysed with thematic analysis.	Themes included feeling part of family, positive experience and enhance positive feelings
Tsai & Tsai (2010) Taiwan	Qualitative	N = 34. Age range = 60 to 95. Nursing home residents.	Participants communicated with their family for five minutes per week via Skype or Windows Live messenger, accessed through broadband and operated via a computer.	Data collected from semi-structured interviews and analysed by thematic analysis.	Themes included: enriched life, second-best option for visiting, life adjustments and true picture of family life.
Tsai & Tsai (2011) Taiwan	Quantitative: Pre- post quasi-experimental design.	Intervention condition: N= 40; Mean age = 73. Control condition: N = 50. Mean age = 79. Participants resided in a nursing home.	Participants communicated with their family for five minutes per week via Skype or Windows Live messenger, accessed through broadband and operated via a computer. Control group received care	Measured depressive symptoms, loneliness and social support, via self-report questionnaires, administered at baseline, three, six and twelve months. The differences in scores between the groups and across the different time points were analysed using multiple linear regression.	From baseline, compared to the control groups, video-communication significantly reduced feelings of loneliness at three months and depression status at three months and these were maintained at six and twelve months. From baseline scores, changes in emotional social support scores at three months and twelve months, and appraisal support scores at three

			as usual and did not receive any intervention		months were found to be significantly higher in the experimental groups compared to the changes in the control groups.
Tsai, Tsai, Wang, Chang, & Chu (2010) Taiwan	Quantitative: Pre-post quasi-experimental design	Participants (N=57: experimental group, N= 24; Mean age = 78 and control group, N = 33; Mean age = 74) resided in a nursing home.	Intervention group communicated with their family for 5minutes per week via Skype or Windows Live messenger, accessed through broadband and operated via a computer. Control group received care as usual and did not receive any intervention.	Measured depressive symptoms, loneliness and social support, via self-report questionnaires, administered at baseline, one week, three months and six months. The differences in scores between the groups and across the different time points were analysed using multiple linear regression.	From baseline, compared to the control groups, video-communication significantly reduced feelings of loneliness at one week and three months, and depressive status at three months. From baseline scores, changes in emotional social support scores at one week and three months, and appraisal support scores at one week and three months were found to be significantly higher in the experimental groups compared to the changes in the control groups.
Van der Heide, Willems, Spreeuwenberg, Rietman, & de Witte (2012) Netherlands	Quantitative. Pre-post experimental design, with no control group.	Participants had no prior experience of using video-communication	Supported participants to use video-communication with relatives, accessed through a television, via a microphone and a camera.	Participants completed measures of loneliness at baseline and one year after instalment of the technological device. Data was analysed by repeated measures t-tests.	Statistically significant reduction of social and emotional loneliness from baseline to twelve months, following use of the technological device.

VOLUNTEERS NEEDED

To take part in a research study

**Would you like to learn how to use
the internet to communicate with your
family or friends?**

Voluntary participants are needed for a research project conducted by the University of Essex. **No previous computer experience is needed.**

The study aims to explore how using the internet impacts upon older adults' emotional health.

If you would like to be a voluntary participant, you must be 55 years old or older.

If you would like to find out more about this research project to decide whether you may want to participate, then please speak to your accommodation manager or contact Natasha Bennett by telephone on 07582606415.

VOLUNTEERS NEEDED

To take part in a research study

Would you like to learn basic computer skills?

Voluntary participants are needed for a research project conducted by the University of Essex. **No previous computer experience is needed.**

The study aims to explore how using computers impacts upon older adults' emotional health.

If you would like to be a voluntary participant, you must be 55 years old or older and not be a current user of computers.

If you would like to find out more about this research project to decide whether you may want to participate, then please speak to your accommodation manager, or contact Natasha Bennett by telephone on 07582606415.

Appendix C: Participation Information Sheets

Participation information sheets for video-communication condition, email condition and basic computer skills condition, respectively.

Participation Information Sheet

For the 'Technology & Psychological Well-Being Research Project'

You are being invited to take part in a research project. Before you decide to take part, it is important that you understand what the research project is about and what it will involve. Please take the time to carefully read through the following information. If after reading this information you think you would like to take part, please read the consent form and then sign it and return in the FREEPOST envelope enclosed.

Why is this research project being carried out?

I am interested in exploring the impact of using video-communication, via the internet, on the well-being of adults over the age of 55 years old.

What is video-communication?

Video-communication is a way of communicating with others, which allows individuals to see and hear each other. This way of communicating requires being connected to the internet. One popular application of video-communication is called 'Skype', which is the application the study will be using.

What would participation in the research involve?

You will receive four weekly sessions of basic computer and video-communication training for free, to help you to communicate with your family and/or friends. The training will be delivered in pairs at your supported housing accommodation. Following the training sessions, you will be required to talk to your family and/or friends at least once a week, for four weeks, via 'Skype', with the computers and the internet provided at your supported housing accommodation. Your normal ways of communicating with these individuals can continue. To participate in this study, you will therefore need either a relative or friend who would be willing to use the internet to communicate via video-communication with you. This application is free to use and is easy to download for those who already use the internet.

I will ask you to complete questionnaires at the start of the training session and then monthly for three months thereafter. The questionnaires will take approximately 30 minutes to complete each month.

I am also interested in hearing about your experiences with using the internet. Therefore, three months after you received the first internet training session, I would therefore like to visit you for about 45 minutes at the supported living accommodation to hear your views on using the video-communication to talk to your family or friends. To help ensure that I hear and remember all your comments, with your permission, I would like to audio-record the conversation.

Can anyone take part?

Unfortunately, not everyone can take part. I can only accept those who are over 55 years of age and are available to participate in the study for three months. You will also need to have a relative or friend who would be willing to communicate with you through the internet on video-communication, via the programme 'Skype'. I cannot accept anyone who has a physical impairment which would affect them being able to use a computer, or anyone who is currently receiving any psychological therapy. If you are not sure whether you meet the criteria to take part, please do get in contact whereby I'll be happy to discuss this further with you.

Do I have to take part?

Taking part in the study is voluntary. Therefore, it is entirely up to you to decide whether to take part or not. If you decide to take part, you are still free to withdraw from the study at any time without giving a reason.

If I'm happy to take part in the research, what do I do next?

If you are interested in participating in the study, you will need to complete the 'consent form' and 'questionnaire' that is provided with this sheet and return them in the stamped address envelope. By signing this form, you are providing consent for me to contact you to further discuss the project with you and answer any questions that you may have about the project.

If I sign the consent form, does this mean that I will be obliged to take part in the research?

No, not at all. By signing the consent form attached with this sheet, you are simply agreeing for me to contact you to discuss the research project. Before you agree to take part in the research project, you will be required to sign another form, which I will send to you if, after discussing the project with me, you decide that you would like to be part of the research.

What will happen to the information that I provide?

Any personal information that you provide will be kept confidential and stored securely. The audio-recordings will only be listened to by myself. The audio-recording will be held in a password-protected file on a computer. This means that no other person will be able to access the recording. I will listen to the recording to identify the key points that were talked about. Once this has been done, the audio-recording will be destroyed. Some of your main comments may be documented in a written report. The scores from the questionnaires will also be analysed and written up in the report. The written report of the study will be submitted as an assignment for the Doctorate in Clinical Psychology programme at the University of Essex, which is a training programme that I am currently undergoing.

Will I be identified in the written report?

No, you will remain anonymous. This means that no names or any identifying information will be reported in any written report.

I still have unanswered questions, what do I do?

If you have any further questions or require more information about the evaluation, please contact Natasha Bennett, Trainee Clinical Psychologist by telephone on 07582606415.

Yours sincerely,

Natasha Bennett

Trainee Clinical Psychologist, Supervised by Dr Susan McPherson and Dr Leanne Andrews, University of Essex

Participation Information Sheet**For the 'Technology & Psychological Well-Being Research Project'**

You are being invited to take part in a research project. Before you decide to take part, it is important that you understand what the research project is about and what it will involve. Please take the time to carefully read through the following information. If after reading this information you think you would like to take part, please read the consent form and then sign it and return in the stamped address envelope.

Why is this research project being carried out?

I am interested in exploring the impact of using email to communicate with friends or family, on the well-being of adults over the age of 55 years old.

What is email?

Email is short for electronic mail and it is a way of communicating with others, by writing messages over the internet or other computer networks.

What would participation in the research involve?

You will receive four weekly sessions of basic computer and email training for free, to help you to communicate with your family and/or friends. Following the training sessions, you will be required to talk to your family and/or friends at least once a week, for four weeks, via email with the computers and internet. Your normal ways of communicating with these individuals can continue. To participate in this study, you will therefore need either a relative or a friend who would be willing to communicate with you via email. Most individuals who already access the internet will have an email account.

I will ask you to complete questionnaires at the start of the training session and then monthly for three months thereafter. The questionnaires will take approximately 30 minutes to complete each month.

Can anyone take part?

Unfortunately, not everyone can take part. I can only accept those who are over 55 years of age and are available to participate in the study for three months and not be pre-existing user of email. You will also need to have a relative or friend who would be willing to communicate with you via email. I cannot accept anyone who has a physical impairment which would affect them being able to use a computer, or anyone who is currently receiving any psychological therapy. If you are not sure whether you meet the criteria to take part, please do get in contact whereby I'll be happy to discuss this further with you.

Do I have to take part?

Taking part in the study is voluntary. Therefore, it is entirely up to you to decide whether to take part or not. If you decide to take part, you are still free to withdraw from the study at any time without giving a reason.

If I'm happy to take part in the research, what do I do next?

If you are interested in participating in the study, you will need to complete the 'consent form' and 'questionnaire' that is provided with this sheet and return them in the FREEPOST envelope enclosed. By signing this form, you are providing consent for me to contact you to discuss the project with you and answer any questions that you may have about the project.

If I sign the consent form, does this mean that I will be obliged to take part in the research?

No, not at all. By signing the consent form attached with this sheet, you are simply agreeing for me to contact you to discuss the research project. Before you agree to take part in the research project, you will be required to sign another form, which I will send to you if, after discussing the project with me, you decide that you would like to be part of the research.

What will happen to the information that I provide?

Any personal information that you provide will be kept confidential and stored securely. The scores from the questionnaires will be analysed and will be written up in a written report. The written report of the study will be submitted as an assignment for the Doctorate in Clinical Psychology programme at the University of Essex, which is a training programme that I am currently undergoing.

Will I be identified in the written report?

No, you will remain anonymous. This means that no names or any identifying information will be reported in any written report.

I still have unanswered questions, what do I do? If you have any further questions or require more information about the evaluation, please contact Natasha Bennett, Trainee Clinical Psychologist by telephone on 07582606415.

Participation Information Sheet

For the 'Technology & Psychological Well-Being Research Project'

You are being invited to take part in a research project. Before you decide to take part, it is important that you understand what the research project is about and what it will involve. Please take the time to carefully read through the following information. If after reading this information you think you would like to take part, please read the consent form and then sign it and return in the stamped address envelope.

Why is this research project being carried out?

I am interested in exploring the impact of using computers on the well-being of adults over the age of 55 years old.

What would participation in the research involve?

You will receive four weekly sessions of basic computer skills training for free. I will ask you to conduct activities on the computer once a week. I will also ask you to complete questionnaires at the start of the training session and then monthly for three months thereafter. The questionnaires will take approximately 30 minutes to complete each month.

Can anyone take part?

Unfortunately, not everyone can take part. I can only accept those who are over 55 years of age, available to participate in the study for four months and are not prior users of computers. I cannot accept anyone who has a physical impairment which would prevent them from using a computer, or anyone who is currently receiving any psychological therapy. If you are not sure whether you meet the criteria to take part, please do get in contact whereby I'll be happy to discuss this further with you.

Do I have to take part?

Taking part in the study is voluntary. Therefore, it is entirely up to you to decide whether to take part or not. If you decide to take part, you are still free to withdraw from the study at any time without giving a reason.

If I'm happy to take part in the research, what do I do next?

If you are interested in participating in the study, you will need to complete the 'consent form' and 'questionnaire' that is provided with this sheet and return them in the FREEPOST envelope enclosed. By signing this form, you are providing consent for me to contact you to discuss the project with you and answer any questions that you may have about the project.

If I sign the consent form, does this mean that I will be obliged to take part in the research?

No, not at all. By signing the consent form attached with this sheet, you are simply agreeing for me to contact you to discuss the research project. Before you agree to take part in the research project, you will be required to sign another form, which I

will send to you if, after discussing the project with me, you decide that you would like to be part of the research.

What will happen to the information that I provide?

Any personal information that you provide will be kept confidential and stored securely. The scores from the questionnaires will be analysed and will be written up in a written report. The written report of the study will be submitted as an assignment for the Doctorate in Clinical Psychology programme at the University of Essex, which is a training programme that I am currently undergoing.

Will I be identified in the written report?

No, you will remain anonymous. This means that no names or any identifying information will be reported in any written report.

I still have unanswered questions, what do I do?

If you have any further questions or require more information about the evaluation, please contact Natasha Bennett, Trainee Clinical Psychologist by telephone on 07582606415.

Yours sincerely,
Natasha Bennett
Trainee Clinical Psychologist

Appendix D: Screening Questionnaires

Screening questionnaires for video-communication condition

Screening Questionnaire**What is your date of birth (month/year)?****What is your gender (please tick one option)?** Male Female**What is your ethnicity?**

- Black African
- Black Caribbean
- Pakistani
- Bangladeshi
- Chinese
- Indian
- White British
- White European
- Other (please specify):.....

What is your marital status (please tick the option(s) that applies to you)?

- Married
- Single
- Divorced
- Separated
- Widowed
- Co-habiting with partner

Do you have a physical impairment that would make it difficult for you to use a computer?

Yes No Unsure

Have you been prescribed any new medications in the last month?

Yes No Unsure

On average, what is your weekly alcohol consumption?

As a guide, 2-3 units of alcohol is equal to a pint of beer, a pint of cider, a medium glass of wine (175ml), or 2-3 glasses of 25ml measures of spirits.

- 0-7 units
 8-14 units
 15 - 21units
 21-28 units
 28+ units

Do you consume any illegal substances?

Yes No Unsure

Are you currently receiving any psychological therapeutic intervention?

Yes No Unsure

Do you know how to use a computer?

Yes No

If yes, do you currently use a computer?

Yes No

Do you know how to access the internet?

Yes No

If yes, do you currently use the internet?

Yes No

If yes, do you use the internet to communicate with others?

Yes No

Have you ever emailed someone?

Yes No

If yes, are you currently using email as a way to communicate with others?

Yes No

Have you ever used video-communication (e.g. 'Skype' or 'FaceTime')?

Yes No

If yes, are you currently using video-communication to communicate with others?

Yes No

If you participate in this research project, do you have at least one relative or friend who would be willing to communicate with you over the internet?

Yes No Unsure

Are you available to participate in the study for the next two months to receive computer and internet communication training and to complete the questionnaires?

Yes No Unsure

If you participate in the research study, are you happy to discuss your experiences of using the internet to communicate with your family and/or friends over the internet with me, four months after you begin using it?

Yes No Unsure

Screening questionnaire for email condition

Screening Questionnaire

What is your date of birth (month/year)?

What is your gender (please tick one option)?

Male Female

What is your ethnicity?

- Black African
- Black Caribbean
- Pakistani
- Bangladeshi
- Chinese
- Indian
- White British
- White European
- Other (please specify):.....

What is your marital status (please tick the option(s) that applies to you)?

- Married
- Single
- Divorced
- Separated
- Widowed
- Co-habiting with partner

Do you have a physical impairment that would make it difficult for you to use a computer?

Yes No Unsure

Have you been prescribed any new medications in the last month?

Yes No Unsure

On average, what is your weekly alcohol consumption?

As a guide, 2-3 units of alcohol is equal to a pint of beer, a pint of cider, a medium glass of wine (175ml), or 2-3 glasses of 25ml measures of spirits.

- 0-7 units
 8-14 units
 15 - 21units
 21-28 units
 28+ units

Do you consume any illegal substances?

Yes No Unsure

Are you currently receiving any psychological therapeutic intervention?

Yes No Unsure

Do you know how to use a computer?

Yes No

If yes, do you currently use a computer?

Yes No

Do you know how to access the internet?

Yes No

If yes, do you currently use the internet?

Yes No

If yes, do you use the internet to communicate with others?

Yes No

Have you ever emailed someone?

Yes No

If yes, are you currently using email as a way to communicate with others?

Yes No

Have you ever used video-communication (e.g. 'Skype' or 'FaceTime')?

Yes No

If yes, are you currently using video-communication to communicate with others?

Yes No

If you participate in this research project, do you have at least one relative or friend who would be willing to communicate with you over the internet?

Yes No Unsure

Are you available to participate in the study for the next two months to receive computer and internet communication training and to complete the questionnaires?

Yes No Unsure

Screening questionnaire for basic computer skills condition

Screening Questionnaire

What is your date of birth (month/year)?

What is your gender (please tick one option)?

Male Female

What is your ethnicity?

Black African

Black Caribbean

Pakistani

Bangladeshi

Chinese

Indian

White British

White European

Other (please specify):.....

What is your marital status (please tick the option(s) that applies to you)?

Married

Single

Divorced

Separated

Widowed

Co-habiting with partner

Do you have a physical impairment that would make it difficult for you to use a computer?

Yes No Unsure

Have you been prescribed any new medications in the last month?

- Yes No Unsure

On average, what is your weekly alcohol consumption?

As a guide, 2-3 units of alcohol is equal to a pint of beer, a pint of cider, a medium glass of wine (175ml), or 2-3 glasses of 25ml measures of spirits.

- 0-7 units
 8-14 units
 15 - 21units
 21-28 units
 28+ units

Do you consume any illegal substances?

- Yes No Unsure

Are you currently receiving any psychological therapeutic intervention?

- Yes No Unsure

Do you know how to use a computer?

- Yes No

If yes, do you currently use a computer?

- Yes No

Do you know how to access the internet?

Yes No

If yes, do you currently use the internet?

Yes No

If yes, do you use the internet to communicate with others?

Yes No

Have you ever emailed someone?

Yes No

If yes, are you currently using email as a way to communicate with others?

Yes No

Have you ever used video-communication (e.g. 'Skype' or 'Facetime')?

Yes No

If yes, are you currently using video-communication to communicate with others?

Yes No

Are you available to participate in the study for the next two months to receive computer skills training and complete the questionnaires?

Yes No Unsure

Appendix E: Consent Form to be Contacted

CONSENT FORM (1)**Internet Communication Research Study**

Thank you for considering taking part in this research study.

Please complete this form if, after you have read the 'Participant Information Sheet', you agree for the lead researcher, Natasha Bennett, Trainee Clinical Psychologist, to contact you to provide you with further information about participating in the research study.

I confirm that if I provide my contact details, I may be contacted by Natasha Bennett to discuss the potential of participating in the research study. I understand, however, that completing this form does not guarantee that I will be contacted. I also understand that any personal details that I provide will remain confidential and the information will be stored securely.

Name (printed):.....

Telephone number:.....

Signature:

**PLEASE RETURN THIS CONSENT FORM ALONG WITH THE
COMPLETED 'SCREENING QUESTIONNAIRE'**

Appendix F: Consent Forms to Participate in Study

Consent form for video-communication condition

CONSENT FORM (2)
Internet Communication Research Study

Please initial box

- | | |
|--|--------------------------|
| 1. I confirm that I have read and understand the information sheet and I have had the time and opportunity to consider the information and ask questions, which have been answered satisfactorily. | <input type="checkbox"/> |
| 2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. | <input type="checkbox"/> |
| 3. I agree for the interview to be digitally-recorded. | <input type="checkbox"/> |
| 4. I understand that I can withdraw permission to

use my data within one week of the lead researcher receiving my data. | <input type="checkbox"/> |
| 5. Having been assured of total anonymity, I consent to the collected data being used for analysis, presentation and publication. | <input type="checkbox"/> |
| 6. I agree to take part in the above study. | <input type="checkbox"/> |

Name of participant.....

Date Signature.....

Name of person taking consent.....

Date Signature.....

Consent form for email and basic computer skills conditions

CONSENT FORM (2)
Internet Communication Research Study

Please initial box

- | | |
|--|---|
| 1. I confirm that I have read and understand the information sheet and I have had the time and opportunity to consider the information and ask questions, which have been answered satisfactorily. | <input style="width: 80px; height: 40px;" type="checkbox"/> |
| 2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. | <input style="width: 80px; height: 40px;" type="checkbox"/> |
| 3. I understand that I can withdraw permission to use my data within one week of the lead researcher receiving my data. | <input style="width: 80px; height: 40px;" type="checkbox"/> |
| 4. Having been assured of total anonymity, I consent to the collected data being used for analysis, presentation and publication. | <input style="width: 80px; height: 40px;" type="checkbox"/> |
| 5. I agree to take part in the above study. | <input style="width: 80px; height: 40px;" type="checkbox"/> |

Name of client.....

Date Signature.....

Name of person taking consent.....

Date Signature.....

Appendix G: Training Session Handouts

Computer handout for all conditions

Computer Guide

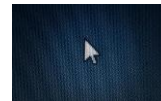
Computer Basics:

To switch on the computer, you need to press the power button.

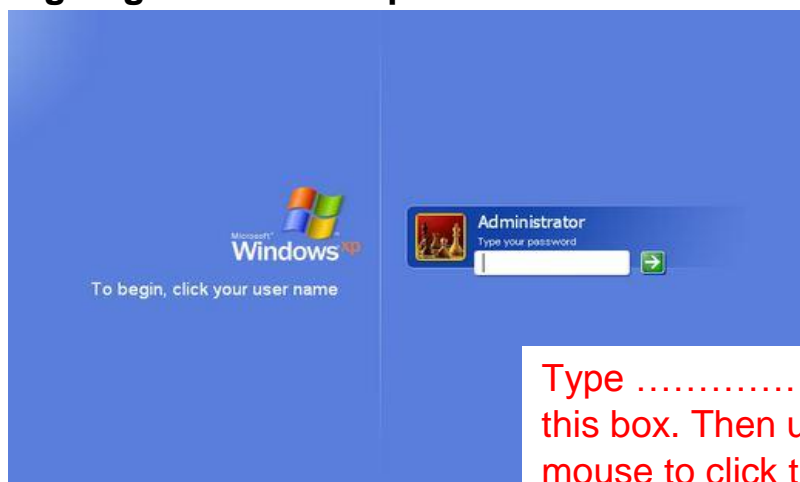


How to use a mouse:

- The mouse is a handheld device that allows you to control your computer. It lets you point to objects on the screen, click on them and move them.
- The mouse needs to be flat on the surface with the end with the buttons pointing towards the computer. Most people find it easier to position the mouse to the side of the computer.
- To hold the mouse, you rest your hand over it and put your index finger on the left button and rest your thumb on the side.
- When you move the mouse, it moves a pointer, or 'cursor' on the screen.
- The cursor will change shape depending on what you are doing.
- To select things, move your cursor over the item and click once with the left button.
- To open things, click twice on the left button.



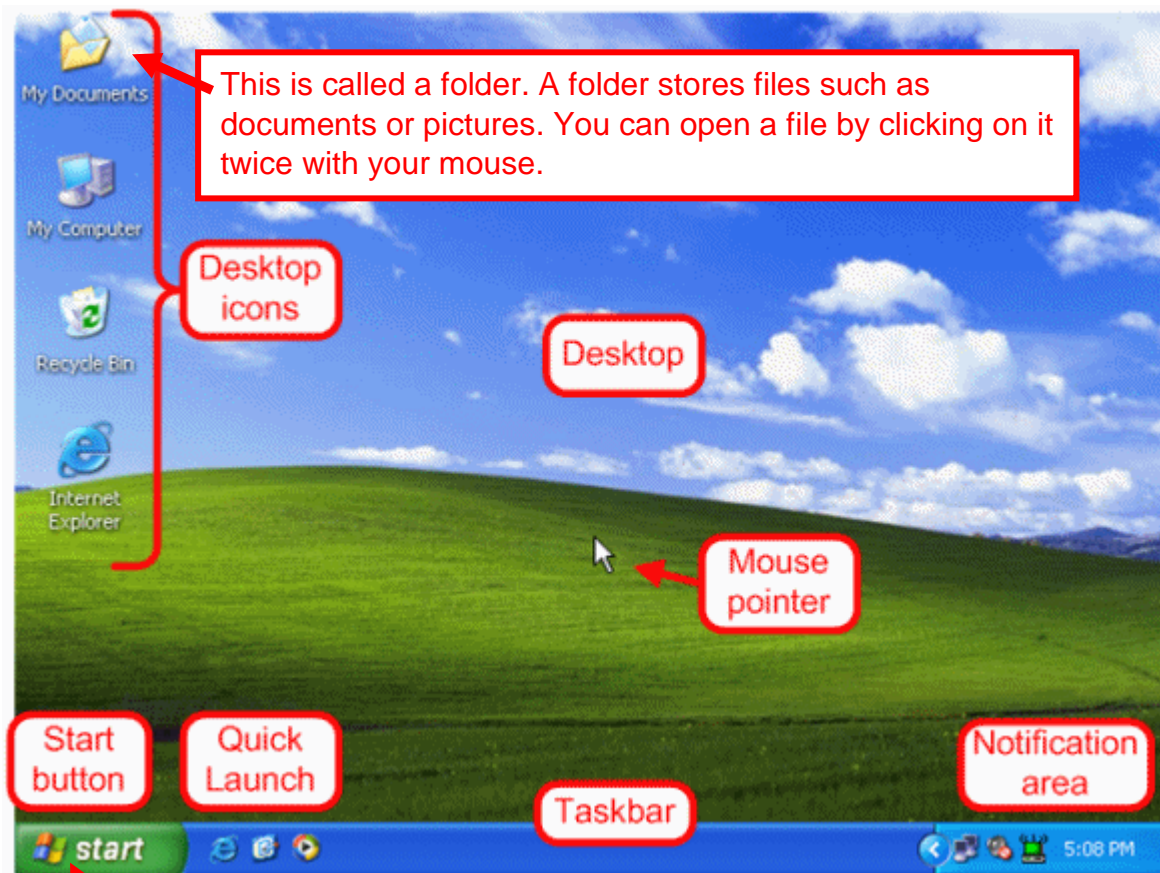
Signing in to the computer:




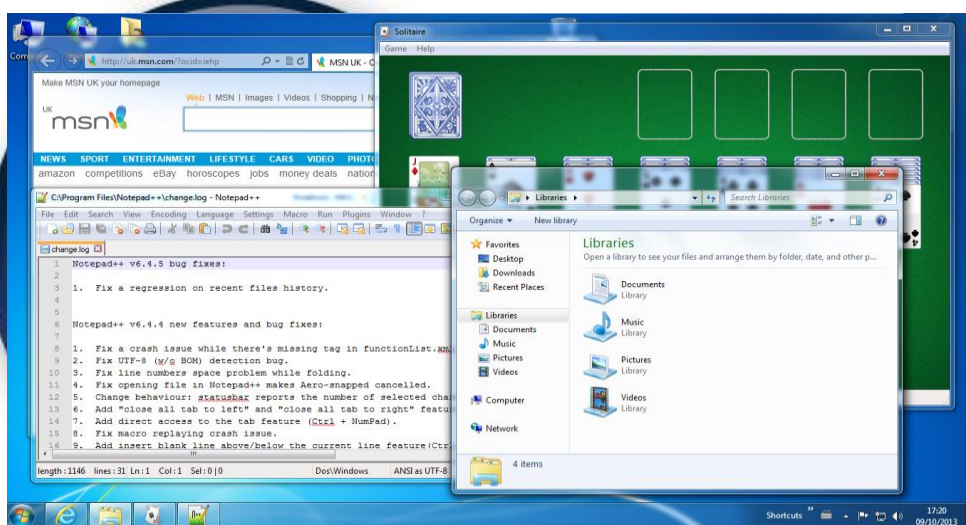
Type in this box. Then use the mouse to click the cursor on the green arrow to sign in.

Desktops and Icons:

A desktop is what you see when the computer is turned on.



If you click on this button, it lets you open programs and files on your computer. On some computer screens, the button may not say 'start', but may just show this image 

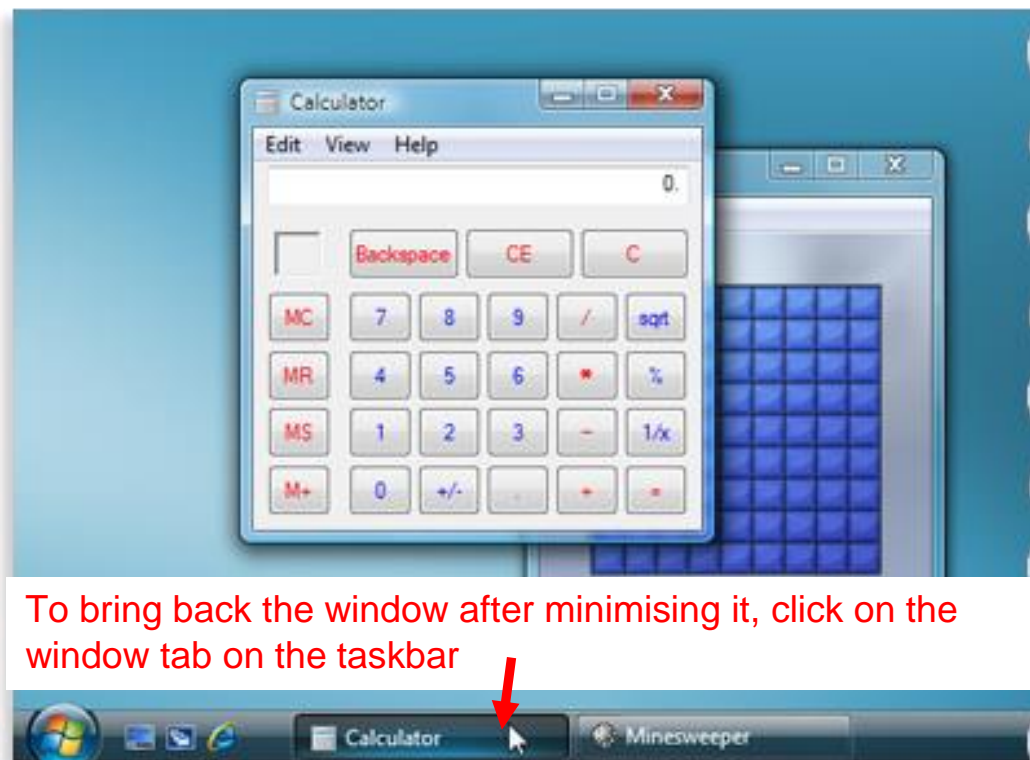
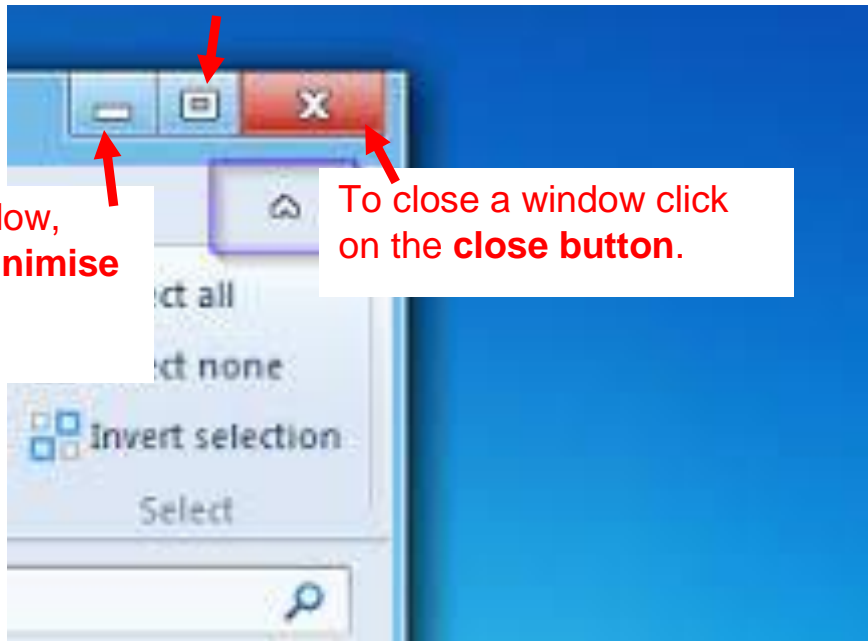


You can have more than one window open at a time.

To make the window larger and fill the screen, click on the **maximise button**.

To hide a window, click on the **minimise button**

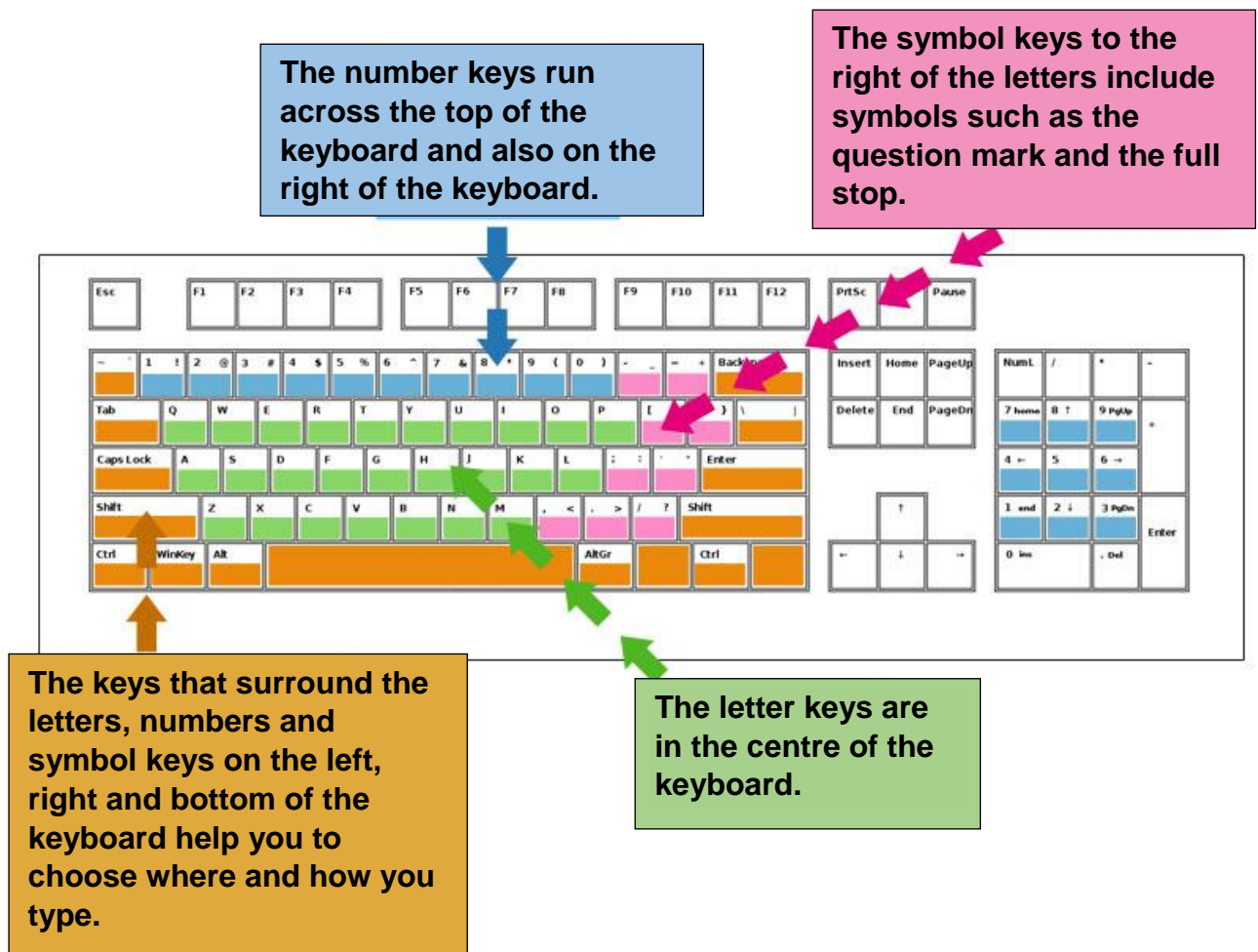
To close a window click on the **close button**.





Using a keyboard:

A keyboard is for putting information such as letters, words and numbers into your computer.



Session handouts for video-communication condition

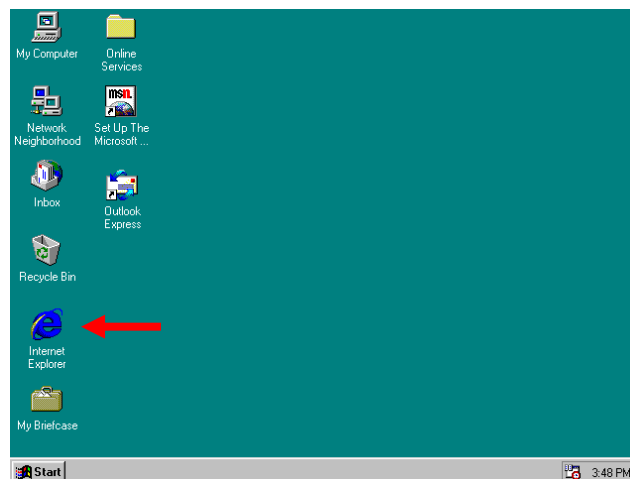
Video-Communication – Skype

What is Skype?

Skype is a way to talk to family members or friends in different parts of the country or world **for free**. A way to **be there** for important life events when you can't be there in person. You can talk to each other live over video. This means you can see each other as you talk.

Setting up a skype account:

You need to start by opening up **Internet Explorer** from your desktop. Double click on the **Internet Explorer** icon.



Type www.skype.com into the address bar.




Click **Join Us**.




A form will appear where you can create an account. Fill out the information it asks for, starting with your **name** and **email address**.

Sign in
Create an account

Skip this step by signing in with your Microsoft or Facebook account

 **Microsoft account**
A Messenger, Hotmail or Outlook.com account.

 **Facebook**

<p>First name*</p> <input style="width: 95%; border: 1px solid #ccc;" type="text" value="Loreta"/>	<p>Last name*</p> <input style="width: 95%; border: 1px solid #ccc;" type="text" value="Jones"/>
<p>Your email address*</p> <input style="width: 95%; border: 1px solid #ccc;" type="text" value="LoretaLynn@yahoo.com"/>	<p>Repeat email*</p> <input style="width: 95%; border: 1px solid #ccc;" type="text" value="LoretaLynn@yahoo.com"/>

Note: no-one can see your email address.

The next part of the form includes a lot of information that's **optional**, like your **birthday**, **city**, and more. The only fields you're required to fill out are the ones with an asterisk (for example, **country***).

Profile information

Note: anyone on Skype can see your profile information.

Birth date **Year**

Gender

Country/Region*

City

Language*

Mobile phone number

Enter your desired **user name**, also known as your **Skype Name**. If the user name you want is taken, Skype will give you some helpful suggestions. Then enter your desired **password**, then enter it again.

Skype Name*

LoretaLynn| ?

Suggestions

- loreta.jones2
- loreta.jones3
- loreta.jones45

Note: only choose a name you have a right to use.

Password*

Repeat password*

Password strength: **Medium**.

Between 6-20 characters, include Latin letters and numbers. Note: no-one else can see your password.

When you're done, enter the **security text** in the box (This is to confirm that you're a real person, not a computer set up for spamming.) Then click **I agree - Continue**.

Inform me about new products, features, and special offers. When you sign up for SMS notifications, our first SMS will allow you to get Skype on your mobile (where applicable, your operator may charge you for receiving SMS messages).

By SMS

By email

Can't read the text in the box?

Refresh Listen Help

Type the text above here*

ariedoc for|

Yes, I have read and I accept the [Skype Terms of Use](#) and the [Skype Privacy Statement](#)

I agree - Continue

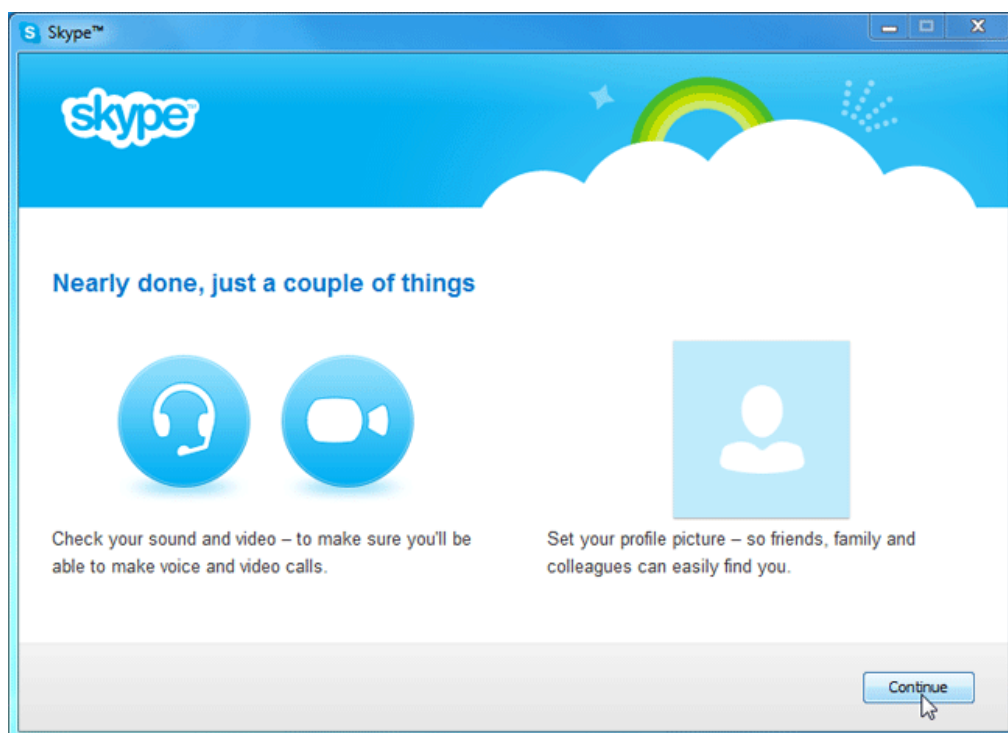


When you have done this, your **account** will have been created, and you will be redirected to your account on Skype.com.

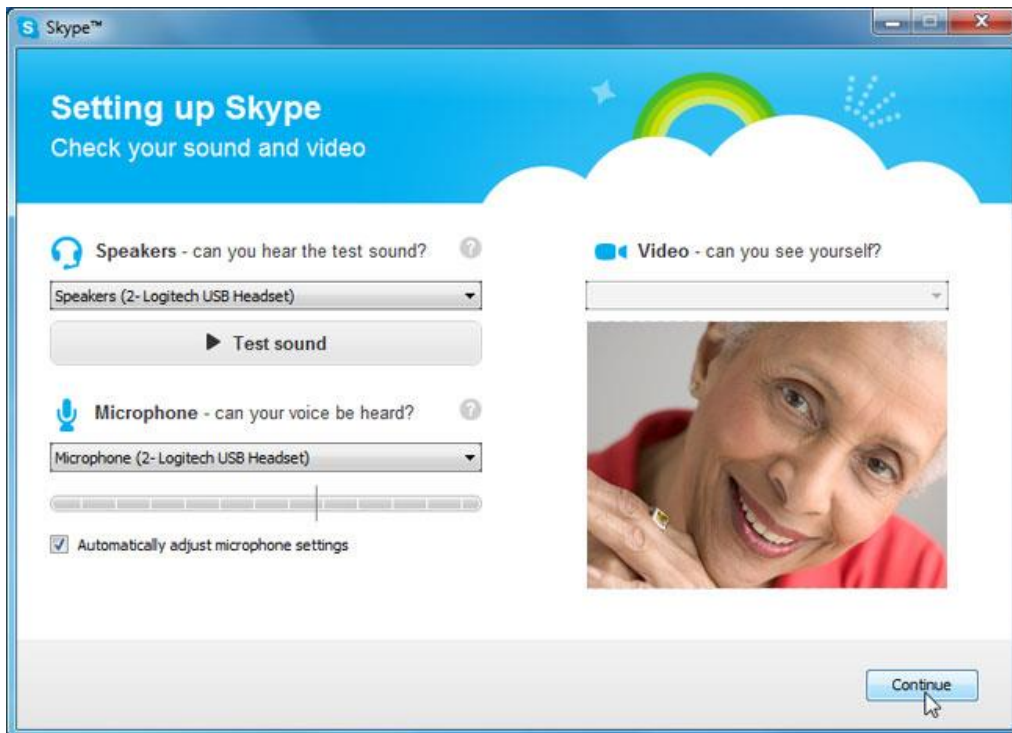
Enter your **user name** and **password**, then click **Sign in**.



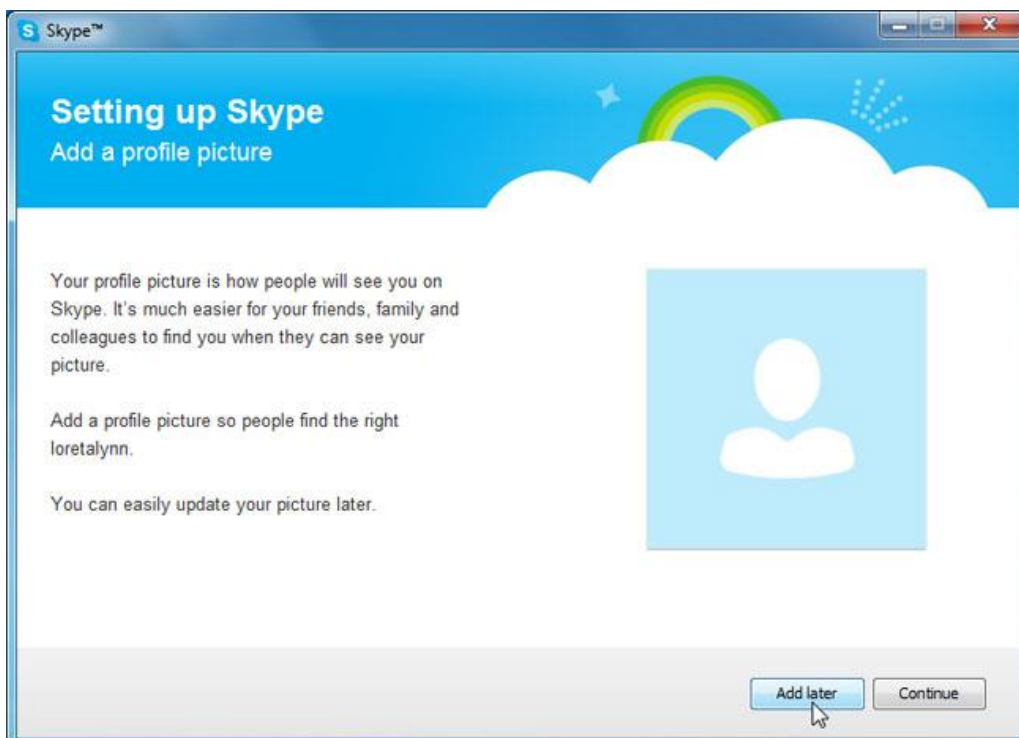
Skype will direct you to set up your sound and video settings, as well as your profile picture. Click **Continue** to begin.



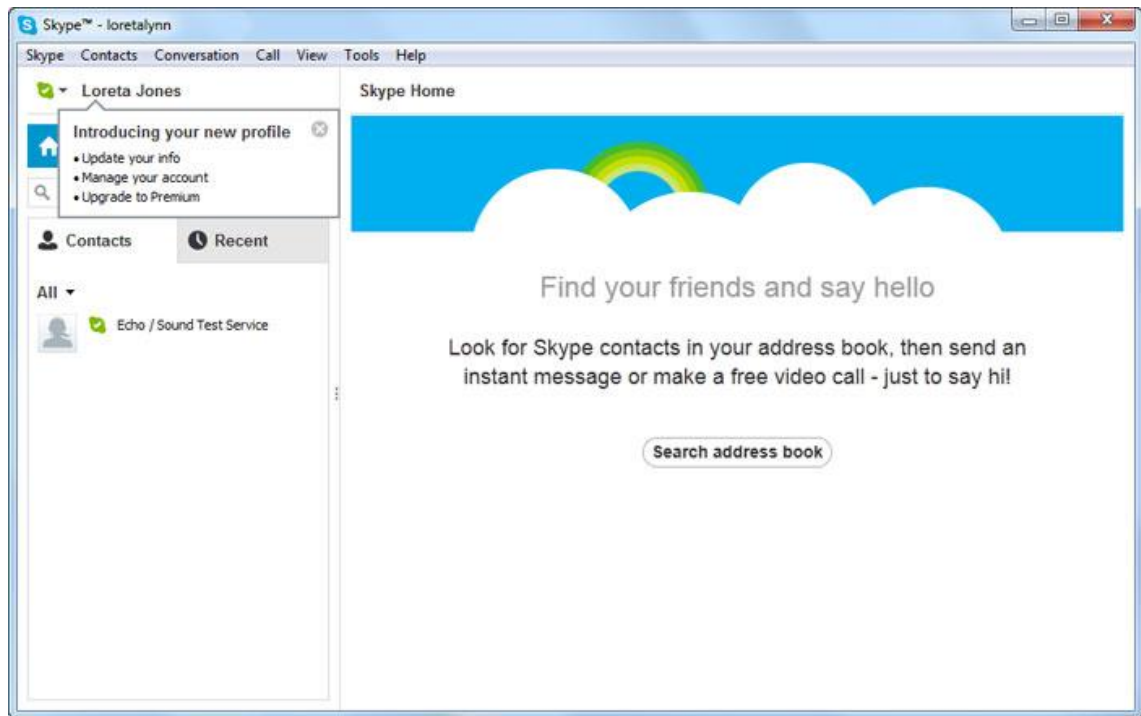
On the next screen, you can adjust your speaker, microphone, and video settings. When you're satisfied, click **Continue**.



On the next screen, you can choose to add a profile picture. In our example, we'll choose to add a profile picture later. Click **Add later** to continue.

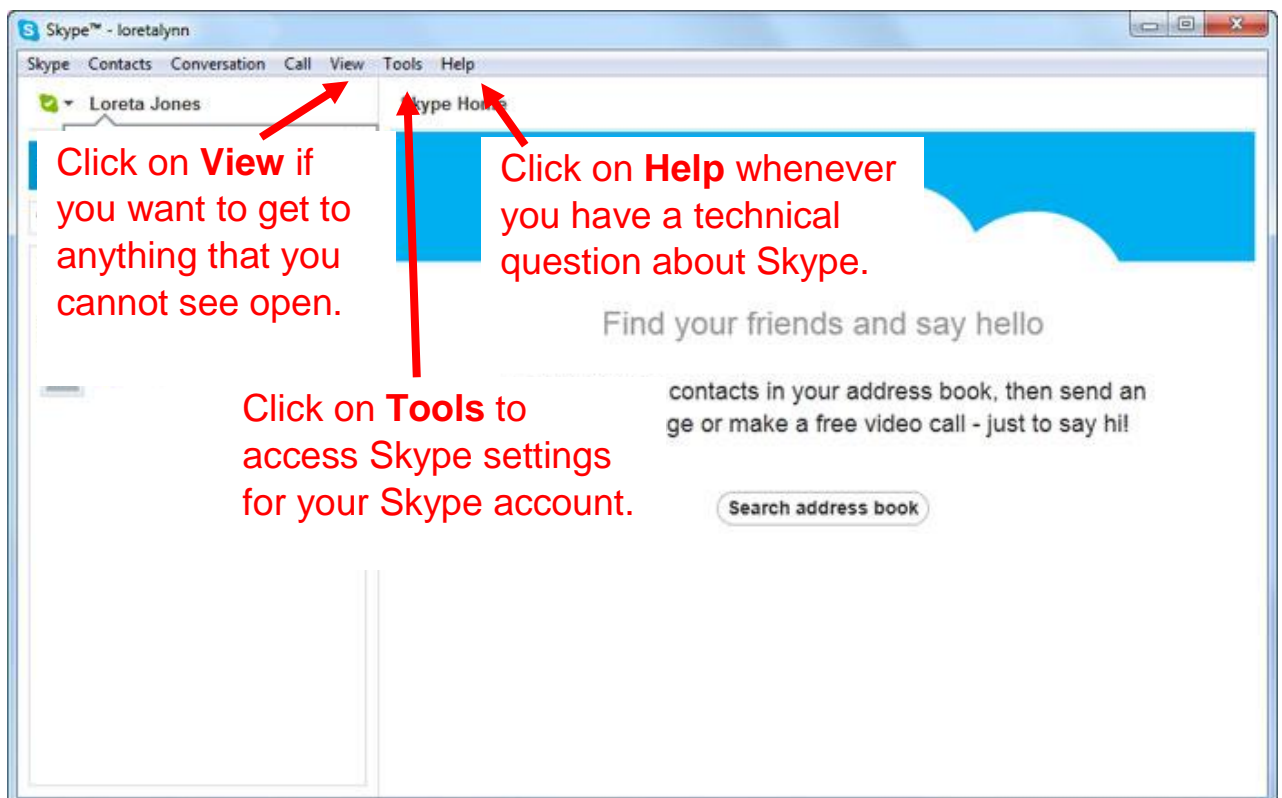
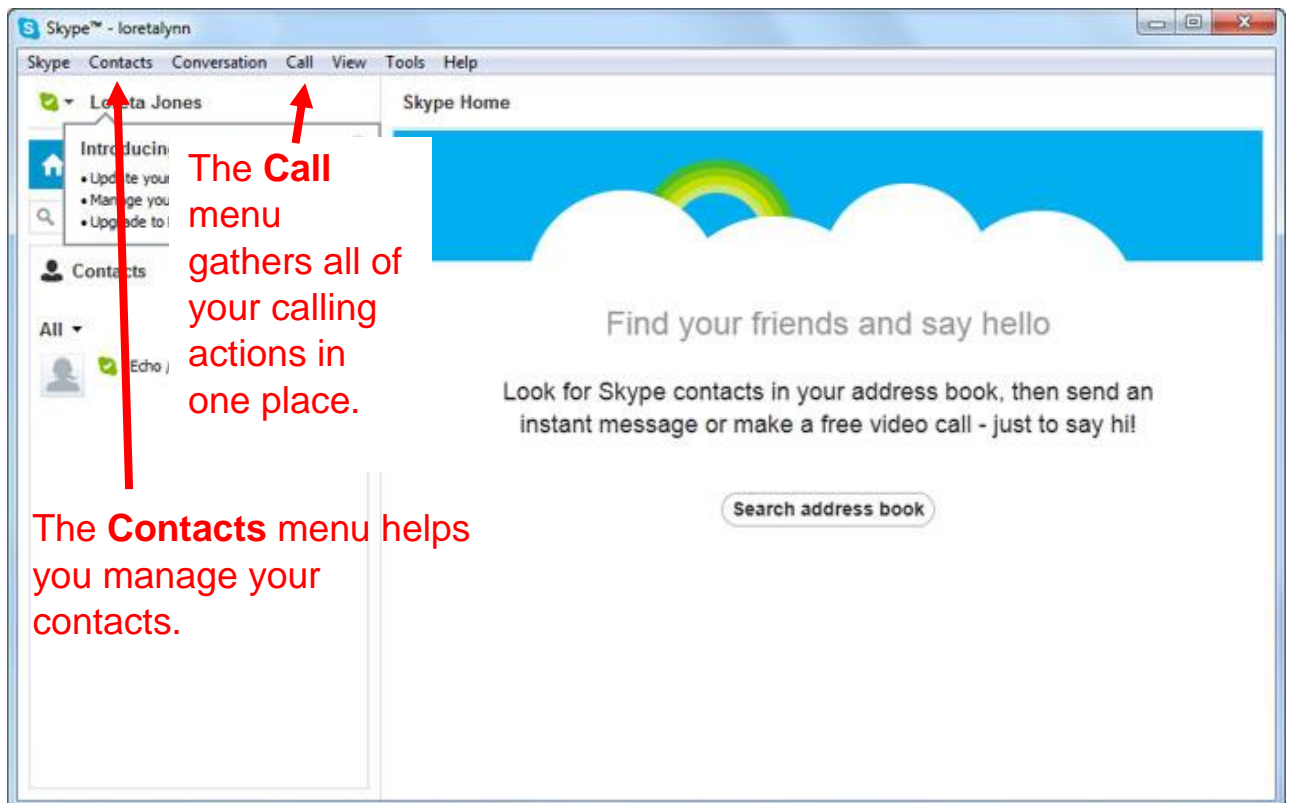


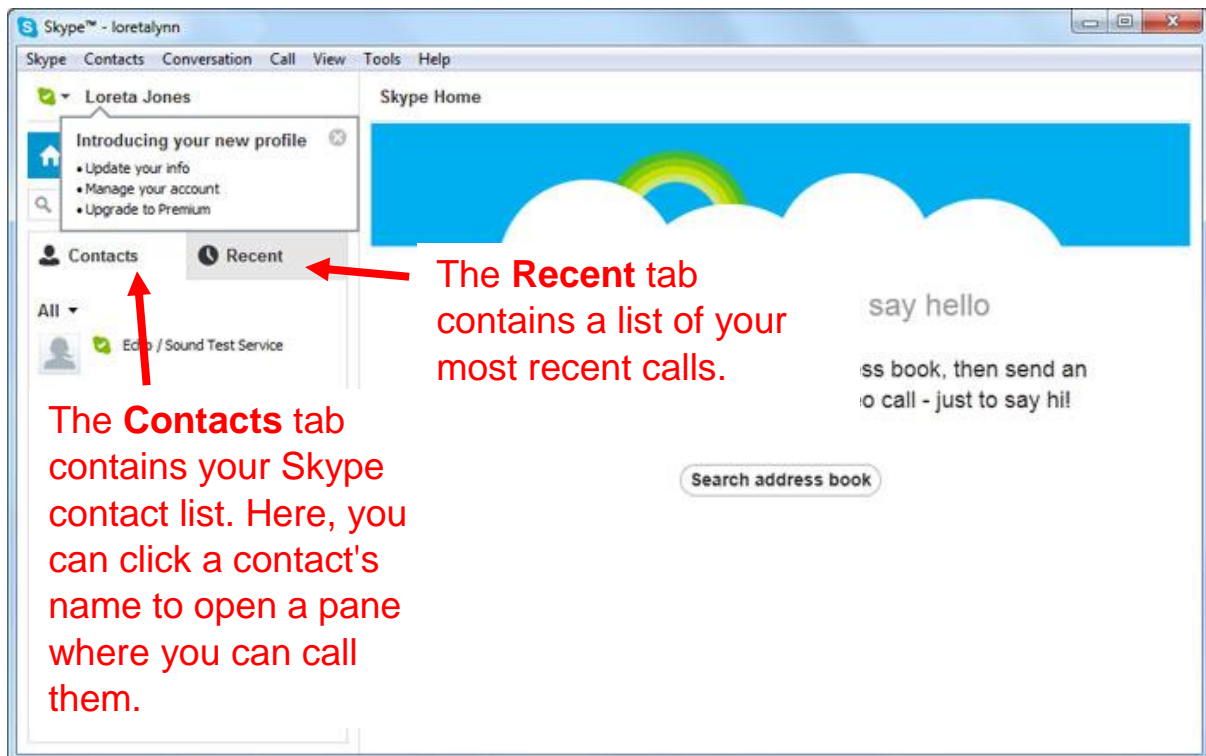
Your **Skype** window will then appear.



The **Skype** menu bar lets you change things related to you and your account - even your **online status** so people can tell when you're available. This is also where you can **sign out** of Skype.



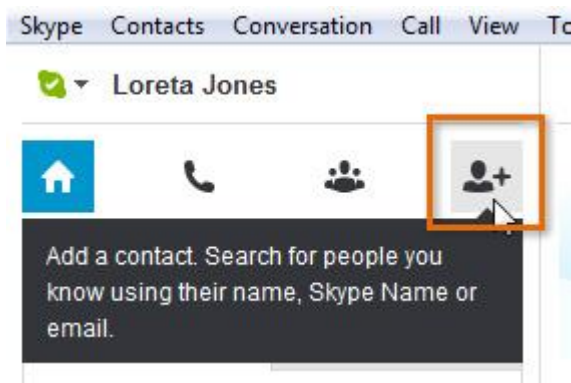




Adding your friends/family to your contact list:

Who do you know on Skype? Maybe a friend or family member? It's time to add them to your **contacts**. Adding contacts is the first step toward actually using Skype.

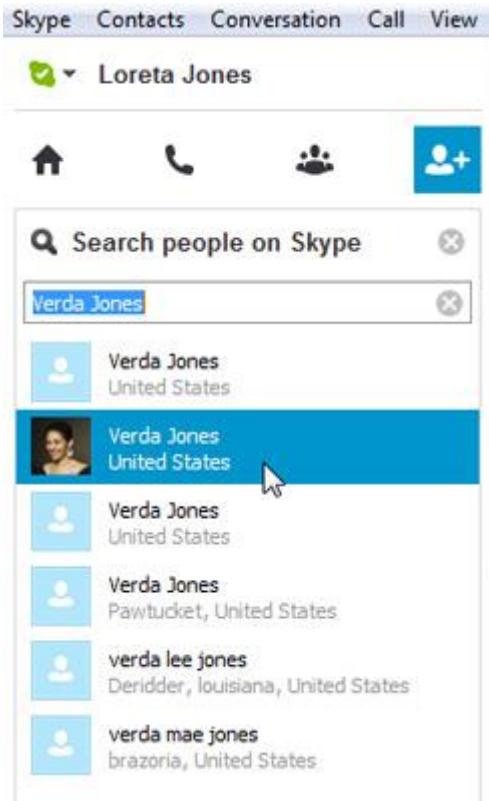
Click the **Add a contact** button.



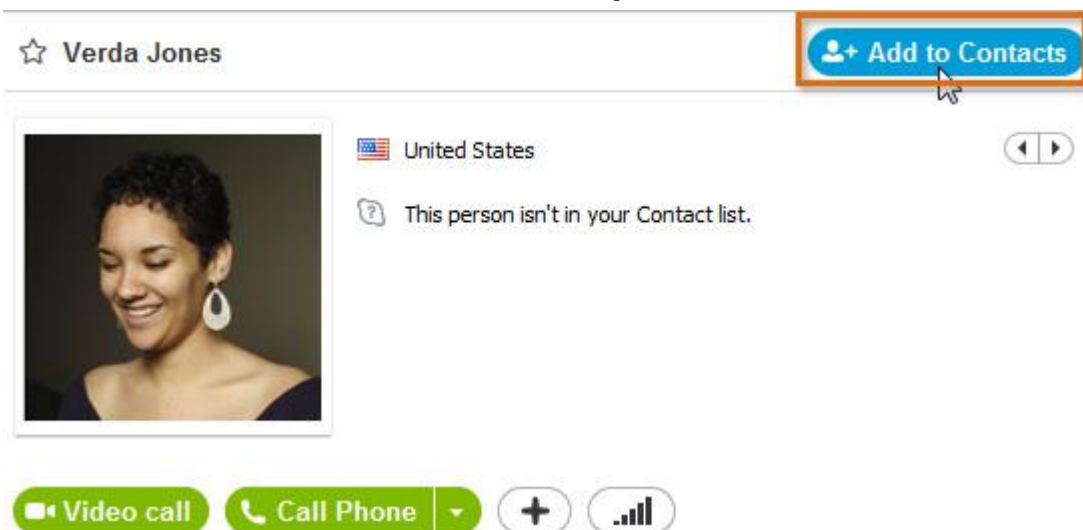
The **Search people on Skype** pane will appear.

Search for someone you know using a **name**, **Skype name**, or **email address**.

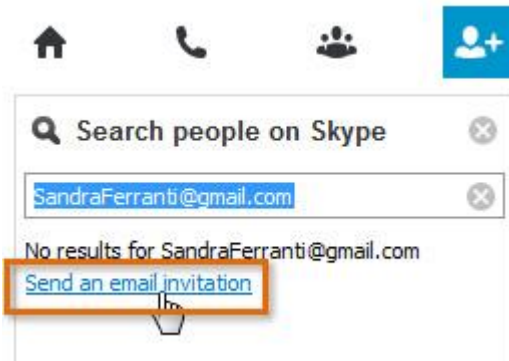
Skype will display a list of search results.



When you find the person you're looking for, click **Add to Contacts** to send him or her a **contact request**.

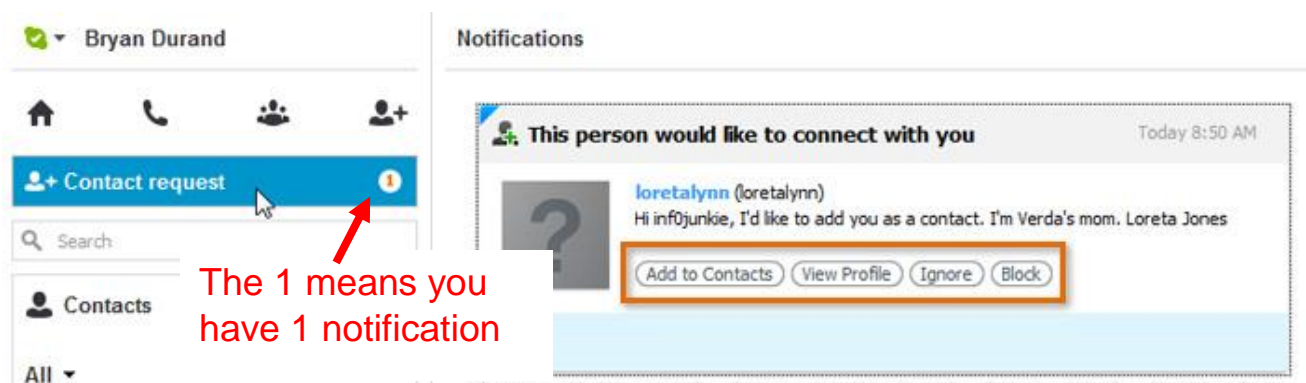


If the person you want to add doesn't have a Skype account, you can send an email invitation. Skype will send the person information on how to download and sign up for the service.



Accepting contact requests:

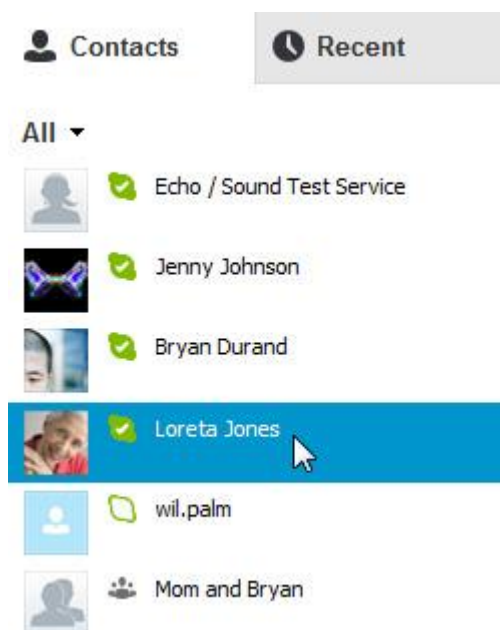
On Skype, you add contacts to your account (and they add you to theirs) via **contact requests**. When you receive a request, it's displayed as a notification above the **Contacts** tab. Just click the notification to open a pane where you can **add**, **ignore**, or **block** the person.



To video call someone on Skype:

Open the **Skype** window and sign in.

Click the person you want to video call on the **Contacts** tab. The contact's **information** will open in a pane on the right.

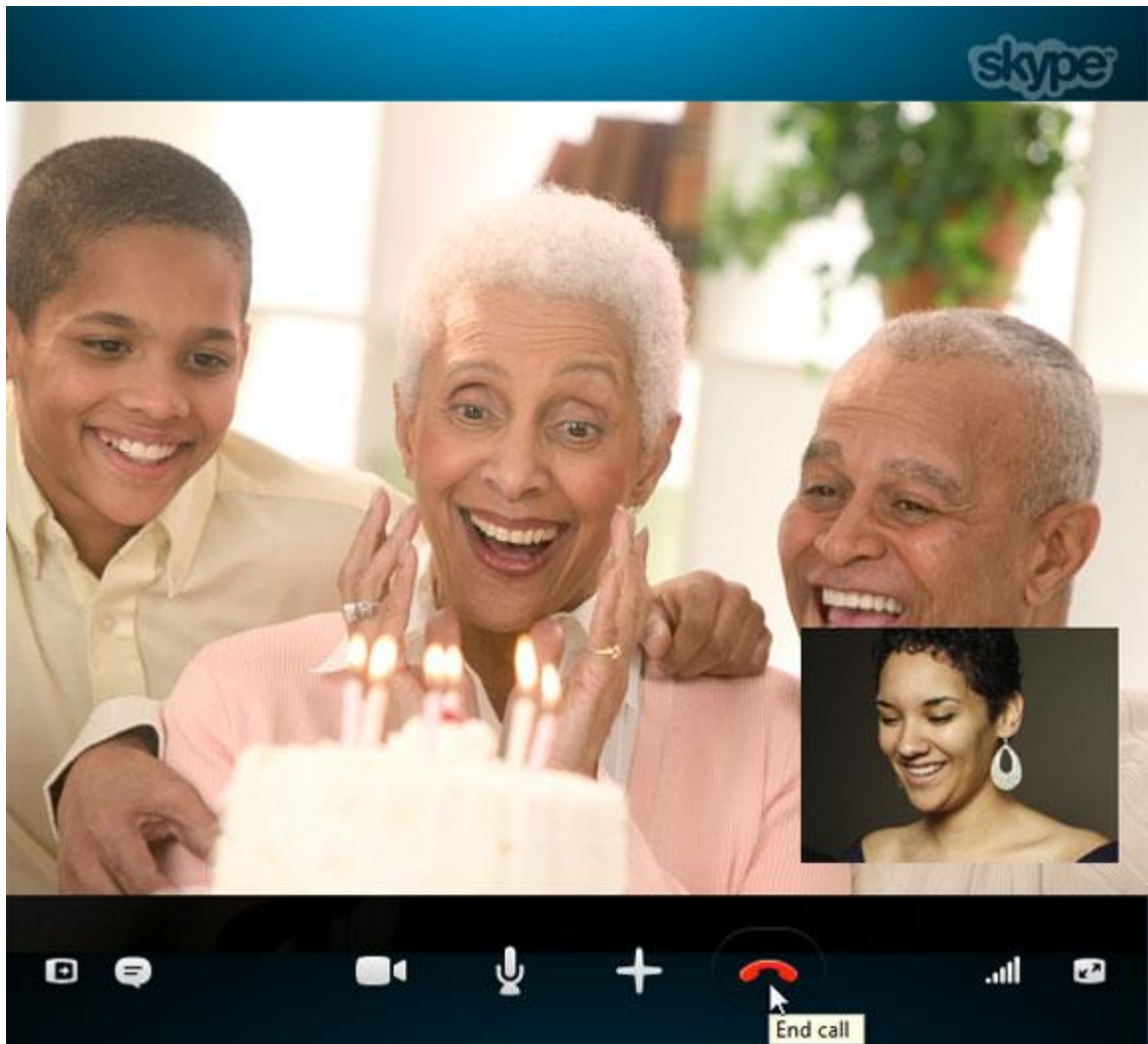


Click the **Video call** button.



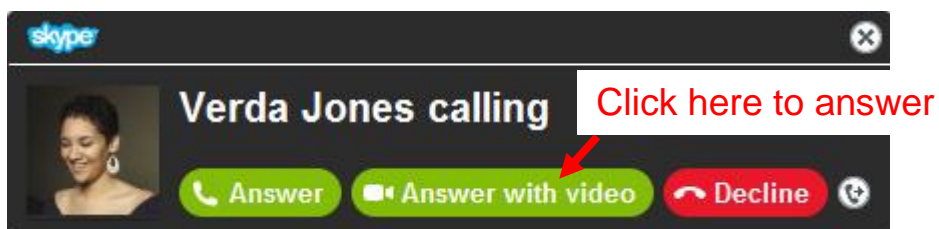
The **call window** will open. The footage from **your webcam** will appear at the bottom, showing what the other person will see when that person answers. The call will keep ringing until someone picks up.

Click the **End Call** button when you're ready to hang up.



Answering incoming video calls:

So what do you see when someone calls *you* on Skype? A **pop-up window** that looks like this:



To answer with your webcam, just click the **Answer with video** button or **Decline** if you're too busy to talk. If you do nothing, the call will keep ringing until the other person hangs up.

Session handout for email condition

How to use Email

What is Email:

Email is short for 'electronic mail'. Similar to a letter, it is sent via the internet to a recipient. An email address is required to receive email, and that address is unique to the user.

When using email, your recipient receives your email as soon as they go online and collect their mail. It's secure. It's low cost. Photos, documents and other files can be attached to an email.

Getting an email account:

There are many email accounts that you can sign up to for free. **Gmail**, **Yahoo! Mail** and **Outlook.com** are currently the most popular email accounts.

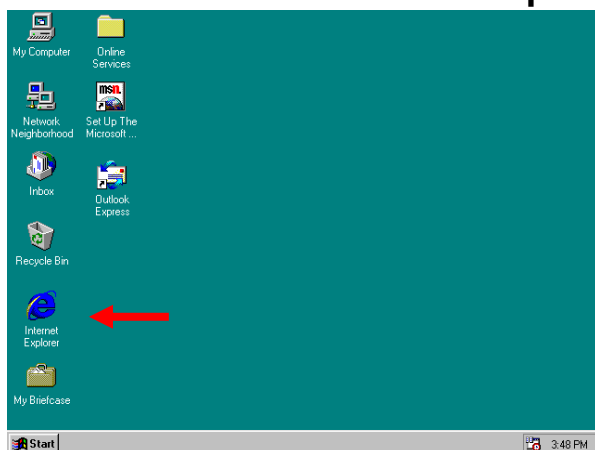
Your computer mentor should have shown you how to sign up to get an email account.

This email guide uses Gmail.

Once sign-up is complete, you'll be able to log into your account with your new username/email address and password and start emailing.

How to send an email:

You need to start by opening up **Internet Explorer** from your desktop. Double click on the **Internet Explorer** icon.



Type www.gmail.com into the address bar.



Log in to your Gmail account. You need to type in your username and password. Then click on the **Sign in** button.

Google

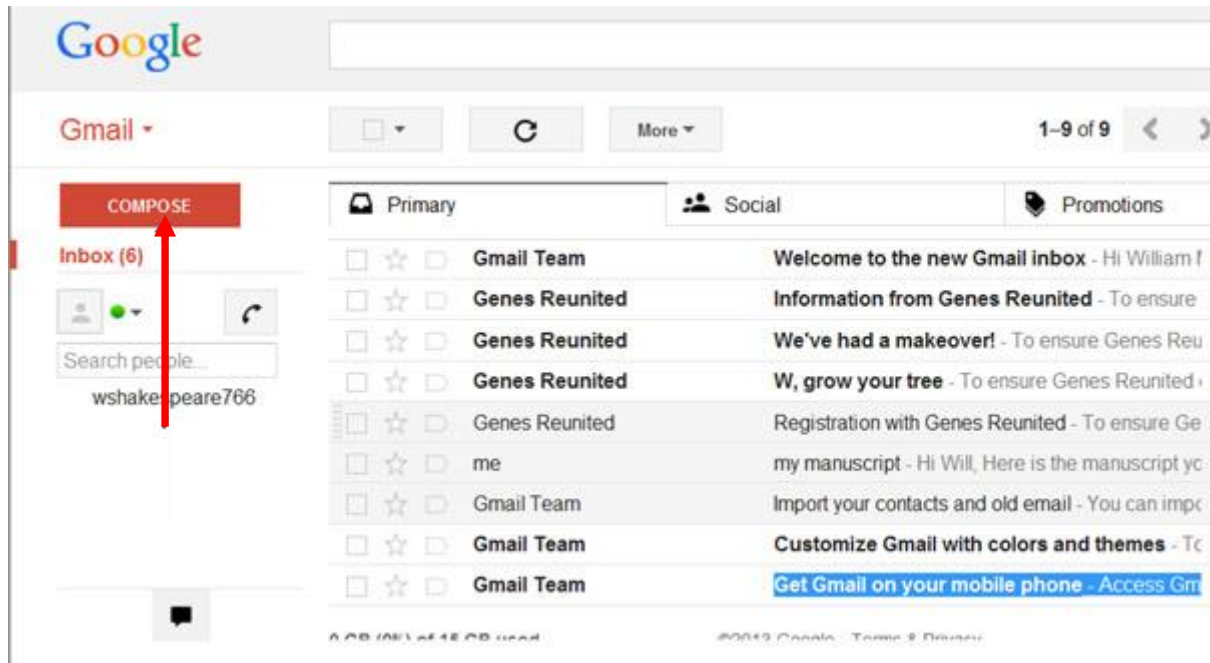
One account. All of Google.

Sign in to continue to Gmail

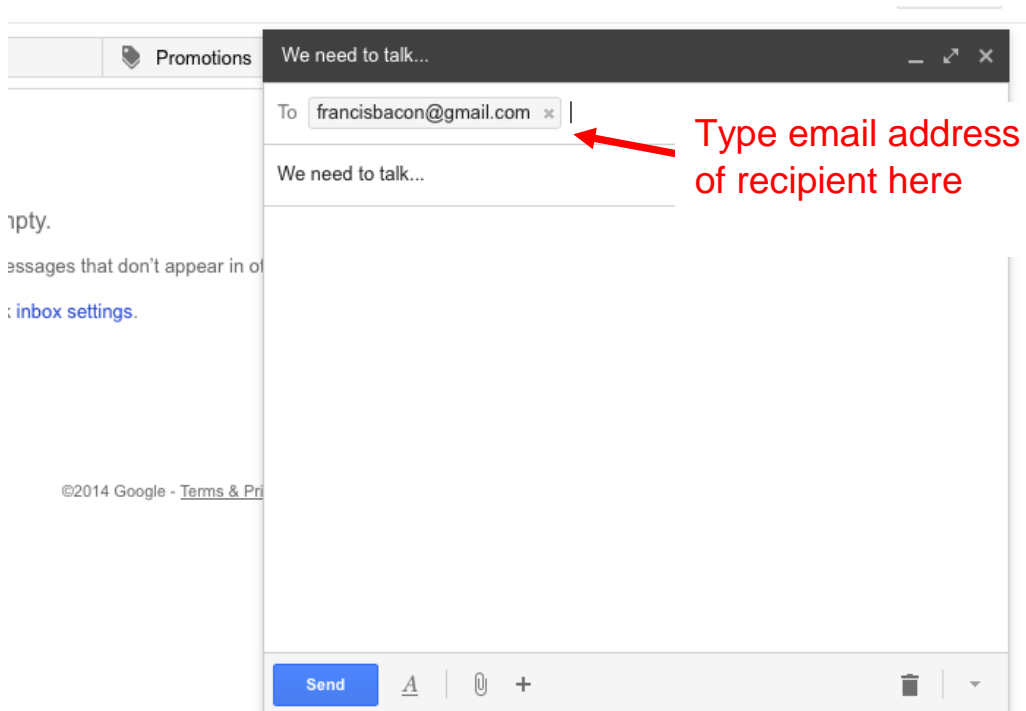
The image shows a screenshot of the Gmail sign-in form. At the top is a grey profile icon. Below it is a text input field containing "username@gmail.com". Underneath is a password input field with masked characters ".....". A blue "Sign in" button is positioned below the password field. At the bottom left, there is a checked checkbox labeled "Stay signed in". At the bottom right, there is a link labeled "Need help?". A mouse cursor is hovering over the "Sign in" button.

Sending an email:

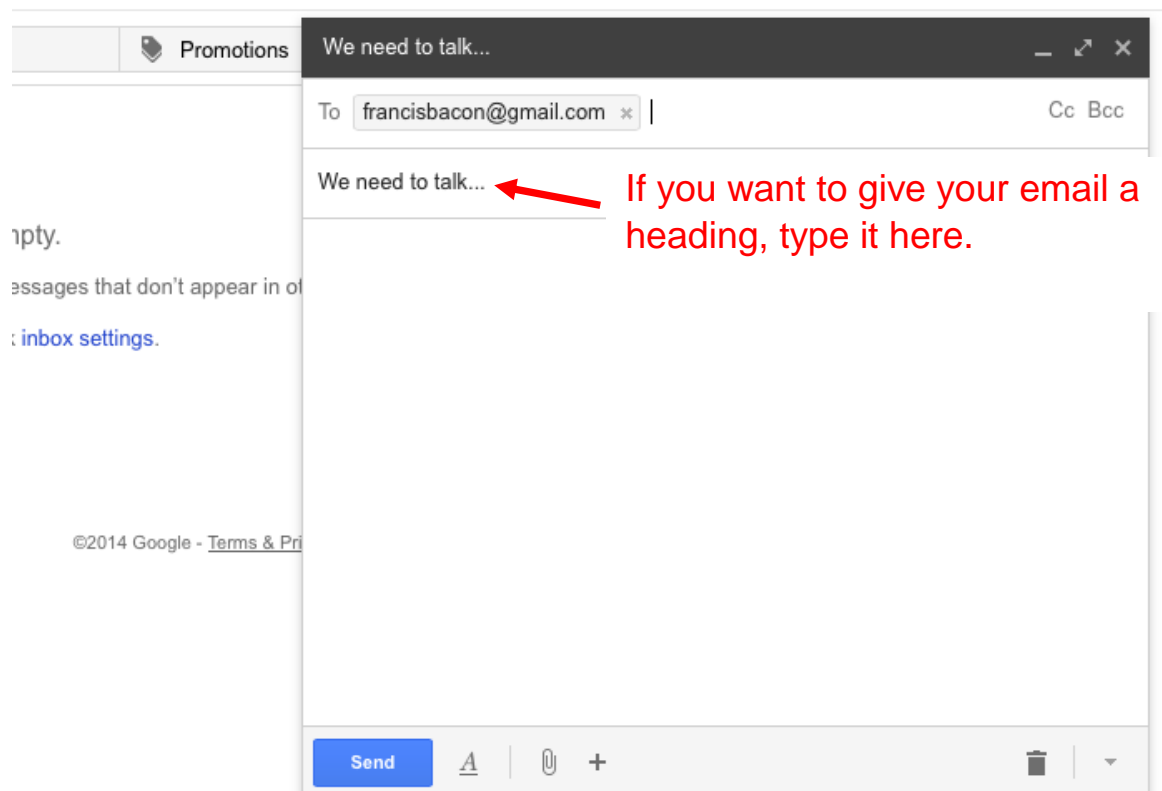
Once you are signed in, Click **Compose**.



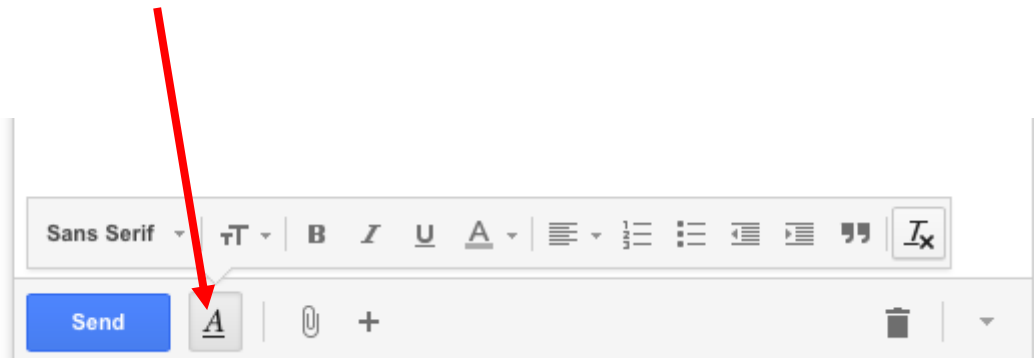
A new blank email window will open up. In the 'To' box, type in the email address of the recipient.



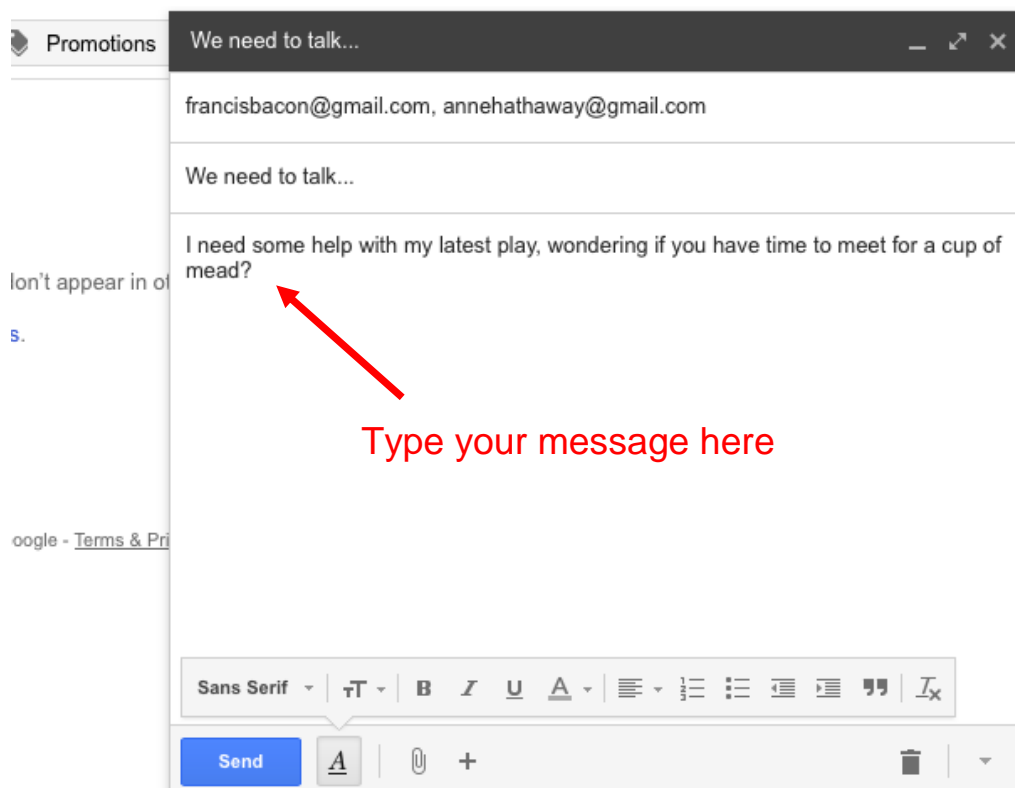
The subject field allows you to give the recipient an idea of the topic of your email, like a heading. However, you don't have to put anything in the subject box if you don't want to.



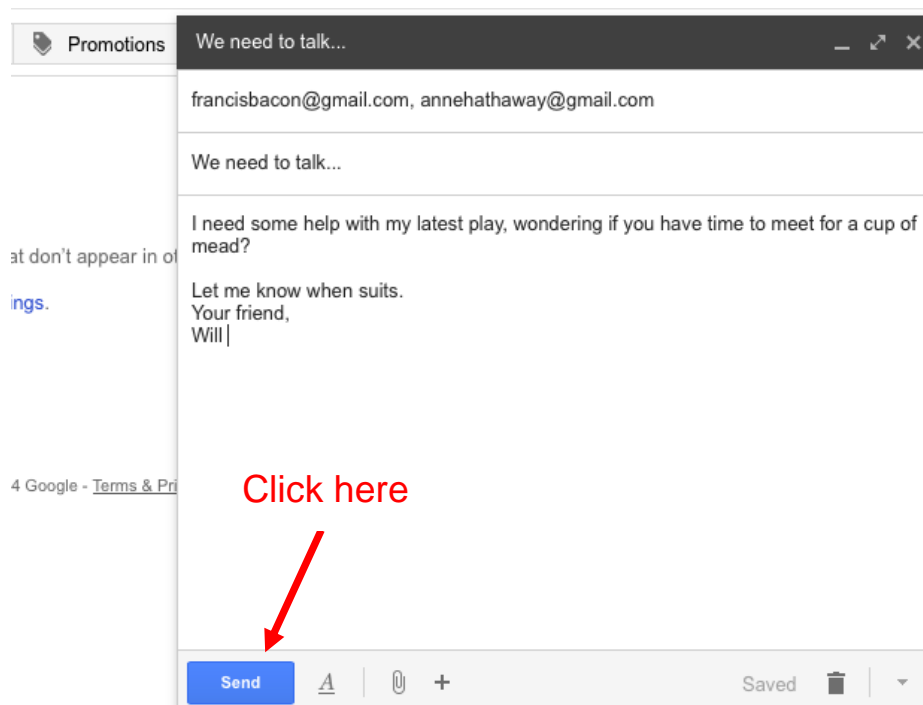
You can change the font style, colour and size of the text in the Email, using the formatting icons. You can also check the spelling of your email. Choose your formatting from the menu shown.



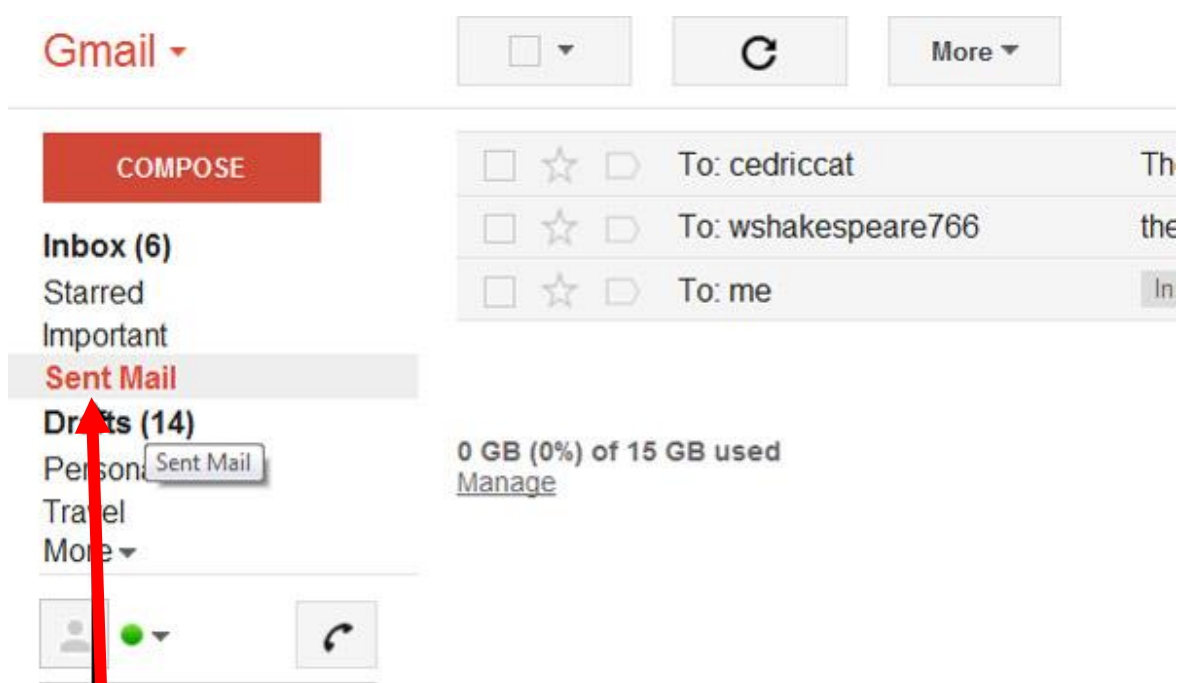
Type your message in the main body field of your email.



When you're happy with your email, click the blue **Send** button at the bottom of the compose window.



The email you've sent will now be stored in the 'Sent Mail' folder on your Gmail dashboard.



You may start an email but then decide to come back to it later rather than sending it straightaway. Gmail saves your drafts automatically. So

you can simply close the email and the unfinished email will be saved to your 'Drafts' folder. When you decide that you're ready to send it, you can retrieve it from the 'Drafts' folder by clicking **Drafts** and then clicking the correct item in the 'Drafts' folder list. Finish the email and click **Send** as normal.

Appendix H: Self-Report Measures

Social Provision Scale (Russell & Catriona, 1984), excluding the items of the 'reassurance of worth' subscale.

Instructions: In answering the following questions, think about your current relationships with friends, family members, co-workers, community members, and so on. Please indicate to what extent each statement describes your current relationships with other people. Use the following scale to indicate your opinion:

1	2	3	4
Strongly Disagree	Disagree	Agree	Strongly Agree

So, for example, if you feel a statement is very true of your current relationships, you would respond with a 4 (strongly agree). If you feel a statement clearly does not describe your relationships, you would respond with a 1 (strongly disagree).

1. There are people I can depend on to help me if I really need it. _____
2. I feel that I do not have close personal relationships with other people. _____
3. There is no one I can turn to for guidance in times of stress. _____
4. There are people who depend on me for help. _____
5. There are people who enjoy the same social activities I do. _____
6. I feel personally responsible for the well-being of another person. _____
7. I feel part of a group of people who share my attitudes and beliefs. _____
8. If something went wrong, no one would come to my assistance. _____
9. I have close relationships that provide me with a sense of emotional security and well-being. _____
10. There is someone I could talk to about important decisions in my life. _____
11. There is no one who shares my interests and concerns. _____
12. There is no one who really relies on me for their well-being. _____
13. There is a trustworthy person I could turn to for advice if I were having Problems. _____
14. I feel a strong emotional bond with at least one other person. _____
15. There is no one I can depend on for aid if I really need it. _____
16. There is no one I feel comfortable talking about problems with. _____
17. I lack a feeling of intimacy with another person. _____
18. There is no one who likes to do the things I do. _____
19. There are people I can count on in an emergency. _____
20. No one needs me to care for them. _____

Perceived Stress Scale (Cohen, Kamarck, Mermelstein, 1983)

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly? **0 1 2 3 4**
2. In the last month, how often have you felt that you were unable to control the important things in your life? **0 1 2 3 4**
3. In the last month, how often have you felt nervous and "stressed"? **0 1 2 3 4**
4. In the last month, how often have you felt confident about your ability to handle your personal problems? **0 1 2 3 4**
5. In the last month, how often have you felt that things were going your way? **0 1 2 3 4**
6. In the last month, how often have you found that you could not cope with all the things that you had to do? **0 1 2 3 4**
7. In the last month, how often have you been able to control irritations in your life? **0 1 2 3 4**
8. In the last month, how often have you felt that you were on top of things? **0 1 2 3 4**
9. In the last month, how often have you been angered because of things that were outside of your control? **0 1 2 3 4**
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? **0 1 2 3 4**

Satisfaction with life Scale (Diener, Emmons, Larsen & Griffin, 1985)

DIRECTIONS: Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number in the line preceding that item. Please be open and honest in your responding.

- 1 = Strongly Disagree**
- 2 = Disagree**
- 3 = Slightly Disagree**
- 4 = Neither Agree or Disagree**
- 5 = Slightly Agree**
- 6 = Agree**
- 7 = Strongly Agree**

1. In most ways my life is close to my ideal. _____
2. The conditions of my life are excellent. _____
3. I am satisfied with life. _____
4. So far I have gotten the important things I want in life. _____
5. If I could live my life over, I would change almost nothing. _____

Rosenberg Self-Esteem Questionnaire (Rosenberg, 1965)

Instructions: Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. On the whole, I am satisfied with myself.

Strongly Agree Agree Disagree Strongly Disagree

2. At times I think I am no good at all.

Strongly Agree Agree Disagree Strongly Disagree

3. I feel that I have a number of good qualities.

Strongly Agree Agree Disagree Strongly Disagree

4. I am able to do things as well as most other people.

Strongly Agree Agree Disagree Strongly Disagree

5. I feel I do not have much to be proud of.

Strongly Agree Agree Disagree Strongly Disagree

6. I certainly feel useless at times.

Strongly Agree Agree Disagree Strongly Disagree

7. I feel that I'm a person of worth, at least on an equal plane with others.

Strongly Agree Agree Disagree Strongly Disagree

8. I wish I could have more respect for myself.

Strongly Agree Agree Disagree Strongly Disagree

9. All in all, I am inclined to feel that I am a failure.

Strongly Agree Agree Disagree Strongly Disagree

10. I take a positive attitude toward myself.

Strongly Agree Agree Disagree Strongly Disagree

UCLA Loneliness scale (Version 3; Russell, 1996)

INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you. Record the number which is relevant to you.

1	2	3	4
Never	Rarely	Sometimes	Often

1. How often do you feel that you are "in tune" with the people around you? _____
2. How often do you feel that you lack companionship? _____
3. How often do you feel that there is no one you can turn to? _____
4. How often do you feel alone? _____
5. How often do you feel part of a group of friends? _____
6. How often do you feel that you have a lot in common with the people around you? _____
7. How often do you feel that you are no longer close to anyone? _____
8. How often do you feel that your interests and ideas are not shared by those around you? _____
9. How often do you feel outgoing and friendly? _____
10. How often do you feel close to people? _____
11. How often do you feel left out? _____
12. How often do you feel that your relationships with others are not meaningful? _____
13. How often do you feel that no one really knows you well? _____
14. How often do you feel isolated from others? _____
15. How often do you feel you can find companionship when you want it? _____
16. How often do you feel that there are people who really understand you? _____
17. How often do you feel shy? _____
18. How often do you feel that people are around you but not with you? _____
19. How often do you feel that there are people you can talk to? _____
20. How often do you feel that there are people you can turn to? _____

Hospital Anxiety and Depression Scale (HADS)



Name: _____ Date: _____

Clinicians are aware that emotions play an important part in most illnesses. If your clinician knows about these feelings he or she will be able to help you more.

This questionnaire is designed to help your clinician to know how you feel. Read each item below and **underline the reply** which comes closest to how you have been feeling in the past week. Ignore the numbers printed at the edge of the questionnaire.

Don't take too long over your replies, your immediate reaction to each item will probably be more accurate than a long, thought-out response.

A	D		A	D
3		I feel tense or 'wound up'		
2		Most of the time		3
1		A lot of the time		2
0		From time to time, occasionally		1
		Not at all		0
	0	I still enjoy the things I used to enjoy		
	1	Definitely as much		3
	2	Not quite so much		2
	3	Only a little		1
		Hardly at all		0
3		I get a sort of frightened feeling as if something awful is about to happen		
2		Very definitely and quite badly		3
1		Yes, but not too badly		2
0		A little, but it doesn't worry me		1
		Not at all		0
	0	I can laugh and see the funny side of things		
	1	As much as I always could		3
	2	Not quite so much now		2
	3	Definitely not so much now		1
		Not at all		0
3		Worrying thoughts go through my mind		
2		A great deal of the time		3
1		A lot of the time		2
0		Not too often		1
		Very little		0
	3	I feel cheerful		
	2	Never		3
	1	Not often		2
	0	Sometimes		1
		Most of the time		0
0		I can sit at ease and feel relaxed		
1		Definitely		3
2		Usually		2
3		Not often		1
		Not at all		0
		I feel as if I am slowed down		
		Nearly all the time		3
		Very often		2
		Sometimes		1
		Not at all		0
		I get a sort of frightened feeling like 'butterflies' in the stomach		
	0	Not at all		3
	1	Occasionally		2
	2	Quite often		1
	3	Very often		0
		I have lost interest in my appearance		
		Definitely		3
		I don't take as much care as I should		2
		I may not take quite as much care		1
		I take just as much care as ever		0
		I feel restless as if I have to be on the move		
		Very much indeed		3
		Quite a lot		2
		Not very much		1
		Not at all		0
		I look forward with enjoyment to things		
		As much as I ever did		3
		Rather less than I used to		2
		Definitely less than I used to		1
		Hardly at all		0
		I get sudden feelings of panic		
		Very often indeed		3
		Quite often		2
		Not very often		1
		Not at all		0
		I can enjoy a good book or radio or television programme		
		Often		3
		Sometimes		2
		Not often		1
		Very seldom		0

Now check that you have answered all the questions

This form is printed in green. Any other colour is an unauthorized photocopy.

TOTAL

A	D

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 Record form items originally published in Acta Psychiatrica Scandinavica 67, 361-70, copyright © Munksgaard International Publishers Ltd, Copenhagen, 1983.
 First published in 1994 by nferNelson Publishing Company Ltd.
 Published by GL Assessment, 389 Chiswick High Road, 9th Floor, London W4 4AL. GL Assessment is part of GL Education.
 Code 0090002511 Printed in Great Britain 15112.141

Sense of belonging instrument - Psychological Experience (SOBI-P)

Instructions: Here are some statements with which you may or may not agree. Using the key listed below, circle the number that most closely reflects your feelings about each statement.

KEY:

1 = strongly Agree 2 = Agree 3 = Disagree 4 = Strongly Disagree

- | | | | | |
|---|---|---|---|---|
| 1. I often wonder if there is any place on earth where I really fit in. | 1 | 2 | 3 | 4 |
| 2. I am just not sure if I fit in with my friends. | 1 | 2 | 3 | 4 |
| 3. I would describe myself as a misfit in most social situations. | 1 | 2 | 3 | 4 |
| 4. I generally feel that people accept me. | 1 | 2 | 3 | 4 |
| 6. I feel like a piece of a jig-saw puzzle that doesn't fit into the puzzle. | 1 | 2 | 3 | 4 |
| 7. I would like to make a difference to people or things around me, but I don't feel that what I have to offer is valued. | 1 | 2 | 3 | 4 |
| 8. I feel like an outsider in most situations. | 1 | 2 | 3 | 4 |
| 9. I am troubled by feeling like I have no place in this world. | 1 | 2 | 3 | 4 |
| 10. I could disappear for days and it wouldn't matter to my family. | 1 | 2 | 3 | 4 |
| 11. In general, I don't feel a part of the mainstream of society. | 1 | 2 | 3 | 4 |
| 12. I feel like I observe life rather than participate in it. | 1 | 2 | 3 | 4 |
| 13. If I died tomorrow, very few people would come to my funeral. | 1 | 2 | 3 | 4 |
| 14. I feel like a square peg trying to fit into a round hole. | 1 | 2 | 3 | 4 |
| 15. I don't feel that there is any place where I really fit in this world. | 1 | 2 | 3 | 4 |

- | | | | | |
|--|---|---|---|---|
| 16. I am uncomfortable that my background and experiences are so different from those who are usually around me. | 1 | 2 | 3 | 4 |
| 17. I could not see or call my friends for days and it wouldn't matter to them. | 1 | 2 | 3 | 4 |
| 18. I feel left out of things. | 1 | 2 | 3 | 4 |
| 19. I am not valued by or important to my friends. | 1 | 2 | 3 | 4 |

For the following two questions, please tick the answer that applies to you.

Have you been prescribed any new medications in the last month?

Yes No Unsure

Are you currently receiving any psychological therapeutic intervention?

Yes No Unsure

END

Appendix I: Interview Schedule

Introduction

Introduce Interview:

“Thank you for agreeing to be interviewed. The interview will be informal, like a conversation to see what your thoughts and opinions are on using video-communication. There are no right or wrong answers and I’m just interested in your real opinions. The interview is completely confidential, in that your identity will not be disclosed to anyone. As mentioned before, I would like to tape record the interview, but it will only be myself who will listen to the recording. I would, however, like to create a paper version of what you have said, so I can pick out the main points that we have talked about. Is this ok with you? Do you have any questions before we start? I would like to start by finding out a little about how you got on with the video-communication.”

Warm-up questions

- Who did you communicate with via video-communication? Anyone else?
- How do you usually communicate with ...?
- How often did you use the video-communication?
- Who usually initiated the calls? Do you communicate via any other means? How often? How do the different means of communicating compare? Why do you think that is?

General experience with Skype

- Can you tell me about your experience with using the video-communication?
- Were there any advantages to using the video-communication? If yes, what were they? What do you think it was about the video-communication that enabled (the advantage)? What did this mean for you?
- Were there any disadvantages to using the video-communication? If yes, what were they? What do you think it was about the video-communication that resulted in (disadvantages)? What did this mean for you?
- What was it like being able to talk via video?
- How did it affect your relationship? Why?
- Has the video-communication resulted in a change in the frequency of your communications with? How? Why do you think that is?
- Has the video-communication resulted in a difference to your relationship? How? Why do you think that is?

Impact upon psychological well-being

- Has the video-communication impacted upon your sense of closeness with? How? What does that mean for you?
- Has the video-communication impacted upon how you feel you belong, or fit in with your friend(s)/family? How? What does that mean for you?
- Has the video-communication impacted upon the amount of love and care that you received? How? How about support you were able to give?
- Has the video-communication impacted upon your mood? How? Why do you think that is?
- Has it impacted upon your feelings of loneliness? How? Why do you think that is?
- Has the video-communication impacted upon your levels of stress? How?

Appendix J: Ethical Approval



Application for Ethical Approval of Research Involving Human Participants

This application form should be completed for any research involving human participants conducted in or by the University. 'Human participants' are defined as including living human beings, human beings who have recently died (cadavers, human remains and body parts), embryos and foetuses, human tissue and bodily fluids, and human data and records (such as, but not restricted to medical, genetic, financial, personnel, criminal or administrative records and test results including scholastic achievements). Research should not commence until written approval has been received (from Departmental Research Director, Faculty Ethics Committee (FEC) or the University's Ethics Committee). This should be borne in mind when setting a start date for the project.

Applications should be made on this form, and submitted electronically, to your Departmental Research Director. A signed copy of the form should also be submitted. Applications will be assessed by the Research Director in the first instance, and may then pass to the FEC, and then to the University's Ethics Committee. A copy of your research proposal and any necessary supporting documentation (e.g. consent form, recruiting materials, etc) should also be attached to this form.

A full copy of the signed application will be retained by the department/school for 6 years following completion of the project. The signed application form cover sheet (two pages) will be sent to the Research Governance and Planning Manager in the REO as Secretary of the University's Ethics Committee.

1.

Title of project: Mixed-methods case series study exploring the impact of video-communication on older adults' psychological well-being
--

2. The title of your project will be published in the minutes of the University Ethics Committee. If you object, then a reference number will be used in place of the title.
 Do you object to the title of your project being published? Yes / No

3. This Project is: Staff Research Project Student Project

4. Principal Investigator(s) (students should also include the name of their supervisor):

Name:	Department:
Natasha Bennett	Health and Human Sciences, University of Essex
Dr Susan McPherson	Health and Human Sciences, University of Essex
Dr Leanne Andrews	Health and Human Sciences, University of Essex

Declaration of Principal Investigator:

The information contained in this application, including any accompanying information, is, to the best of my knowledge, complete and correct. I/we have read the University's *Guidelines for Ethical Approval of Research Involving Human Participants* and accept responsibility for the conduct of the procedures set out in this application in accordance with the guidelines, the University's *Statement on Safeguarding Good Scientific Practice* and any other conditions laid down by the University's Ethics Committee. I/we have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my/our obligations and the rights of the participants.

Signature(s): N Bennett

Name(s) in block capitals: NATASHA BENNETT

Date: 4/2/14

Supervisor's recommendation (Student Projects only):

I have read and approved both the research proposal and this application.

Supervisor's signature: [Signature]

Outcome:

The Departmental Director of Research (DoR) has reviewed this project and considers the methodological/technical aspects of the proposal to be appropriate to the tasks proposed. The DoR considers that the investigator(s) has/have the necessary qualifications, experience and facilities to conduct the research set out in this application, and to deal with any emergencies and contingencies that may arise.

This application falls under Annex B and is approved on behalf of the FEC

This application is referred to the FEC because it does not fall under Annex B

This application is referred to the FEC because it requires independent scrutiny

Signature(s): [Signature]

Name(s) in block capitals: W. W. 1101

Department: HHS

Date: 13/2/14

The application has been approved by the FEC

The application has not been approved by the FEC

The application is referred to the University Ethics Committee

Signature(s):

Name(s) in block capitals:

Faculty:

Date:

[Type text]

Declaration of Principal Investigator:

The information contained in this application, including any accompanying information, is, to the best of my knowledge, complete and correct. I/we have read the University's *Guidelines for Ethical Approval of Research Involving Human Participants* and accept responsibility for the conduct of the procedures set out in this application in accordance with the guidelines, the University's *Statement on Safeguarding Good Scientific Practice* and any other conditions laid down by the University's Ethics Committee. I/we have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my/our obligations and the rights of the participants.

Signature(s): N Bennett

Name(s) in block capitals: NATASHA BENNETT

Date: 4/2/14

Supervisor's recommendation (Student Projects only):

I have read and approved both the research proposal and this application.

Supervisor's signature: [Signature]

Outcome:

The Departmental Director of Research (DoR) has reviewed this project and considers the methodological/technical aspects of the proposal to be appropriate to the tasks proposed. The DoR considers that the investigator(s) has/have the necessary qualifications, experience and facilities to conduct the research set out in this application, and to deal with any emergencies and contingencies that may arise.

This application falls under Annex B and is approved on behalf of the FEC

This application is referred to the FEC because it does not fall under Annex B

This application is referred to the FEC because it requires independent scrutiny

Signature(s): [Signature]

Name(s) in block capitals: W. W. 11051

Department: HHS

Date: 13/2/14

The application has been approved by the FEC

The application has not been approved by the FEC

The application is referred to the University Ethics Committee

Signature(s):

Name(s) in block capitals:

Faculty:

Date:

[Type text]

Appendix K: Scatterplots for Clinically Significant Change Tests

A graphical representation of the clinically significant change scores are presented. In the figures each shape on the scatterplot represents one participant; a square represents that the change in the participant's scores was reliable, a triangle represents that the participant's scores were unchanged, and a diamond shows that the participant's psychological well-being deteriorated. The red circle represents the mean group score. The broken horizontal and vertical lines represent the cut-off point for the 'clinical' and the 'non-clinical' population. The position of participants' scores on the graph shows how the video-communication impacted upon their psychological well-being for a particular measure. Interpretation of the graph is varied dependent on whether an increase or decrease in participants' scores is required for recovery. Figure K1 shows different coloured areas of the graph to illustrate the categorical ratings for when an increase in scores on the measures is required for clinical gain, and Figure K2 shows different coloured areas of the graph to illustrate the categorical ratings for when a decrease in scores on the measures is required for clinical gain.

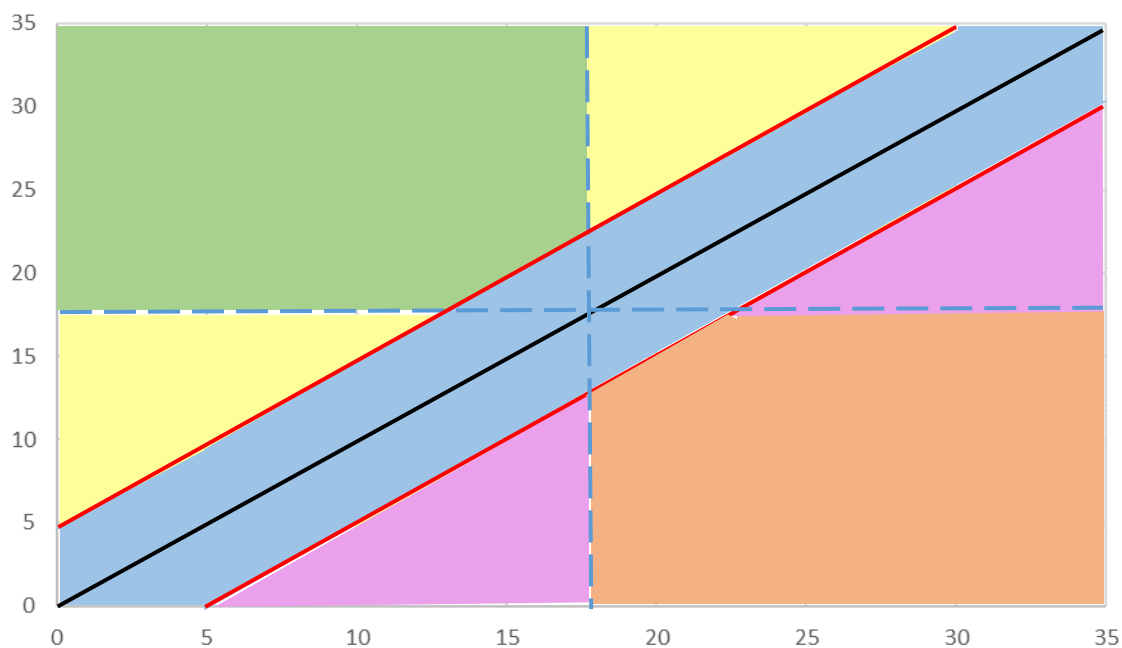


Figure K1. A scatterplot showing coloured areas which represent the different categorical ratings when an increase in scores of the outcome measures indicates improvement.

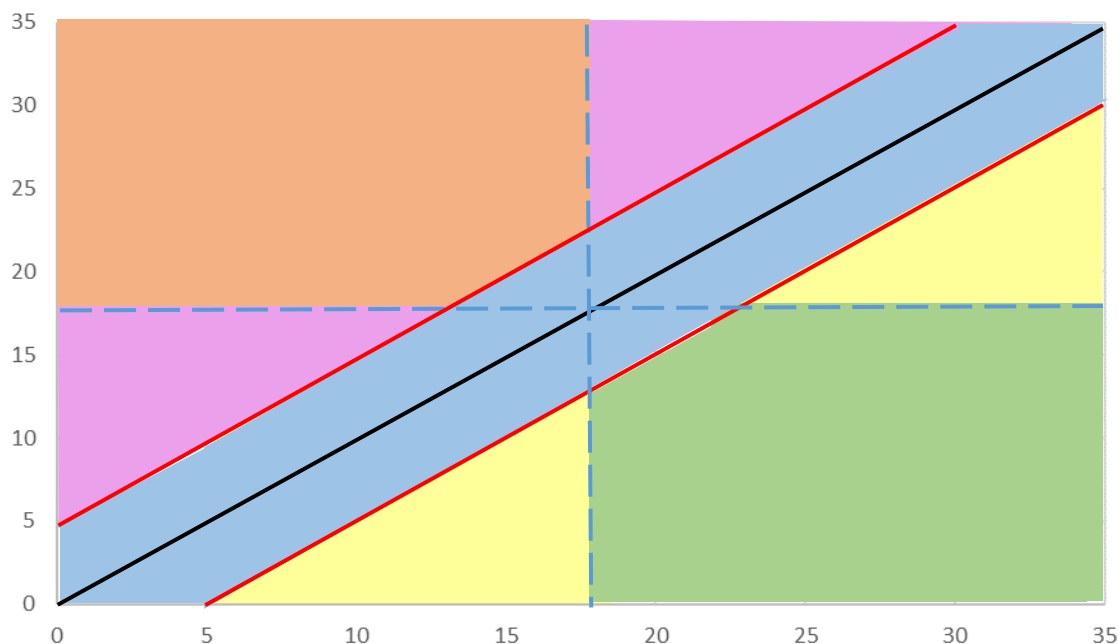


Figure K2. A scatterplot showing coloured areas which represent the different categorical ratings when a decrease in scores of the outcome measures indicates improvement.

Clarification of the categorical ratings illustrated by the coloured areas of Figure K1 and K2 are as follows: a) The black line represents that there was no change between participants' scores between two time points; b) the blue area indicates that there was some change between participants' scores but the change was not large enough to be considered reliable; c) the purple area signifies that the participant's scores deteriorated, which was a large enough change to be considered reliable but the change in scores did not result in the participant's score moving out of either the 'non-clinical' or the 'clinical' range; d) the orange area represents participants whose scores have deteriorated, which was a large enough change to be considered reliable and has moved from the 'non-clinical' to the 'clinical' range; e) the yellow areas indicate that participants scores reliably improved, but did not reach clinically significant change; and f) the green area indicates recovery, where the participants scores moved from the 'clinical' group to the 'non-clinical' group.

Sense of Belonging Instrument –Psychological (SOBI-P). An increase in the participants' scores on the SOBI-P was required in order to suggest an improvement in their sense of belonging.

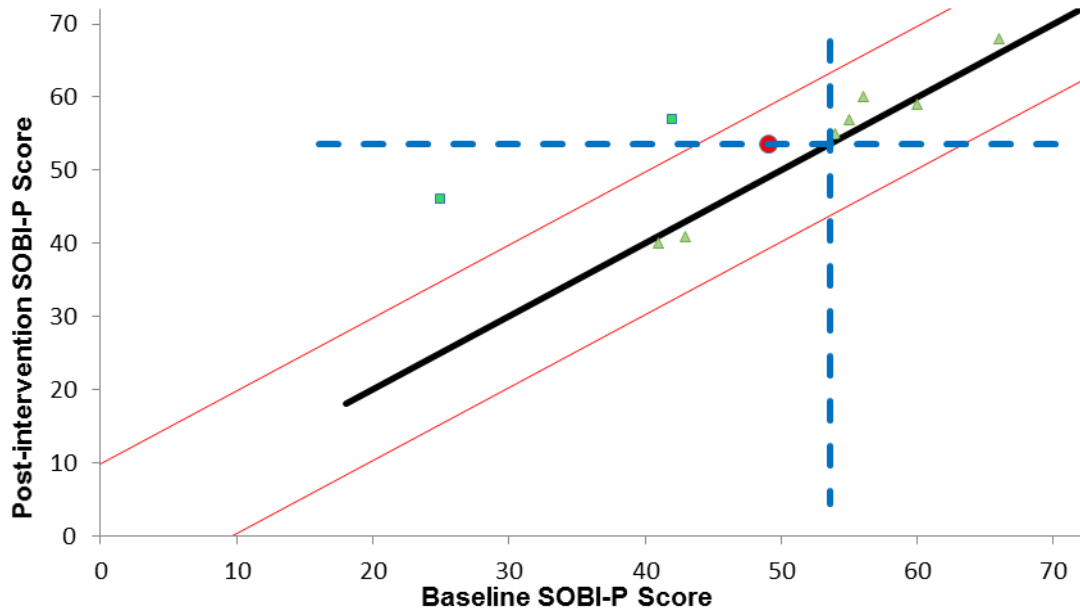


Figure K3. Scatterplot of reliable and clinically significant change parameters of the baseline and post- intervention SOBI-P scores for the video-communication condition.

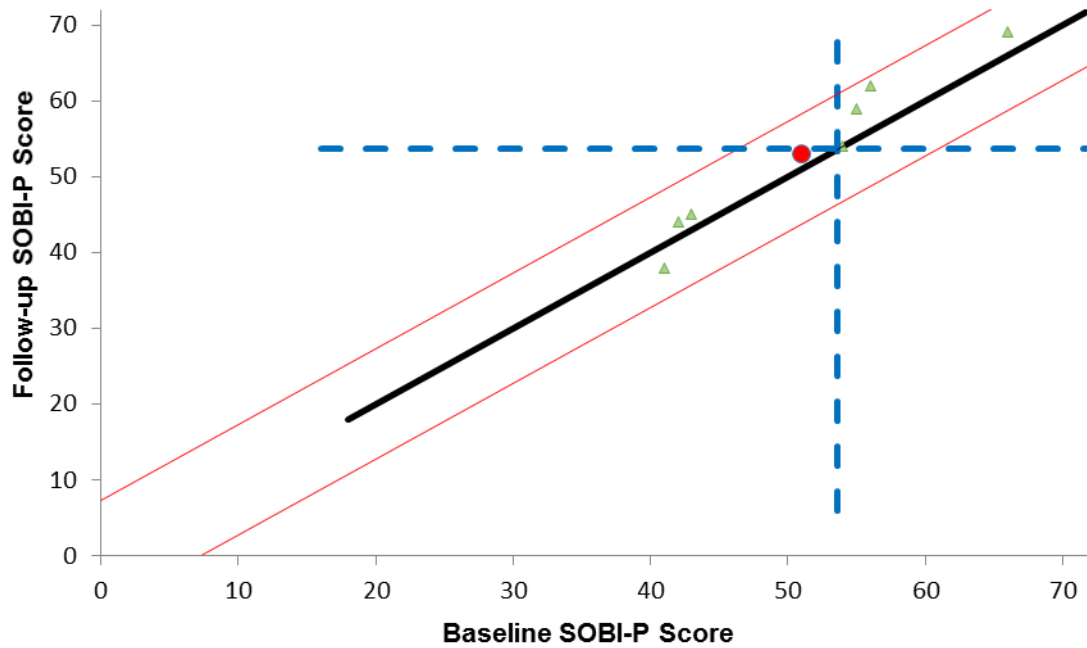


Figure K4. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up SOBI-P scores for the video-communication condition.

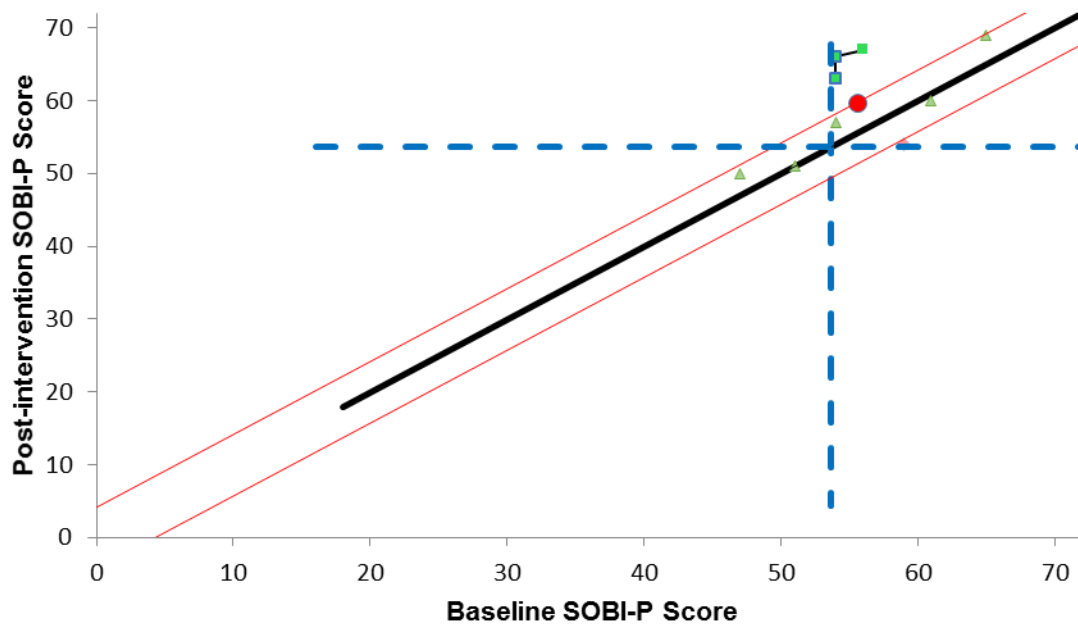


Figure K5. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention SOBI-P scores for the email condition.

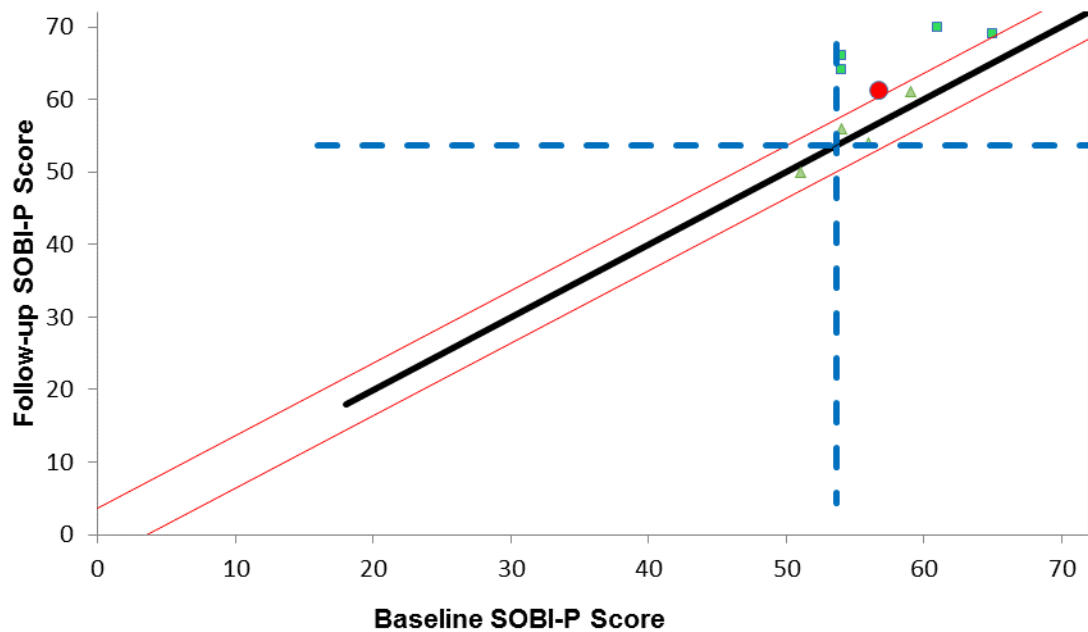


Figure K6. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up SOBI-P scores for the email condition.

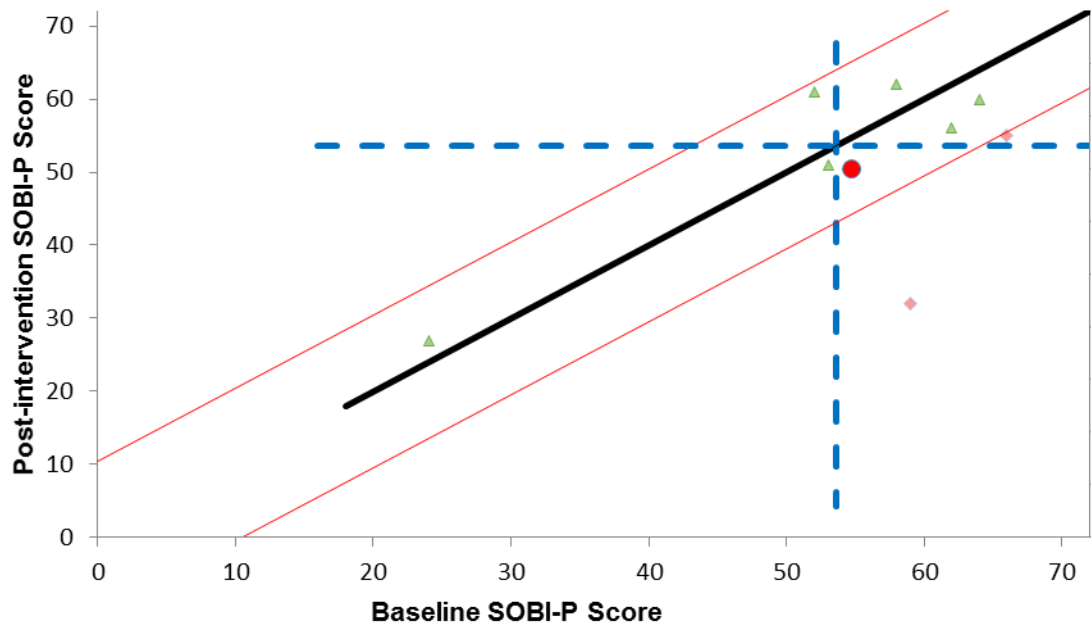


Figure K7. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention SOBI-P scores for the basic computer skills condition.

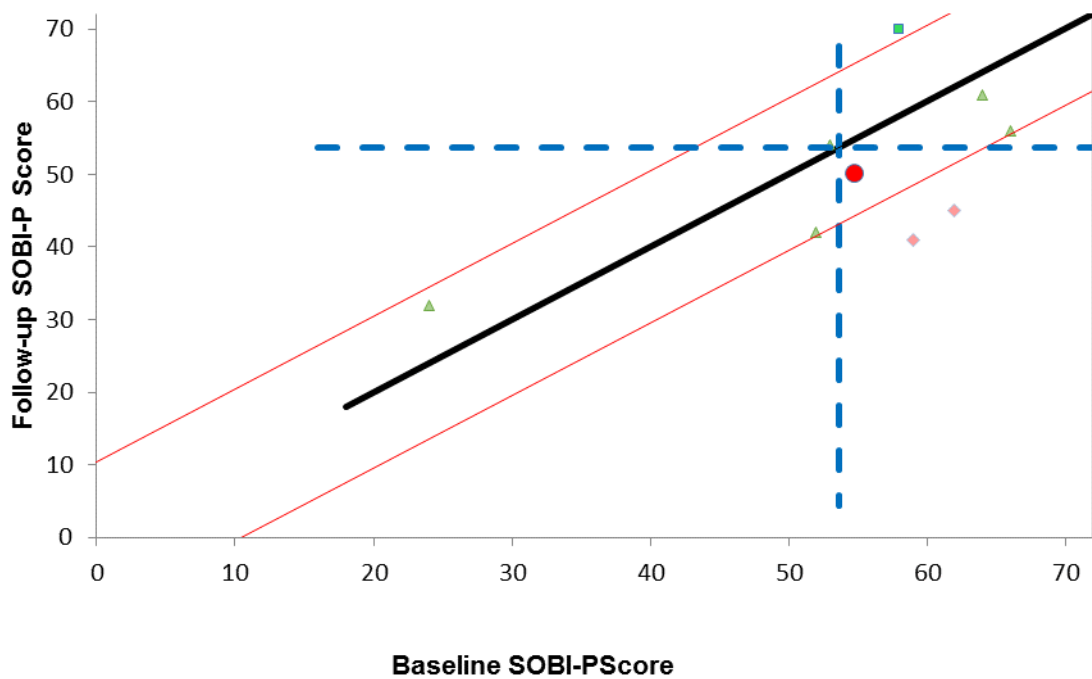


Figure K8. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up SOBI-P scores for the basic computer skills condition.

Perceived Stress Scale (PSS). A decrease in the participants' scores on the PSS was required in order to suggest an improvement in their stress levels.

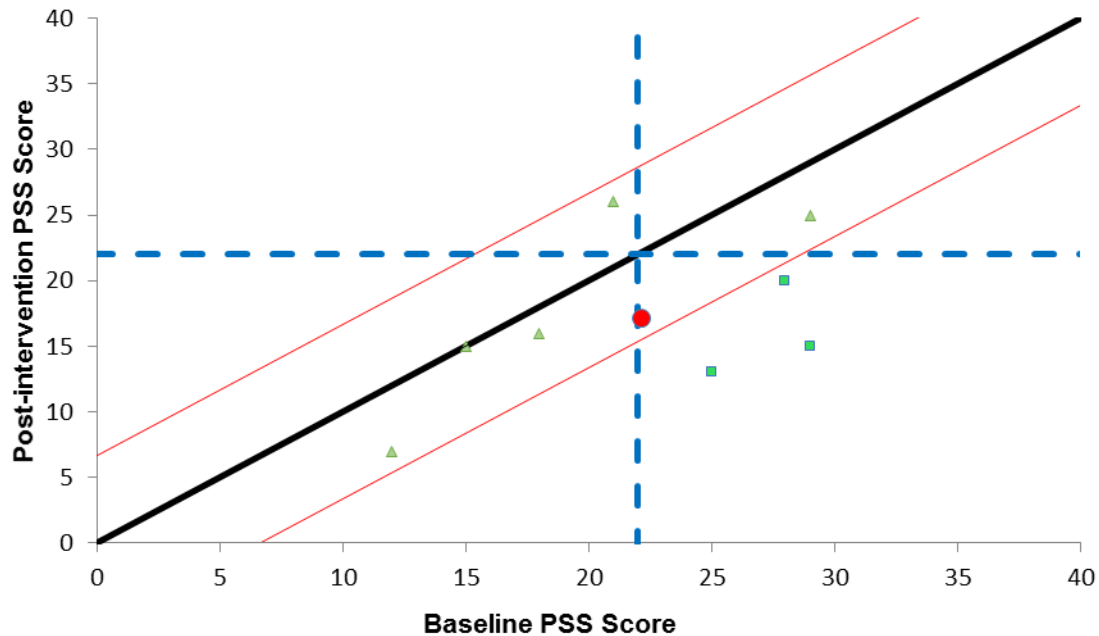


Figure K9. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention PSS scores for the video-communication condition

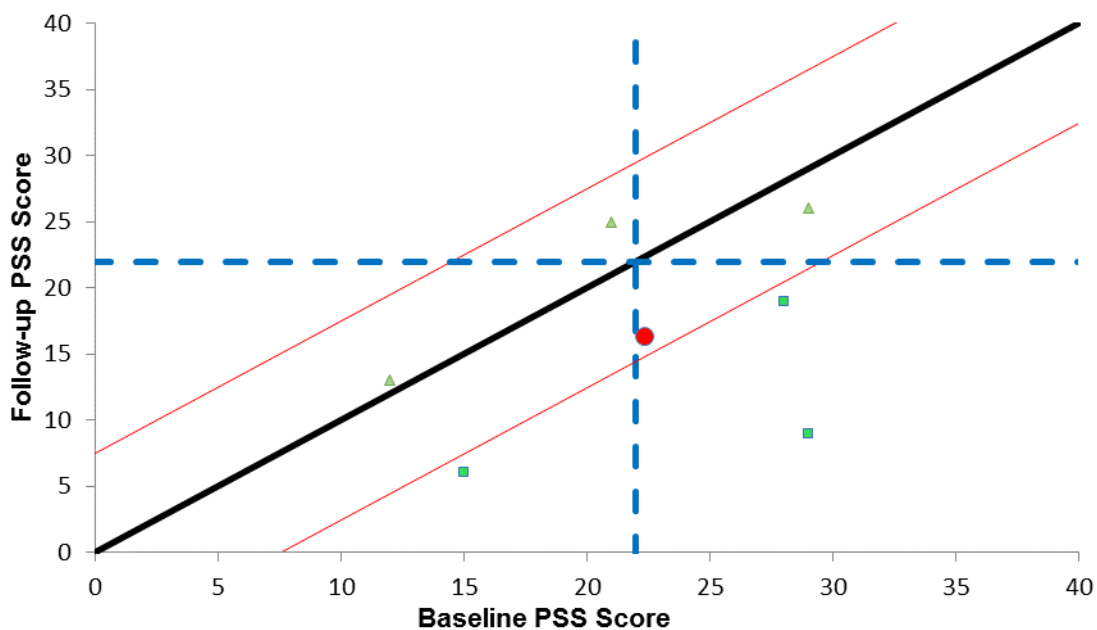


Figure K10. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up PSS scores for the video-communication condition

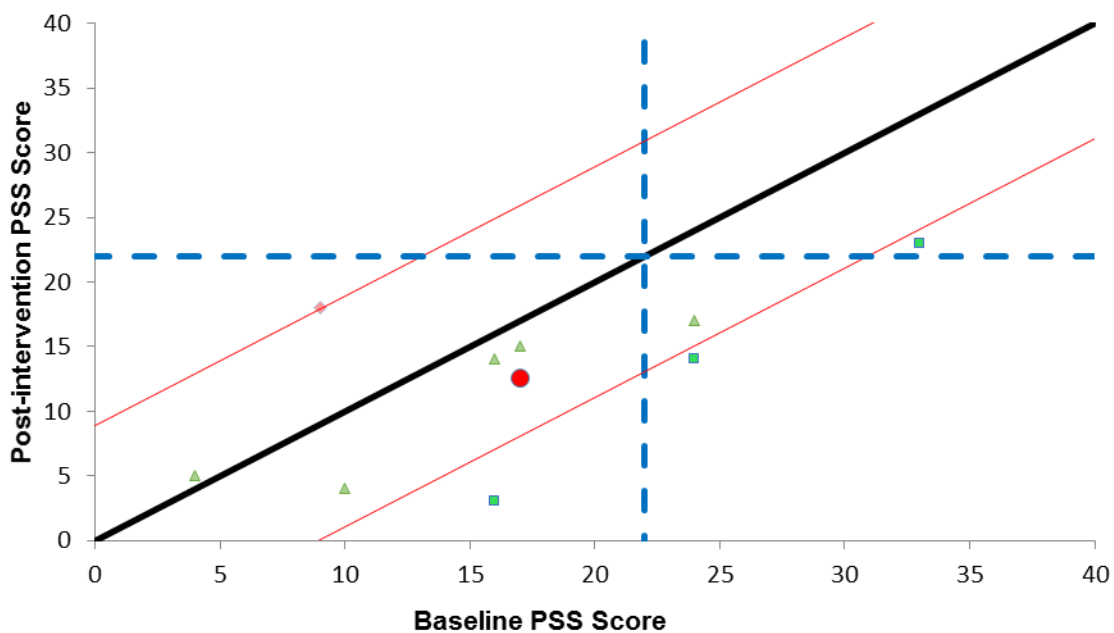


Figure K11. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention PSS scores for the email condition

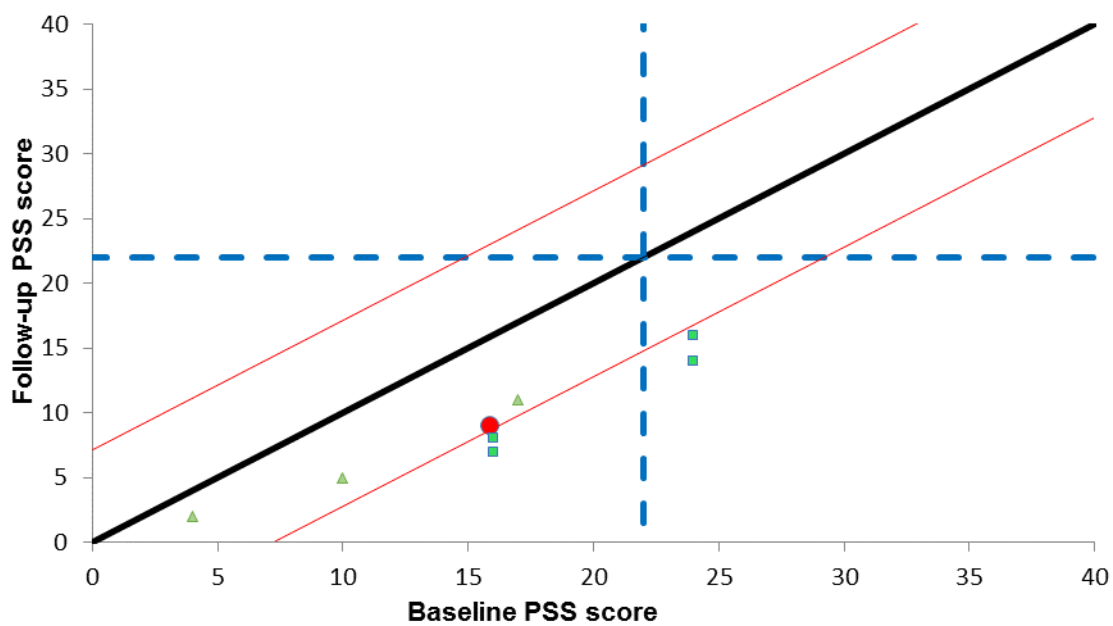


Figure K12. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up PSS scores for the email condition

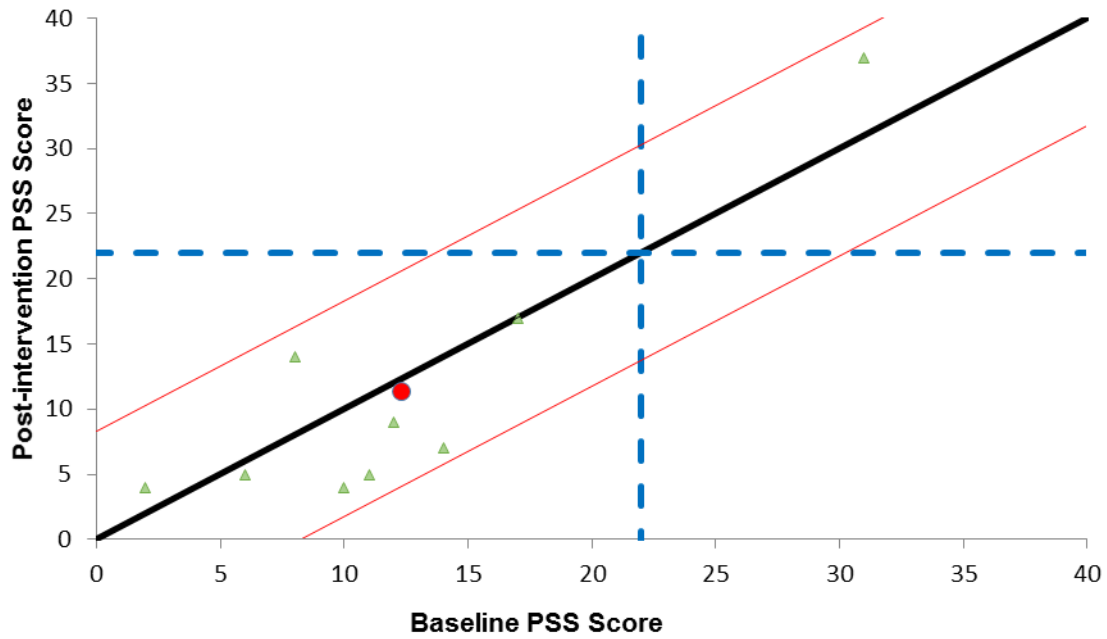


Figure K13. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention PSS scores for the basic computer skills condition

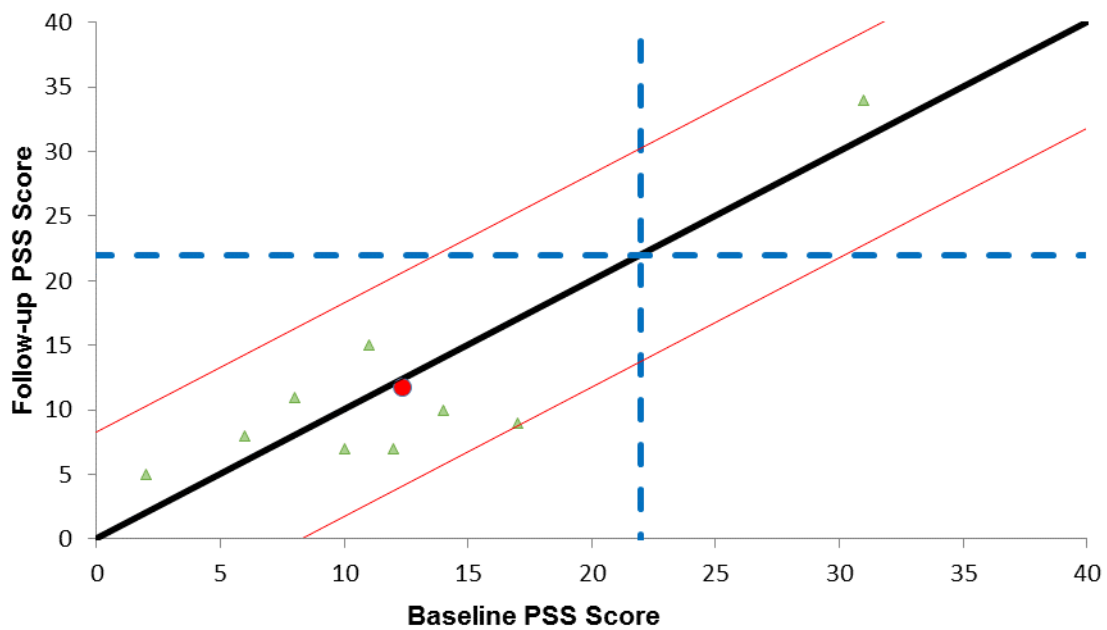


Figure K14. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up PSS scores for the basic computer skills condition

Rosenberg Self-Esteem Scale (RSES). An increase in the participants' scores on the RSES was required in order to suggest an improvement in their self-esteem.

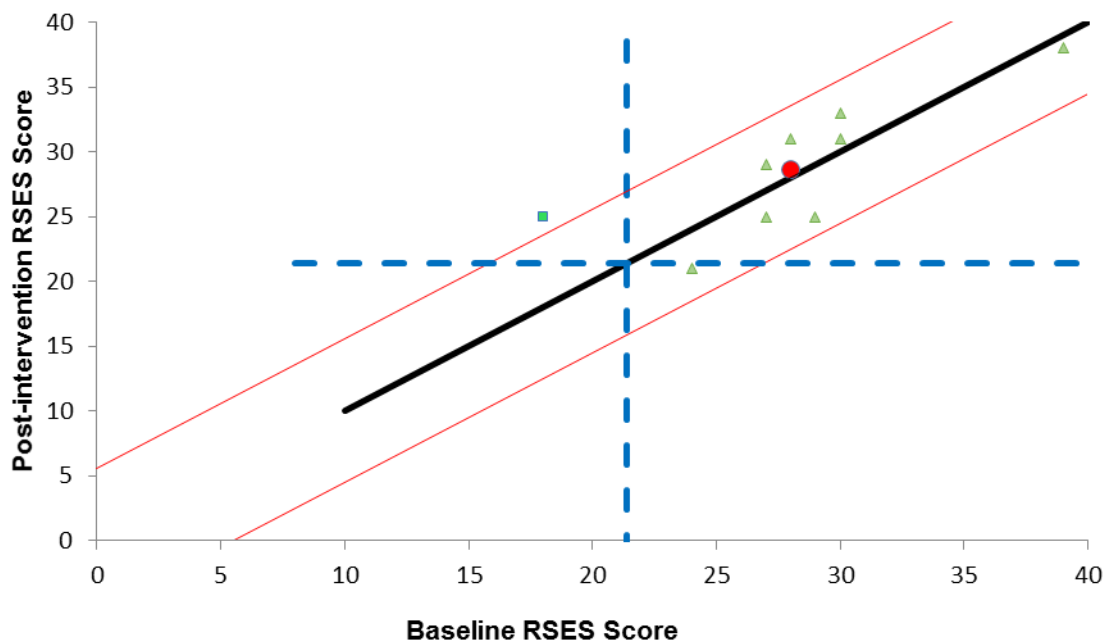


Figure K15. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention RSES scores for the video-communication condition

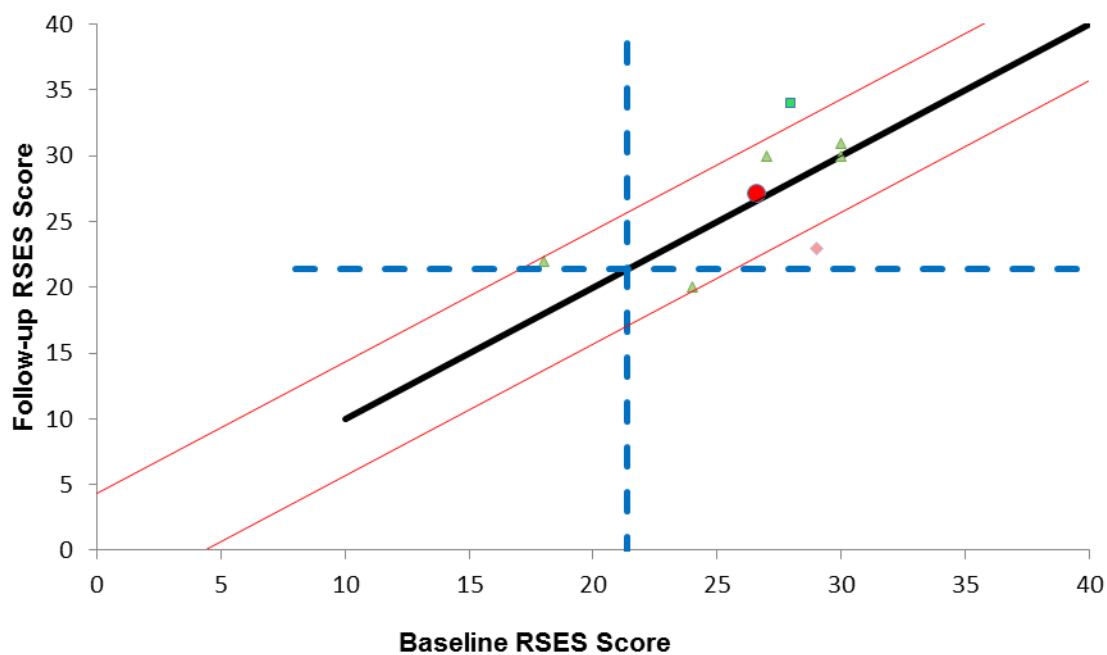


Figure K16. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up RSES scores for the video-communication condition

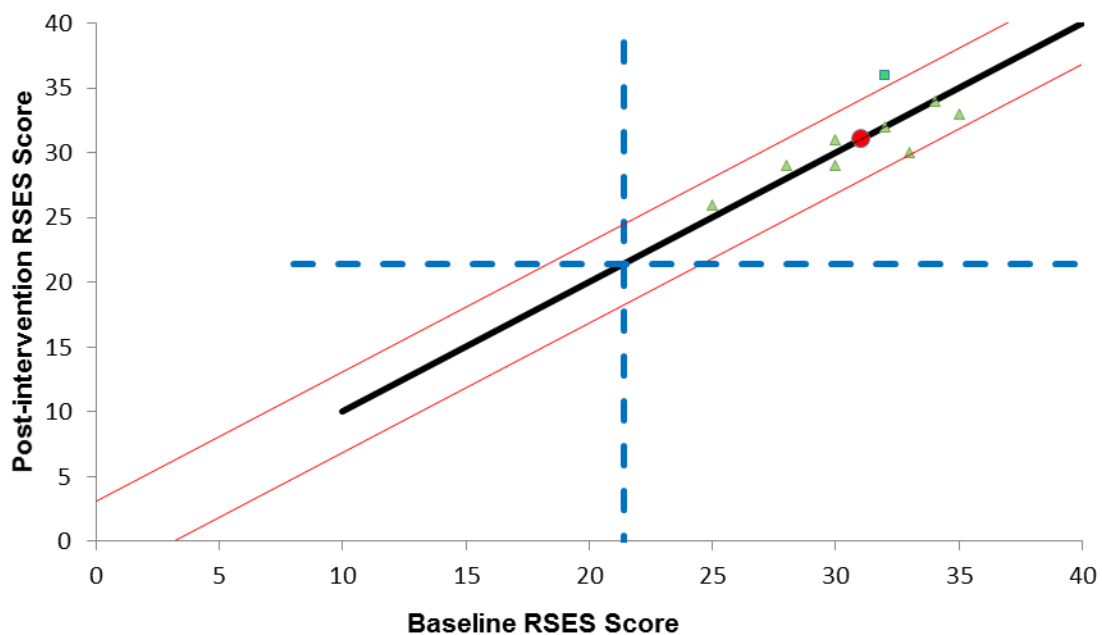


Figure K17. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention RSES scores for the email condition

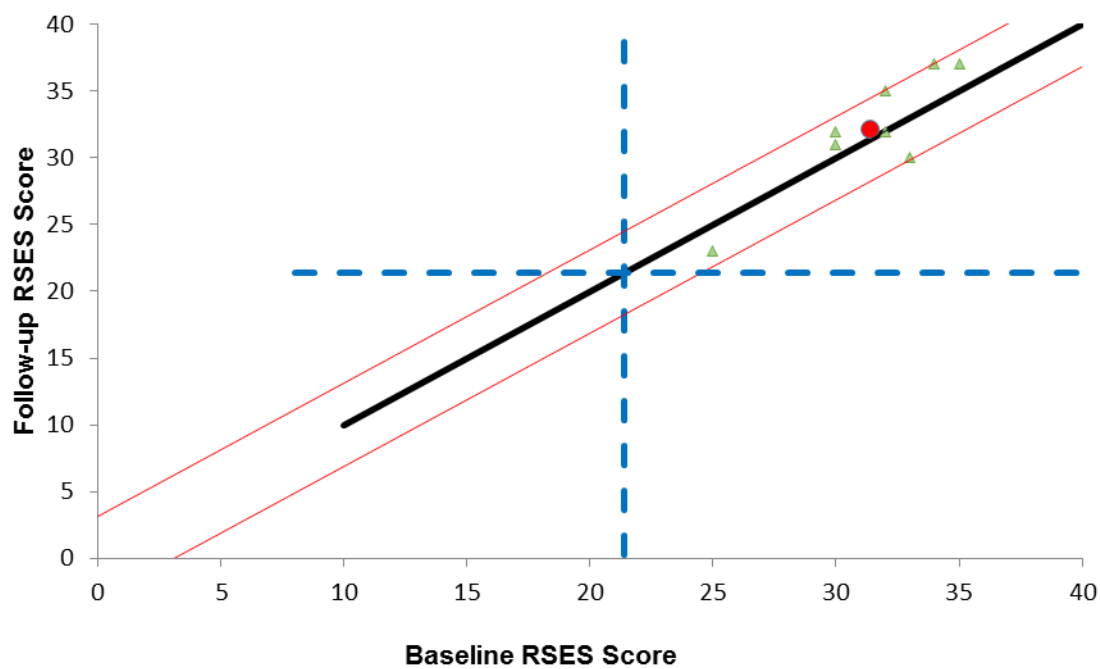


Figure K18. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up RSES scores for the email condition

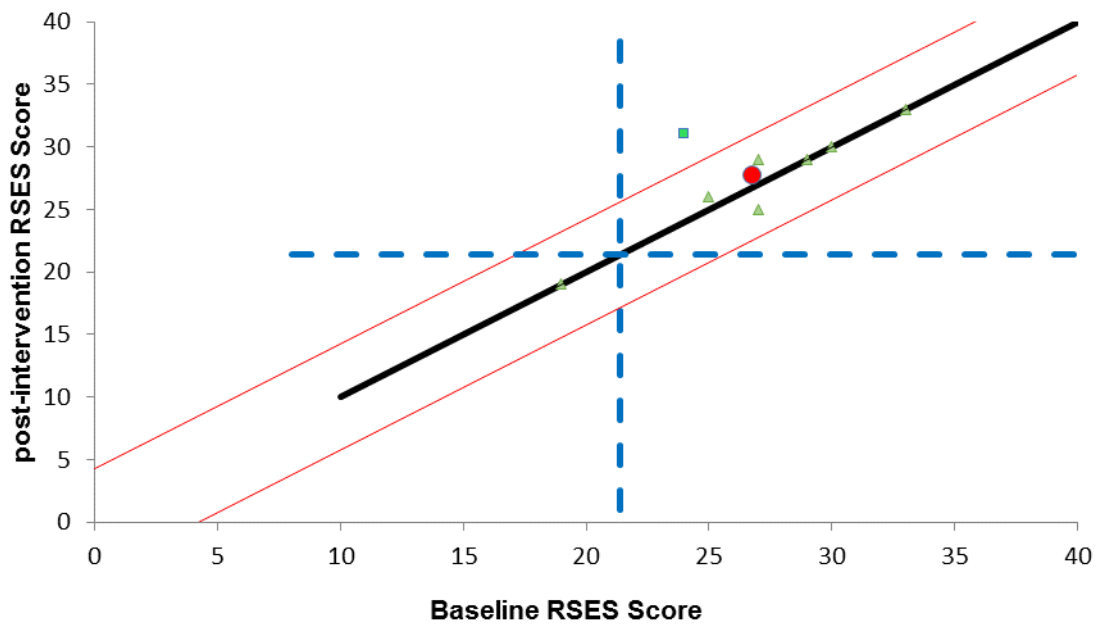


Figure K19. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention RSES scores for the basic computer skills condition

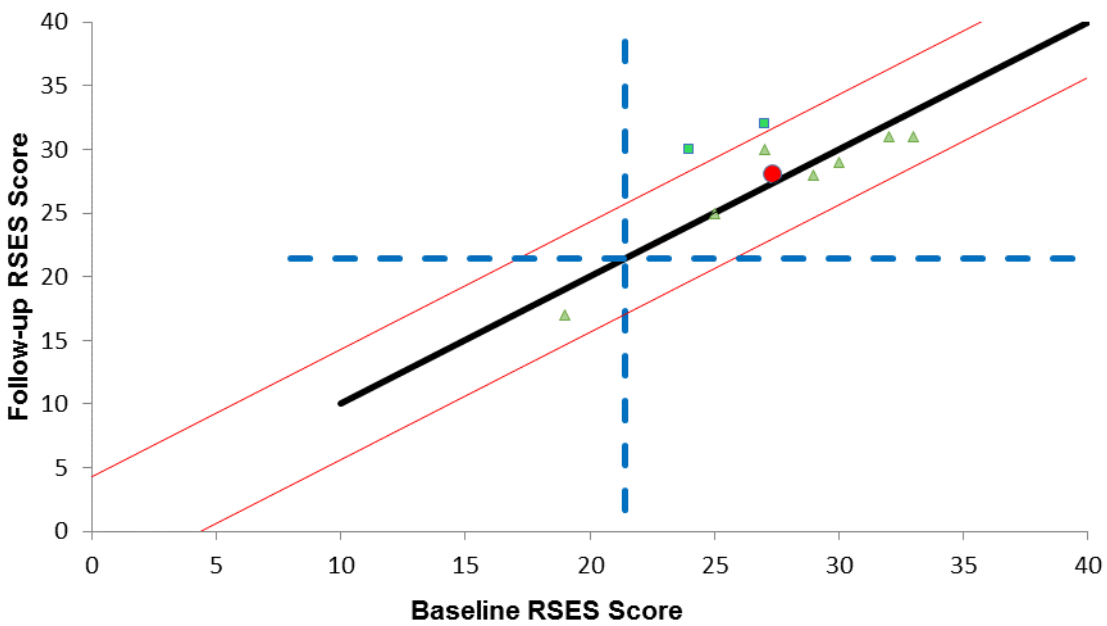


Figure K20. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up RSES scores for the basic computer skills condition

Satisfaction with Life Scale (SWLS). An increase in the participants' scores on the SWLS was required in order to suggest an improvement in their satisfaction with life.

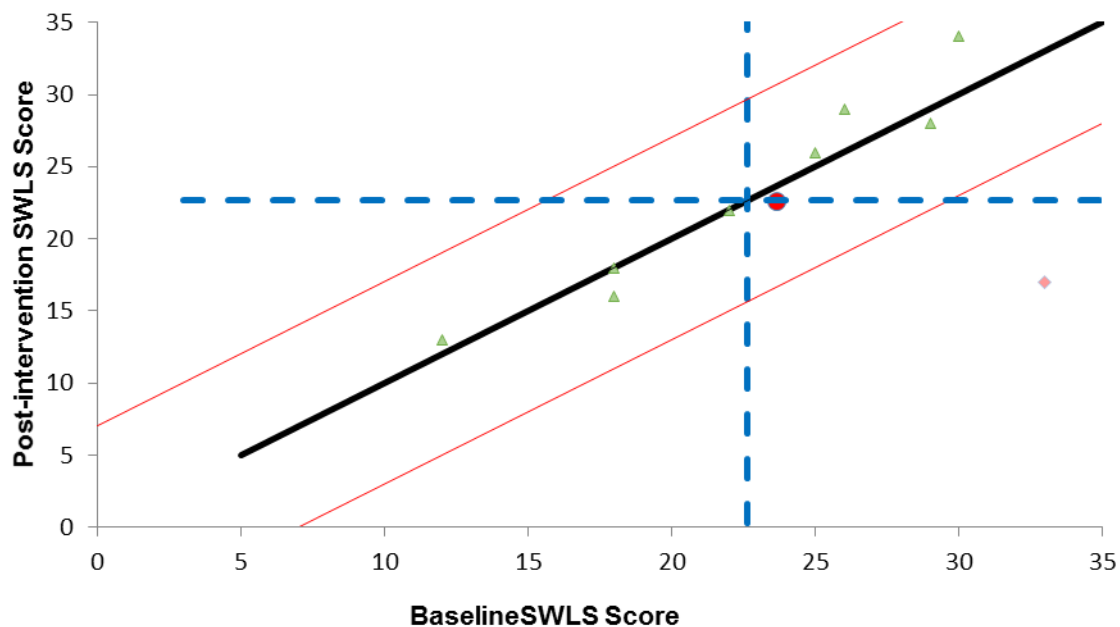


Figure K21. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention SWLS scores for the video-communication condition

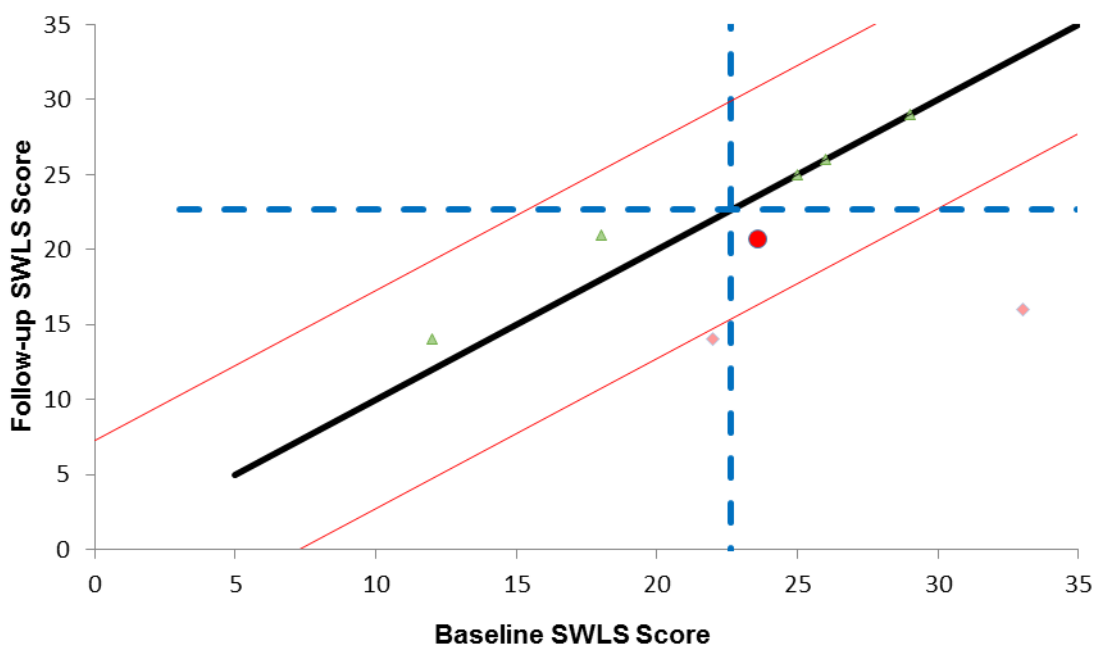


Figure K22. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up SWLS scores for the video-communication condition

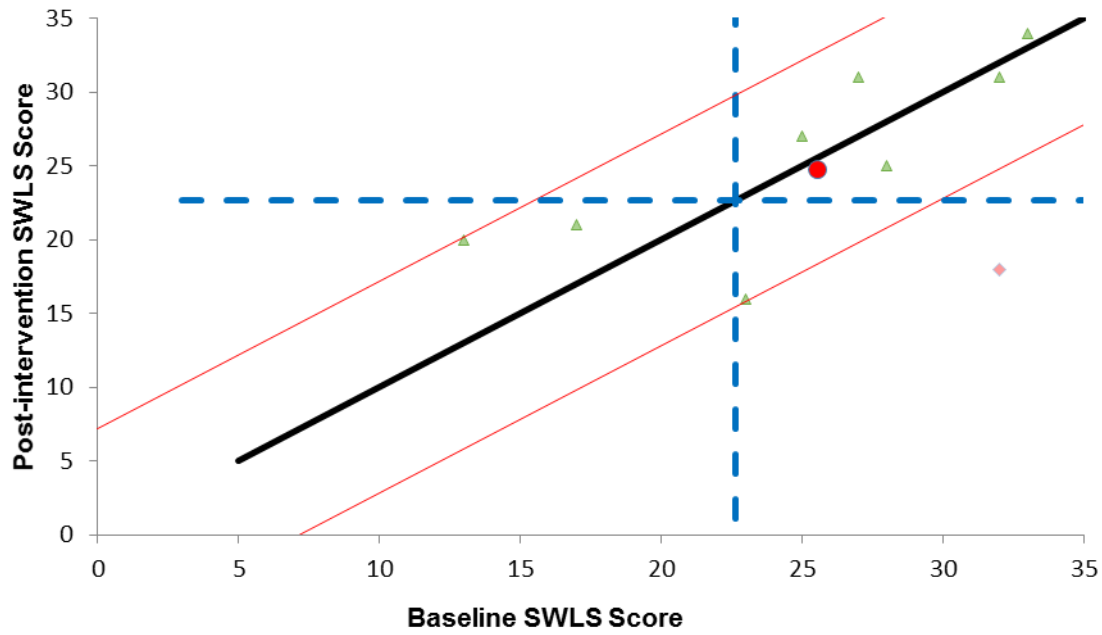


Figure K23. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention SWLS scores for the email condition

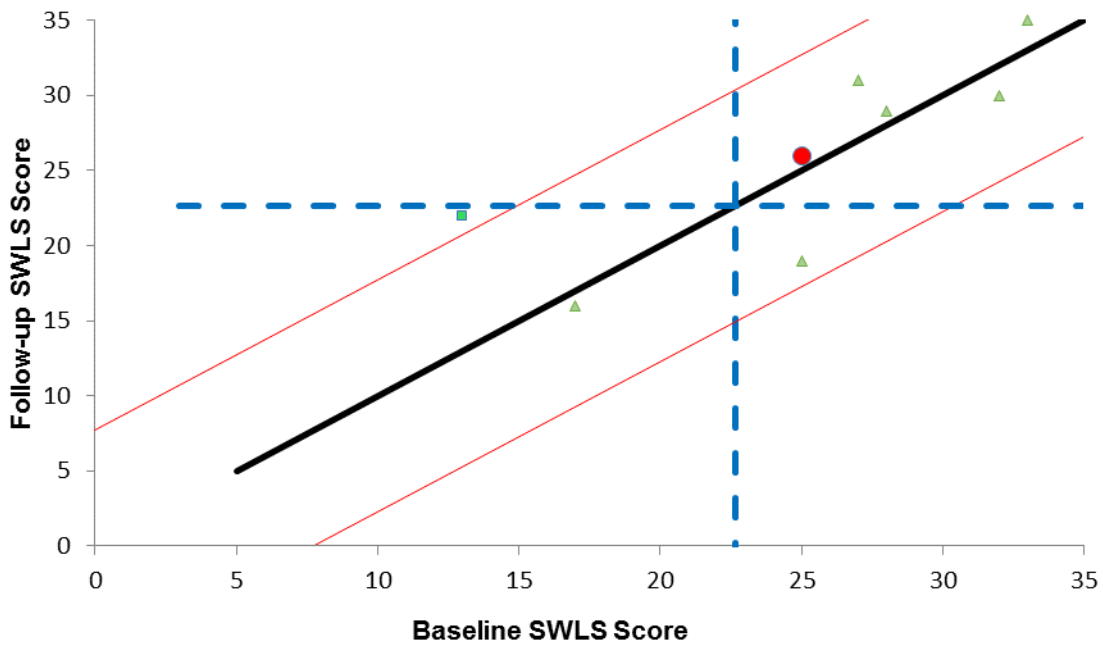


Figure K24. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up SWLS scores for the email condition

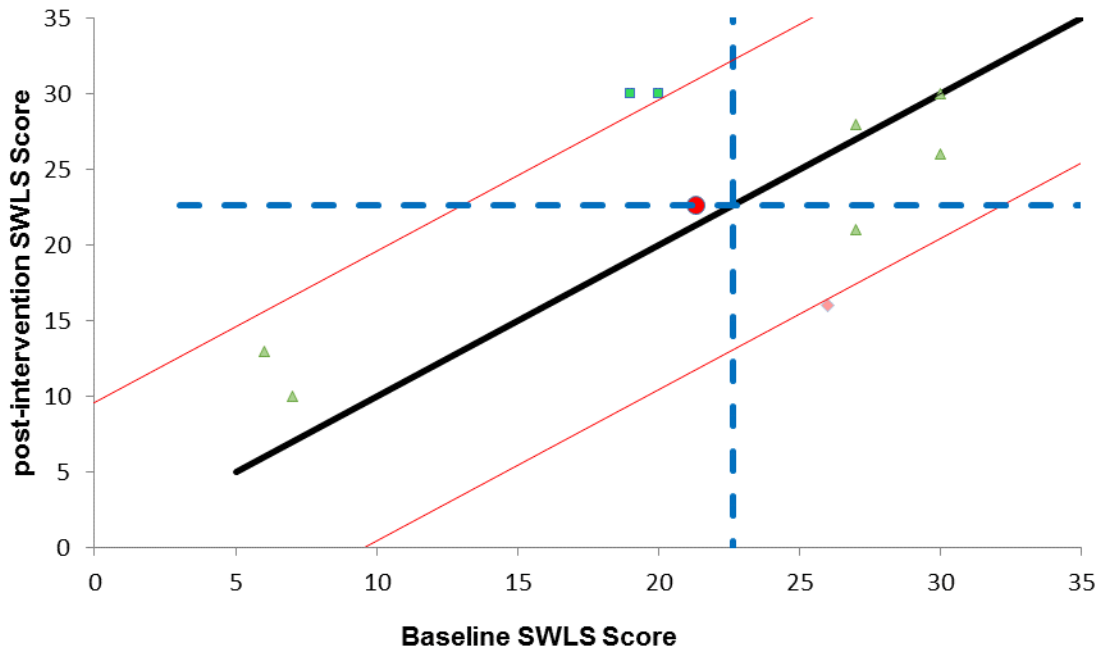


Figure K25. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention SWLS scores for the basic computer skills condition

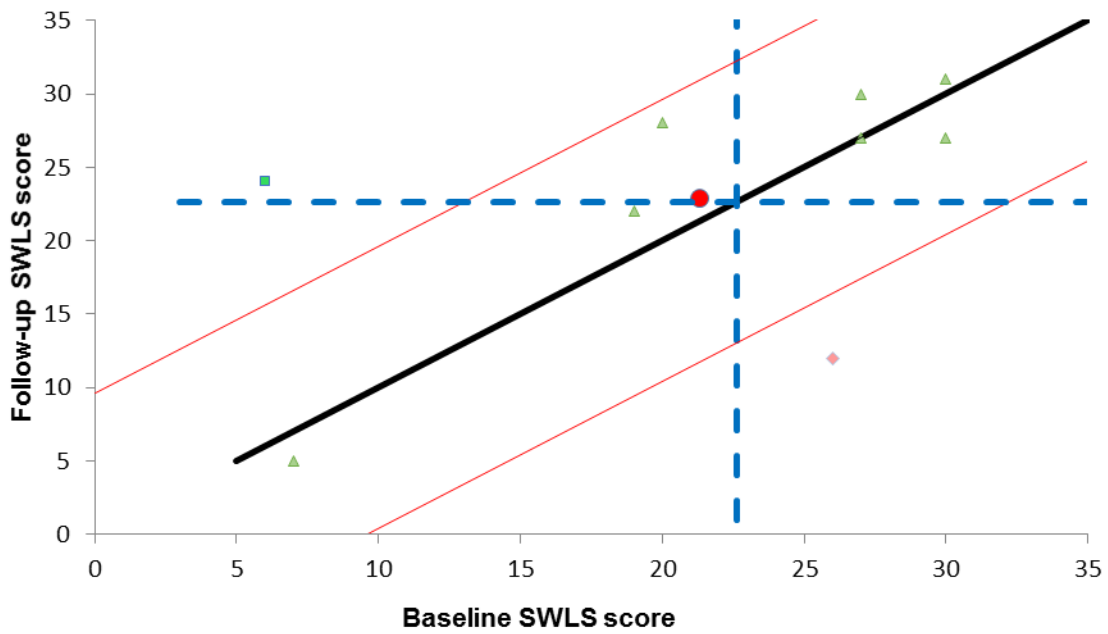


Figure K26. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up SWLS scores for the basic computer skills condition

UCLA Loneliness Scale (UCLA). A decrease in the participants' scores on the UCLA Loneliness Scale was required in order to suggest an improvement in their feelings of loneliness.

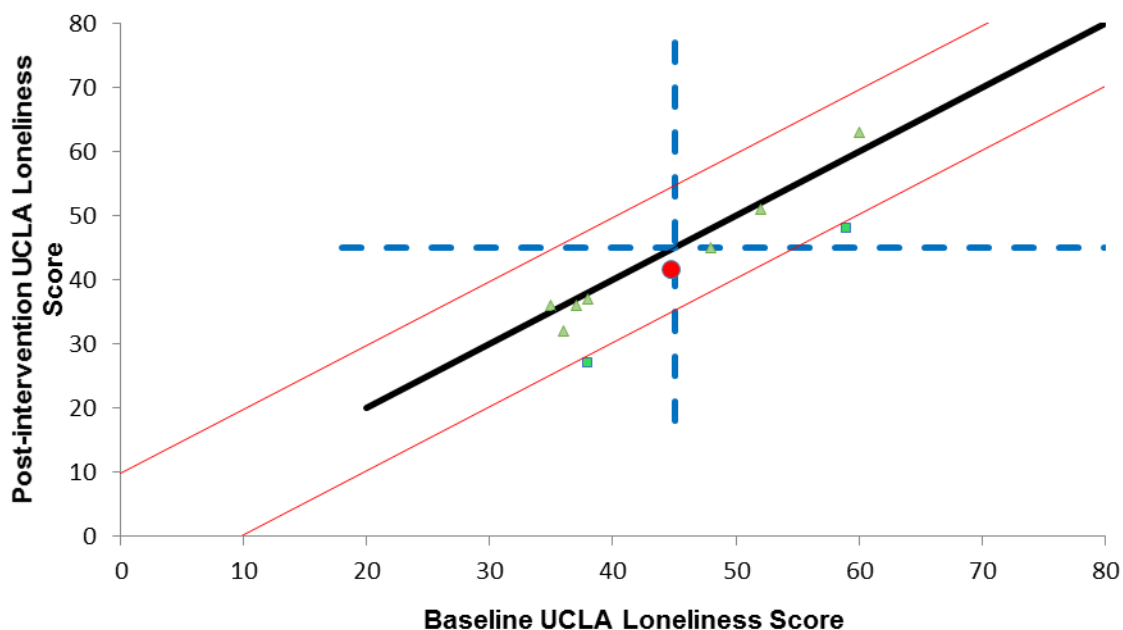


Figure K27. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention UCLA Loneliness Scale scores for the video-communication condition

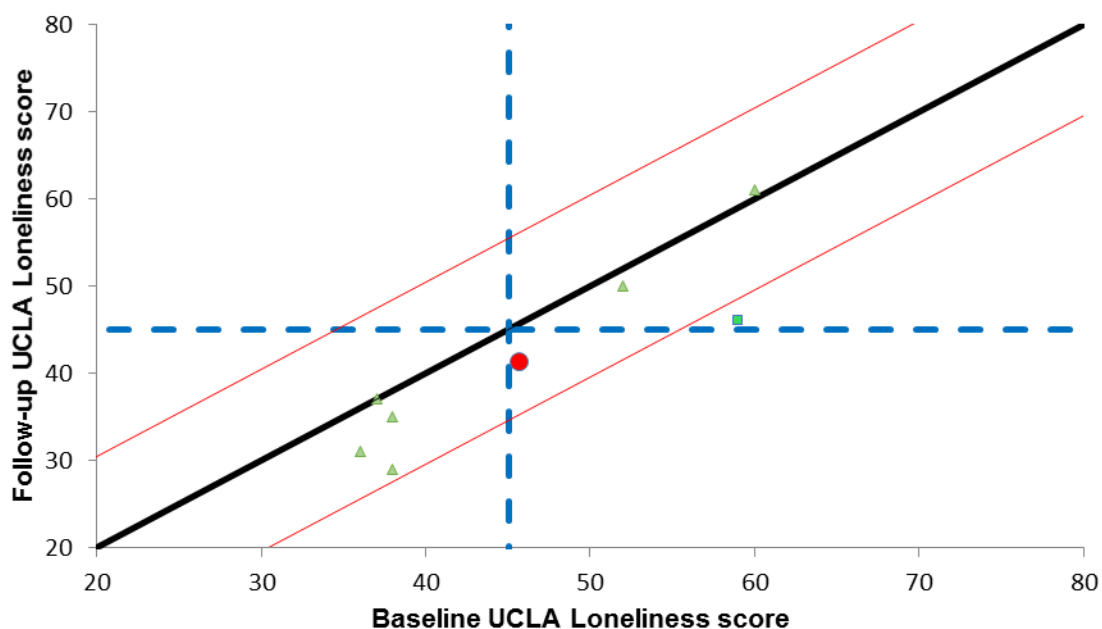


Figure K28. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up UCLA Loneliness Scale scores for the video-communication condition

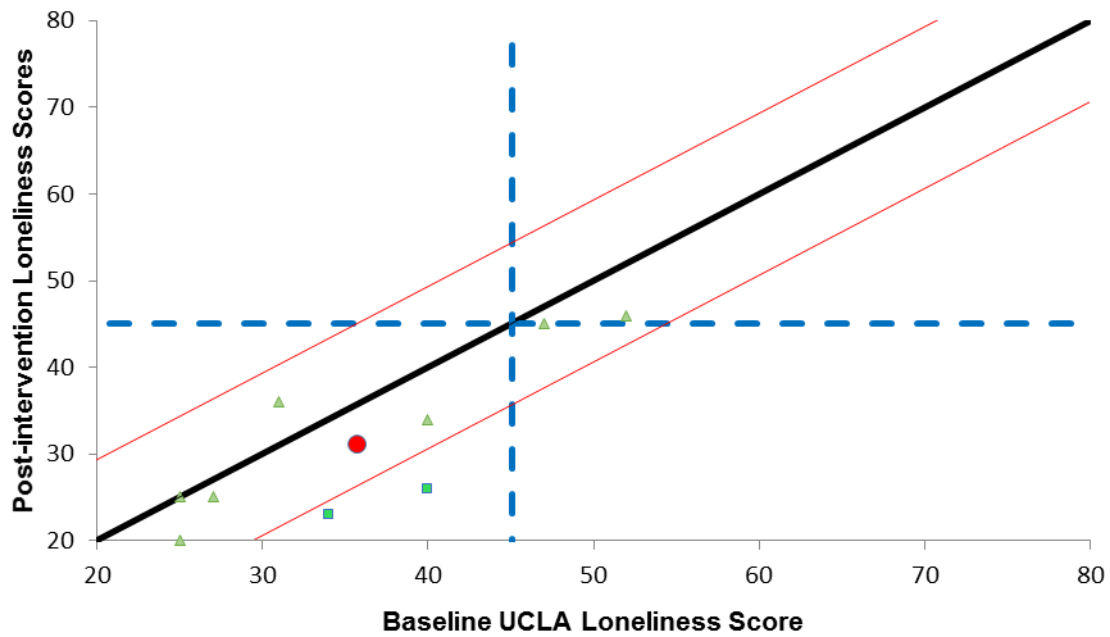


Figure K29. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention UCLA Loneliness Scale scores for the email condition

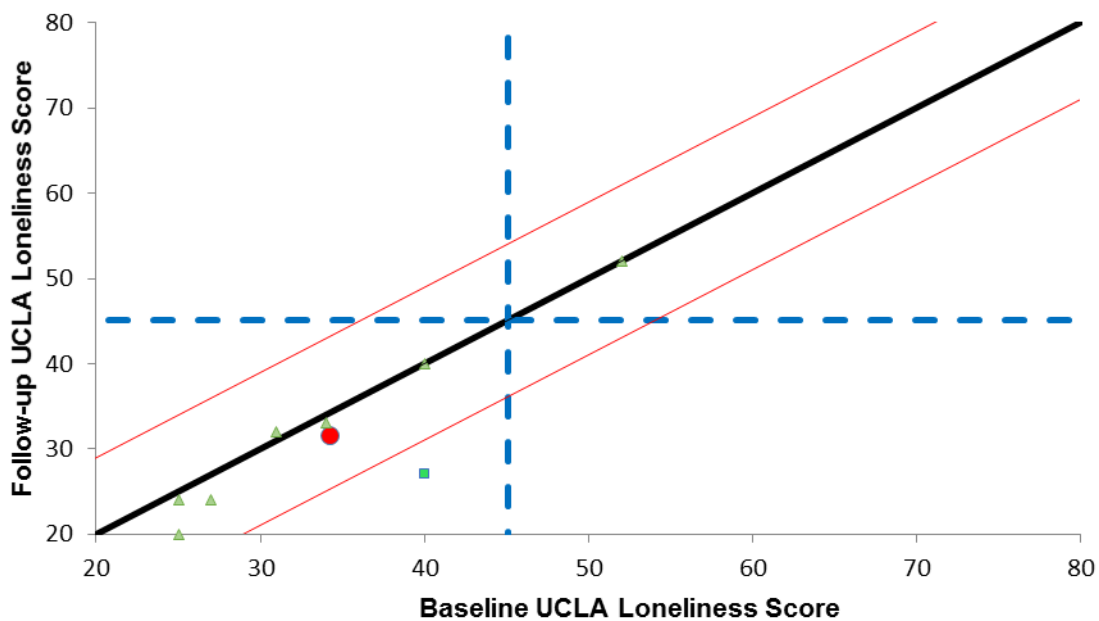


Figure K30. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up UCLA Loneliness Scale scores for the email condition

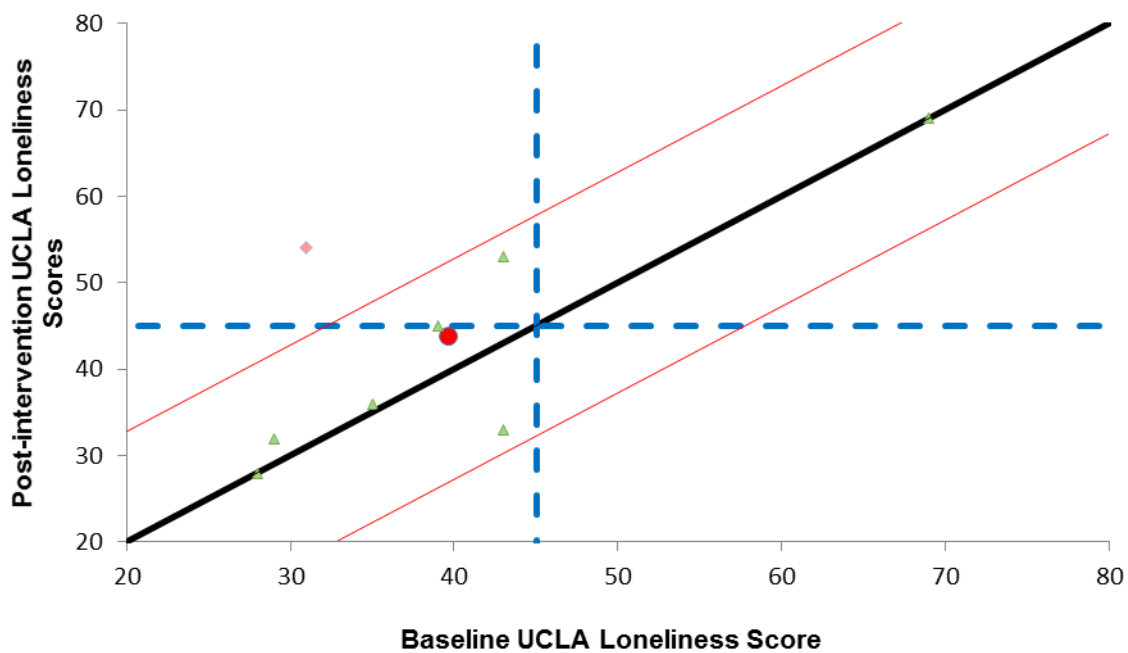


Figure K31. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention UCLA Loneliness Scale scores for the basic computer skills condition

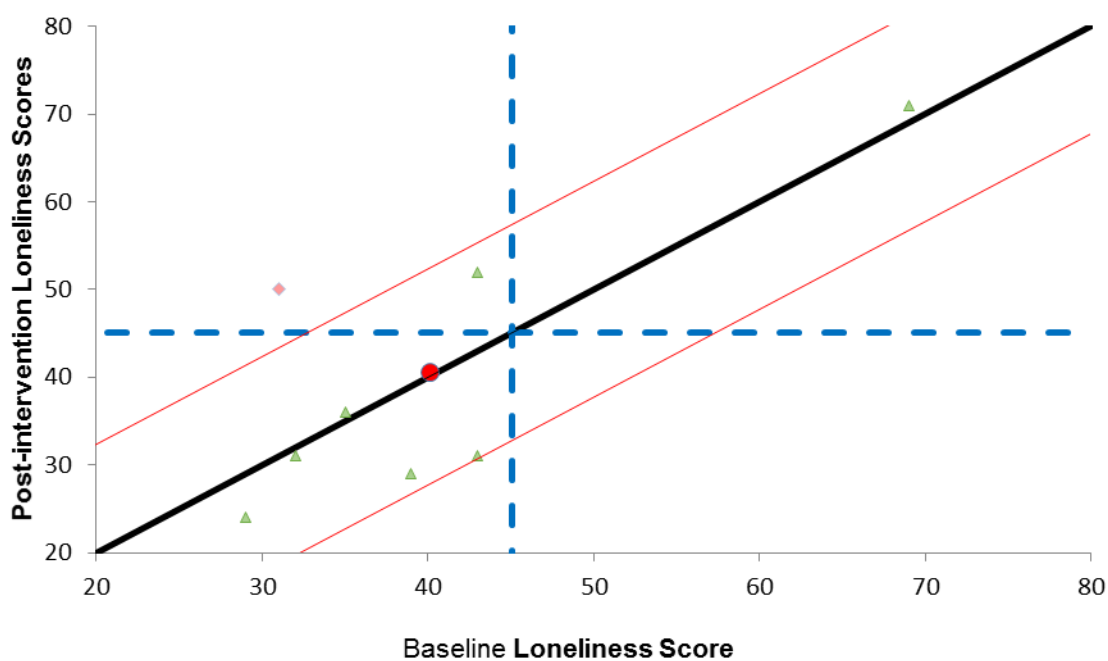


Figure K32. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up UCLA Loneliness Scale scores for the basic computer skills condition

Hospital Anxiety and Depression Scale – Anxiety (HADS-A). A decrease in the participants' scores on the HADS-A was required in order to suggest an improvement in their anxiety.

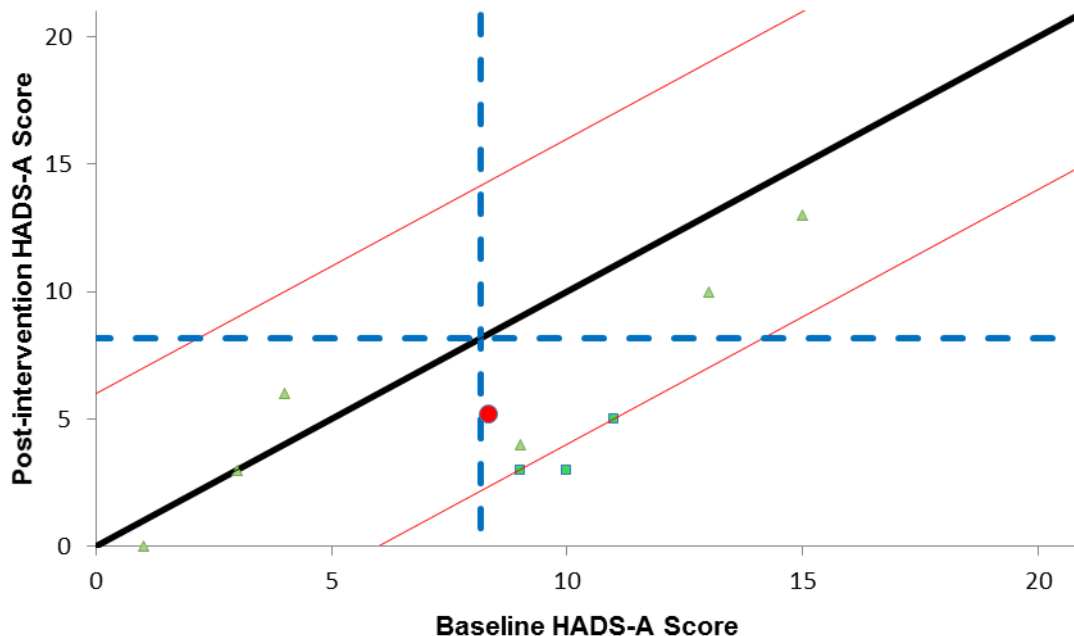


Figure K33. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention HADS-A scores for the video-communication condition

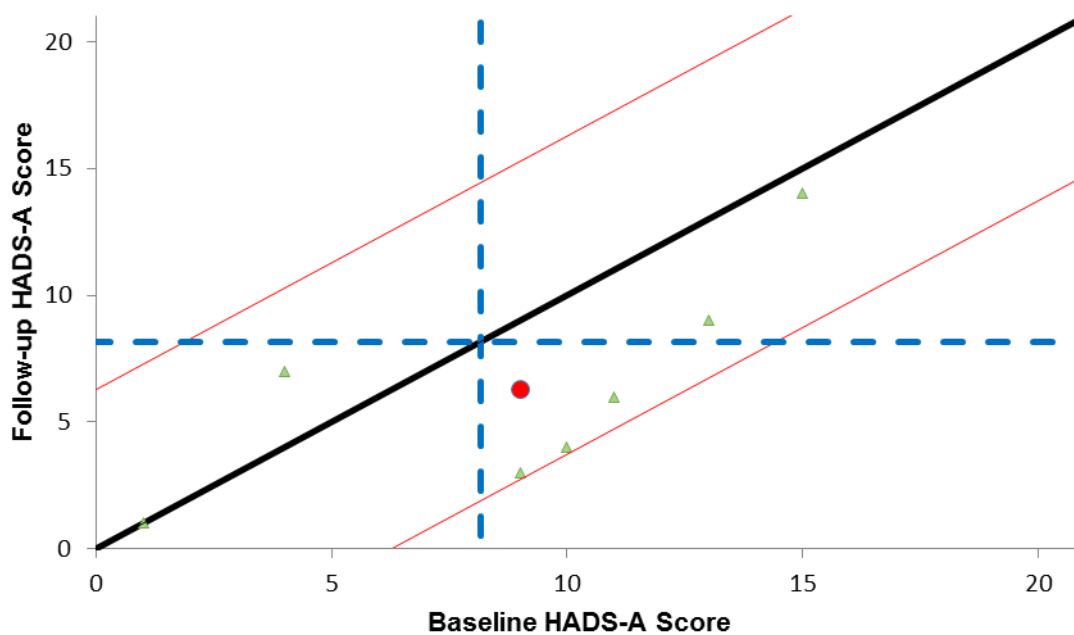


Figure K34. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up HADS-A scores for the video-communication condition

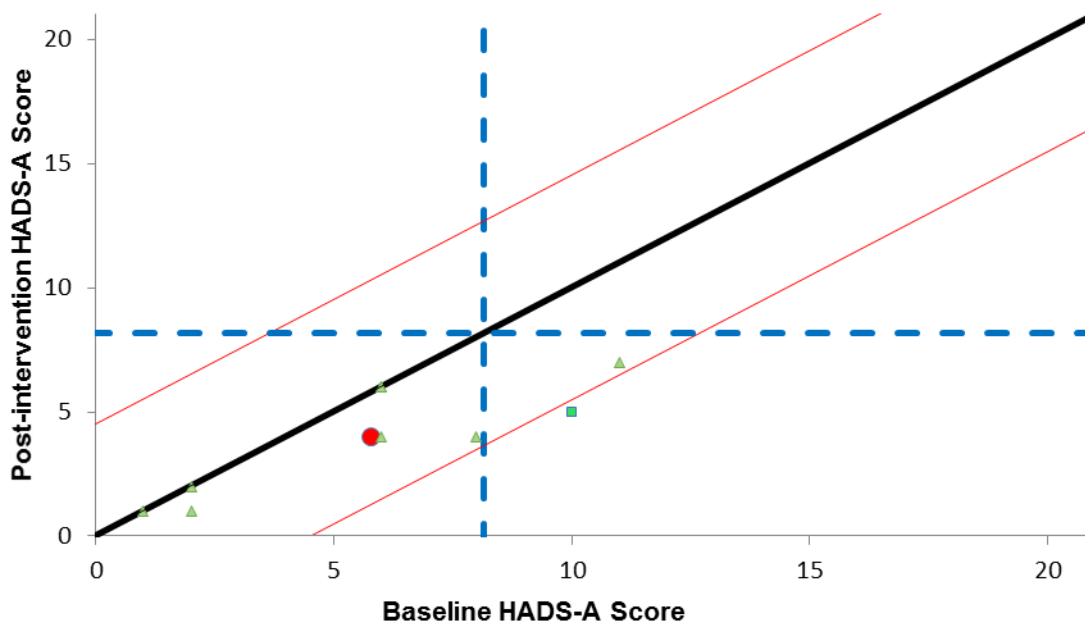


Figure K35. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention HADS-A scores for the email condition

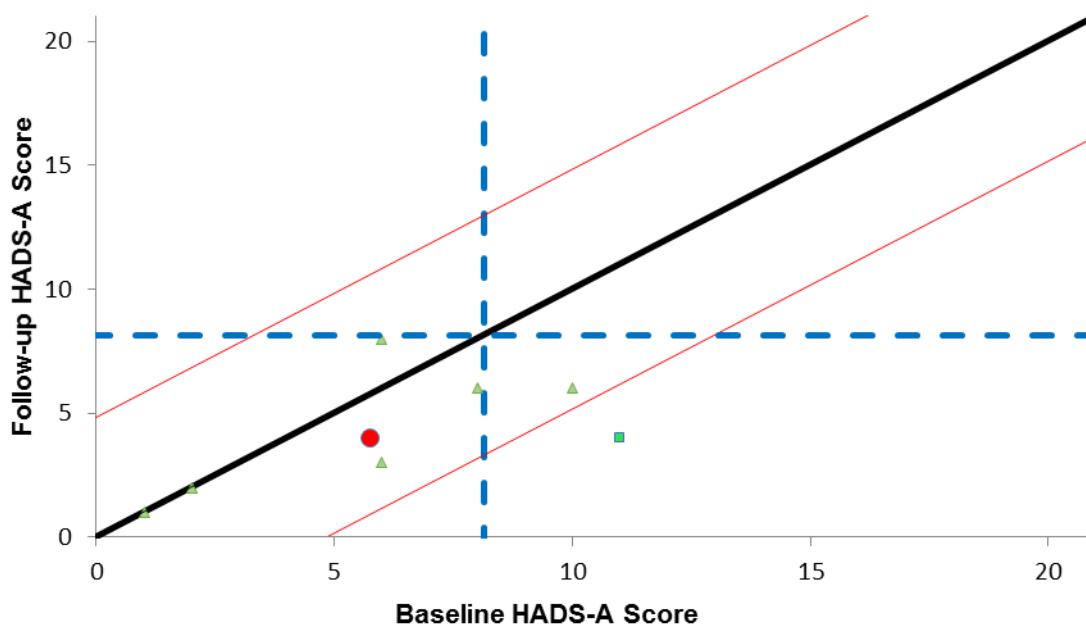


Figure K36. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up HADS-A scores for the email condition

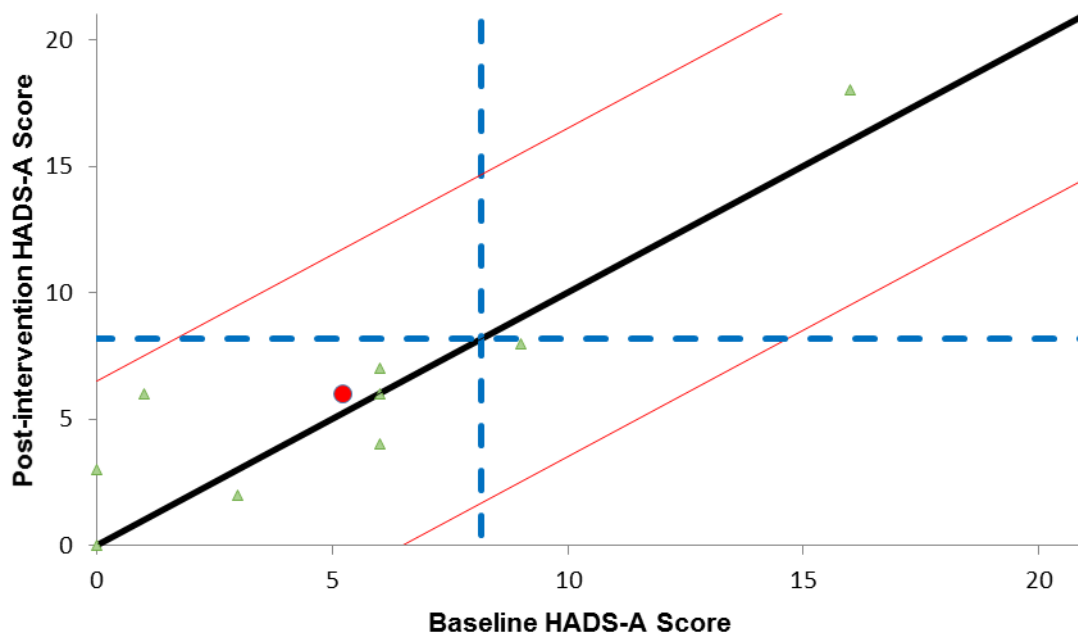


Figure K37. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention HADS-A scores for the basic computer skills condition

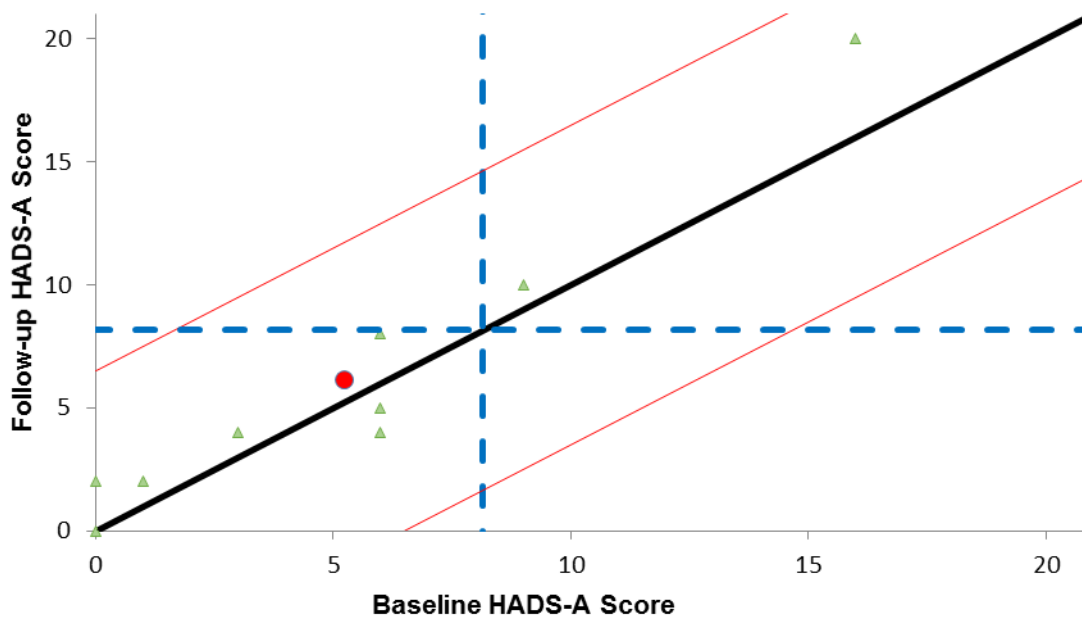


Figure K38. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up HADS-A scores for the basic computer skills condition

Hospital Anxiety and Depression Scale – Depression (HADS-D). A decrease in the participants' scores on the HADS-D was required in order to suggest an improvement in their depressive symptoms.

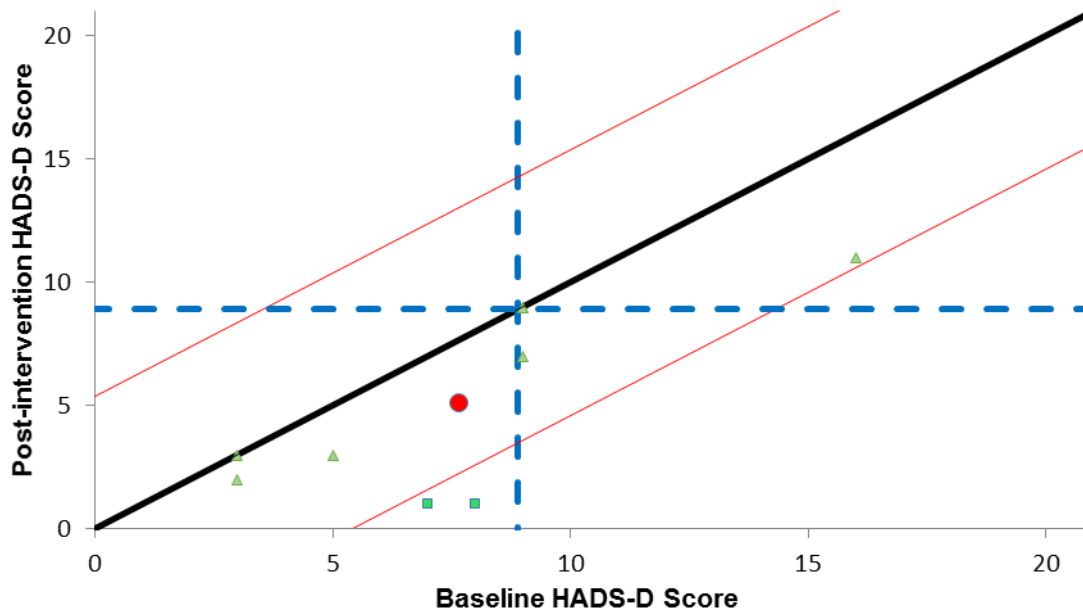


Figure K39. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention HADS-D scores for the video-communication condition

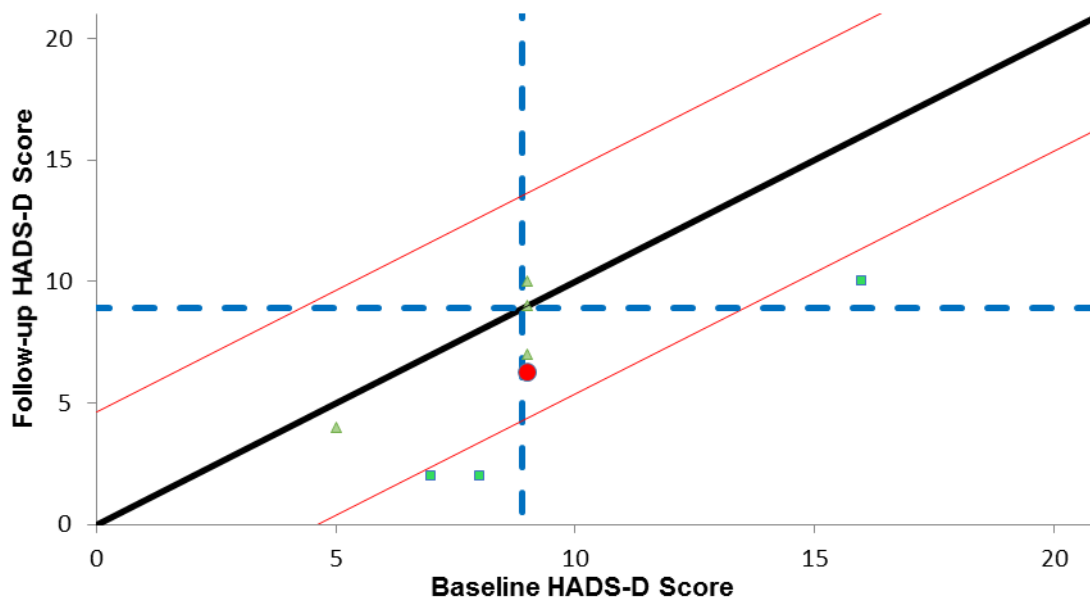


Figure K40. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up HADS-D scores for the video-communication condition

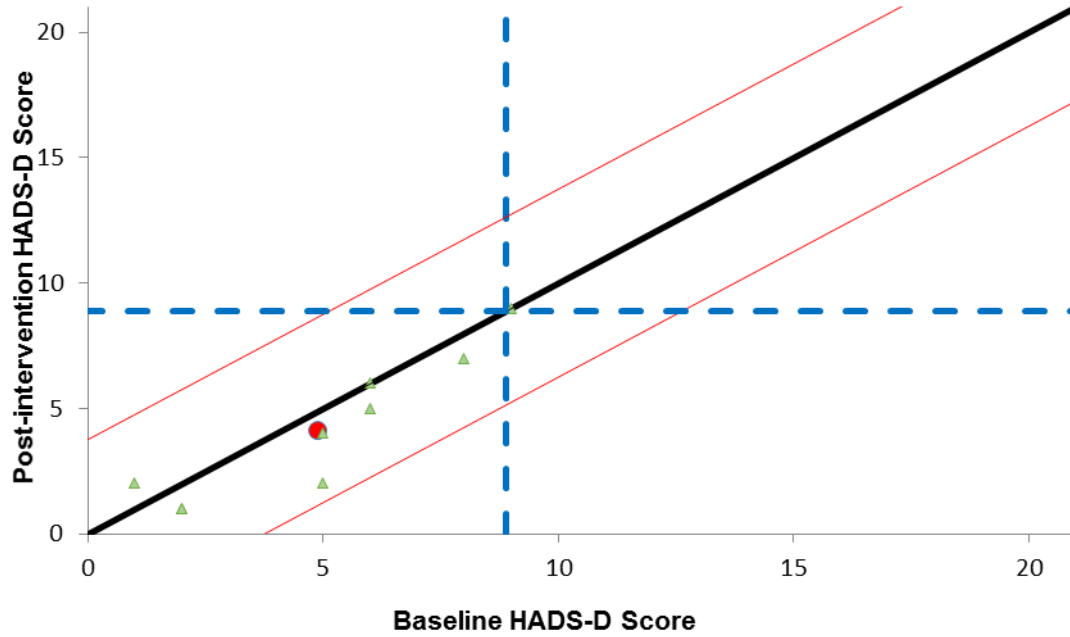


Figure K41. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention HADS-D scores for the email condition

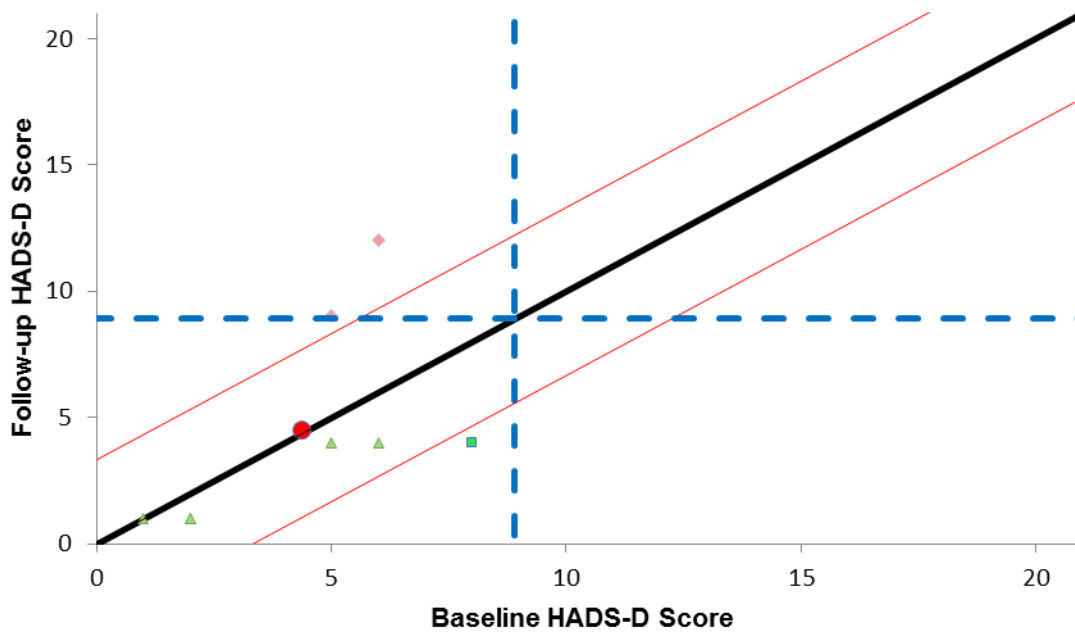


Figure K42. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up HADS-D scores for the email condition

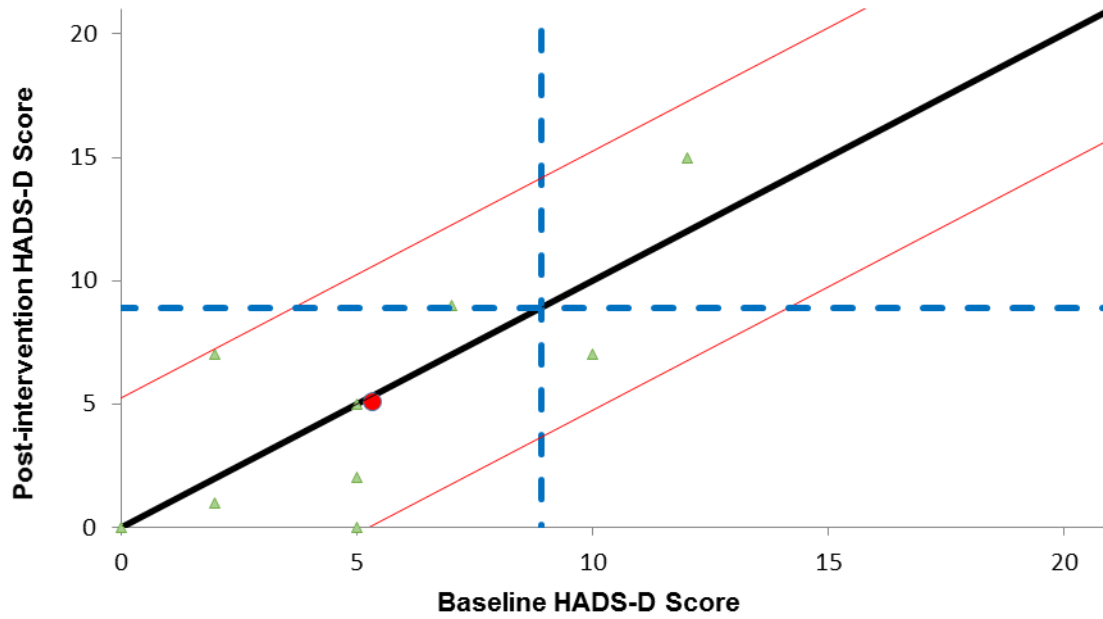


Figure K43. Scatterplot of reliable and clinically significant change parameters of the baseline and post-intervention HADS-D scores for the basic computer skills condition

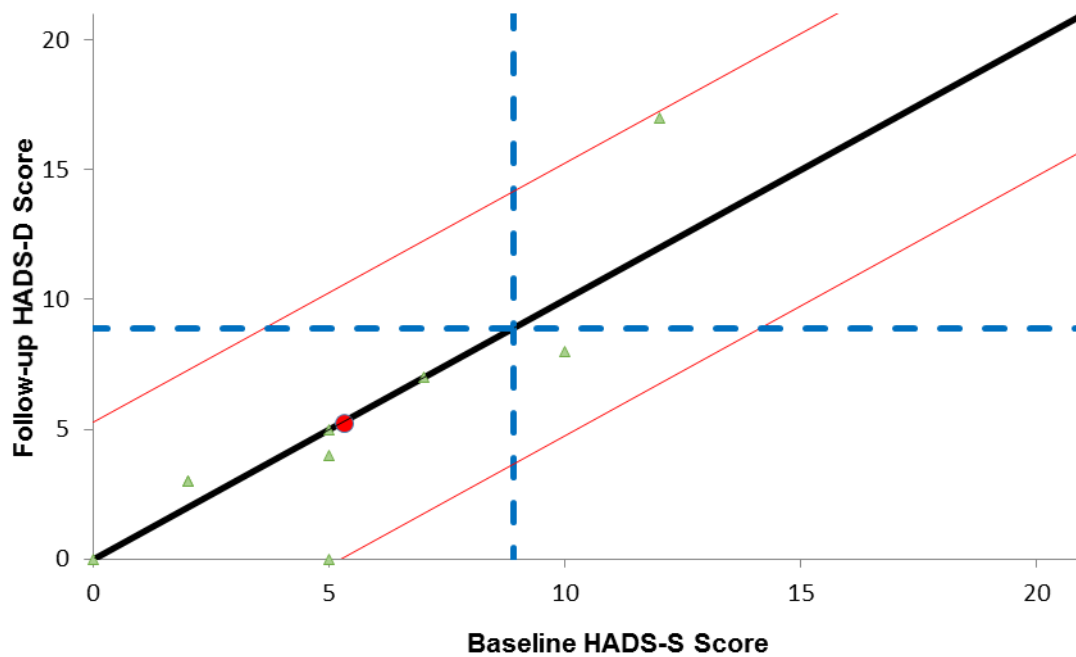


Figure K44. Scatterplot of reliable and clinically significant change parameters of the baseline and follow-up HADS-D scores for the basic computer skills condition

Appendix L: Individual case reports for participants in the video-communication condition

Participant One

Profile. A white British female, aged 88, widowed and living alone in supported living accommodation. She had experience of using computers and the internet prior to participating in the research, but she had forgotten how to use the computer. She had never previously used the internet to communicate with others. Before using the video-communication she had regular contact with one brother, who visited her in-person, but little contact with her other brother.

Intervention. During the intervention she used the video-communication software Skype, accessed through her personal laptop.

Comparison of quantitative and qualitative data. Participant one's scores at pre-intervention suggested that the stress she experienced, her satisfaction with life, her anxiety and self-esteem were all within the 'non-clinical' range, whilst her levels of depression, loneliness and sense of belonging were within the 'clinical' range. Although from baseline to post-intervention, and baseline to follow-up, no reliable change was made on the PSS, HADS-A, HADS-D, SOBI-P, UCLA Loneliness Scale and RSES, and her scores on the SWLS decreased from baseline to post-intervention, participant one's comments during the interview seemed to suggest that her psychological well-being in some areas had improved. She mentioned that prior to using video-communication she felt 'depressed' and experienced suicidal ideations, but she explained that since using the video-communication: she felt better in mood and no longer wanted to end her life; her stress levels reduced as she knew someone was there for her should she need them; she felt less lonely, as, due to her hearing difficulties, she can talk and understand her family by lip-reading them via the video-screen; she felt closer to her family and felt she fitted in better with them; her family shared more information with her; and she was invited to places more frequently by her brothers.

Participant one explained during the interview that she felt more comfortable completing the questionnaires with me once she knew me better. It is therefore possible that she underreported her psychological difficulties at baseline and this may account for the discrepancy between her scores and her comments during the interview.

Summary. Although the scores on the measures do not reflect that the video-communication positively impacted upon participant one's psychological well-being, her comments during the interview suggest that it may have had some impact in improving her mood, reducing her stress levels and making her feel closer to her family. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant one are shown in Table L1.

Table L1

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant one

Measure	Baseline to post-intervention	Baseline to follow-up
PSS*	Unchanged	Unchanged
SWLS*	Deteriorate	Deteriorate
HADS – A*	Unchanged	Unchanged
HADS – D	Unchanged	Unchanged
RSES*	Unchanged	Unchanged
UCLA Loneliness Scale	Unchanged	Unchanged
SOBI-P	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

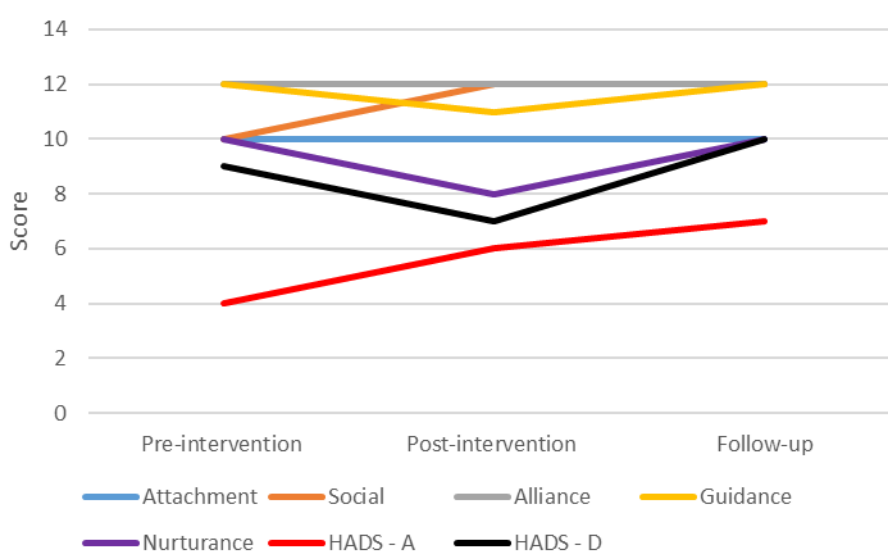


Figure L1. Participant one's scores on the subscales of the social provision scale and the HADS across the three time points.

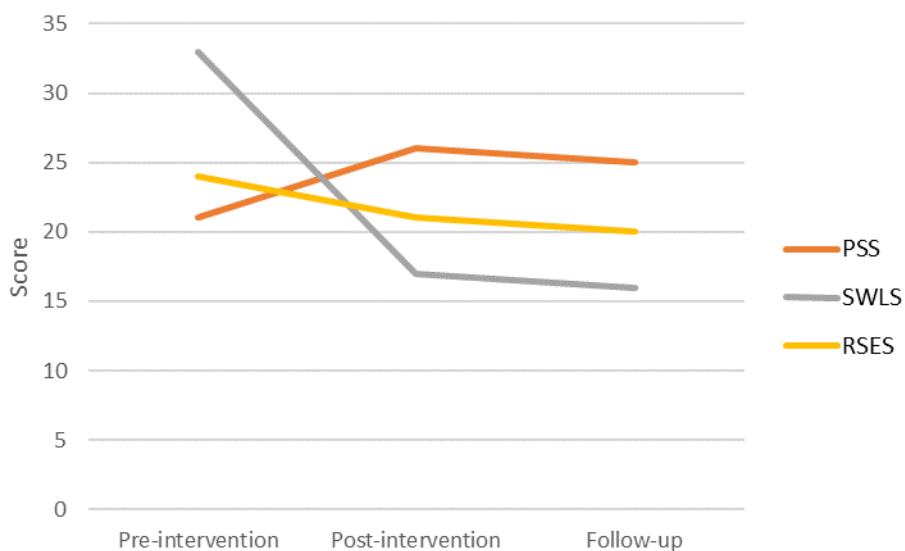


Figure L2. Participant one's scores on the PSS, SWLS and RSES across the three time points

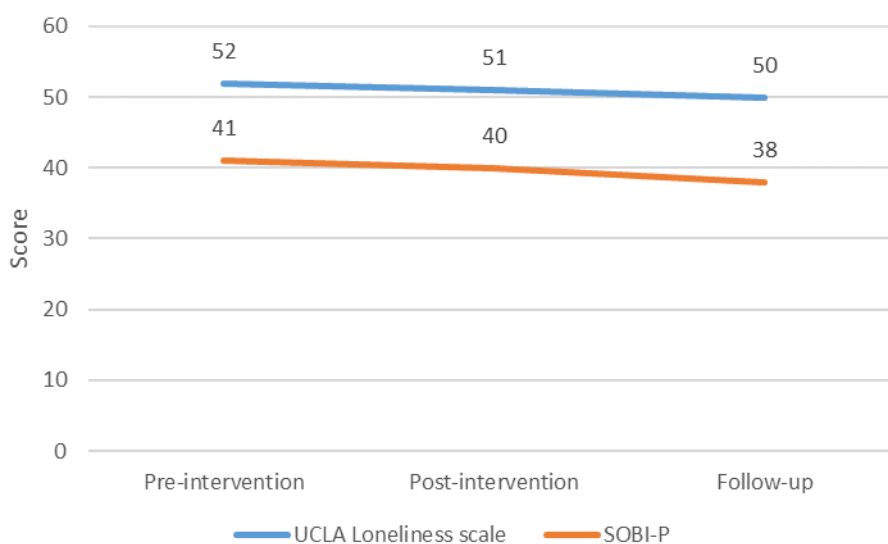


Figure L3. Participant one's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant Two

Profile. A white British male, aged eighty-five, who was widowed and living alone in a supported living accommodation. He had prior use of using a computer, but he had never used the internet before. Prior to participating in the research his step-daughter visited daily and he had not seen his other daughter, who lived abroad, for several years.

Intervention. During the intervention he spoke to both his daughters and a friend on video-communication, via the video-communication software Skype, accessed through his personal computer.

Comparison of quantitative and qualitative data. Participant two's scores on the UCLA Loneliness Scale, RSES, SOBI-P, HADS-D and SWLS at pre-intervention were placed within the 'clinical' range.

His UCLA Loneliness Scale score was consistent with his comment during the interview, where he reported that he felt lonely prior to using the video-communication. At both post-intervention and follow-up participant two's UCLA Loneliness Scale scores showed reliable improvement, and although the change in his scores did not bring him within the 'non-clinical' range, he reported during the interview that he felt less lonely as a result of using the video-communication. Although his scores on the RSES from baseline to follow-up time-point were unchanged, his scores from baseline to post-intervention on the RSES suggested he 'recovered', placing him within the 'non-clinical' range. Furthermore, although his scores on the HADS-D were unchanged at post-intervention, they improved at follow-up. This is consistent with what he reported during in the interview, that using the video-communication made him feel brighter in mood as he was able to see his daughters and it resulted in him having more contact with them.

Participant two's scores on the SOBI-P were unchanged at both post-intervention and follow-up and this is consistent with his comment that he did not feel the video-communication impacted upon how much he felt he fitted in or belonged with his family. His scores on the SWLS were unchanged at post-intervention, but deteriorated at follow-up. However, during the interview, despite stating that it was a little frustrating when he could not get hold of those he wanted to speak to on video-communication, he seemed to suggest that his satisfaction with life had improved since using the video-communication; he described the experience of using the video-communication as 'magic' and 'wonderful'. He spoke about how it made him feel closer to his daughters, as he could see them whilst talking

to them. He also stated that feeling closer to them helped him offer them advice, as he ‘could feel their problems’, and he further stated that he found it easier to ask for support.

His scores on the PSS and the HADS-A were within the ‘non-clinical’ range at baseline and remained unchanged at post-intervention and follow-up. He reported during the interview that the video-communication did not have any impact on his stress levels. There was no mention about his anxiety during the interview. It is noteworthy that participant two reported that he found the questionnaires difficult to answer, as he stated, ‘the questions relate to things that are not material’.

Summary. Although participant two’s results were somewhat inconsistent with regards to the quantitative data measuring his satisfaction with life and his comments during the interview about the impact of the video-communication on his psychological well-being, both the quantitative and qualitative data corroborated with suggesting that the video-communication resulted in him feeling less lonely and it improved his mood. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant two are shown in Table L2.

Table L2

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant two

Outcome Measure	Baseline to post-intervention	Baseline to follow-up
PSS*	Unchanged	Unchanged
SWLS	Unchanged	Deteriorate
HADS – A*	Unchanged	Unchanged
HADS – D	Unchanged	Improved
RSES	Recovered	Unchanged
UCLA Loneliness Scale	Improved	Improved
SOBI-P	Unchanged	Unchanged

Note. Participants’ scores within the ‘non-clinical’ range at baseline are indicated by an asterisk.

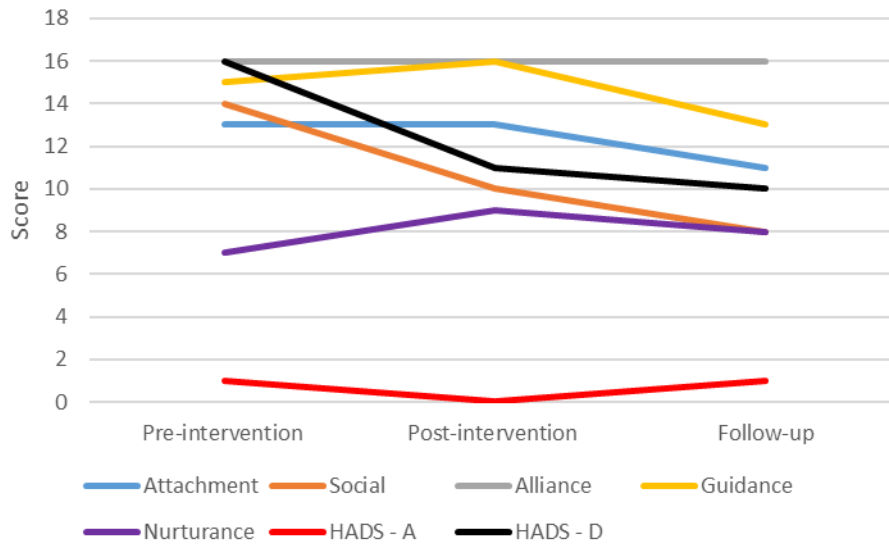


Figure L4. Participant two's scores on the subscales of the social provision scale and the HADS across the three time points

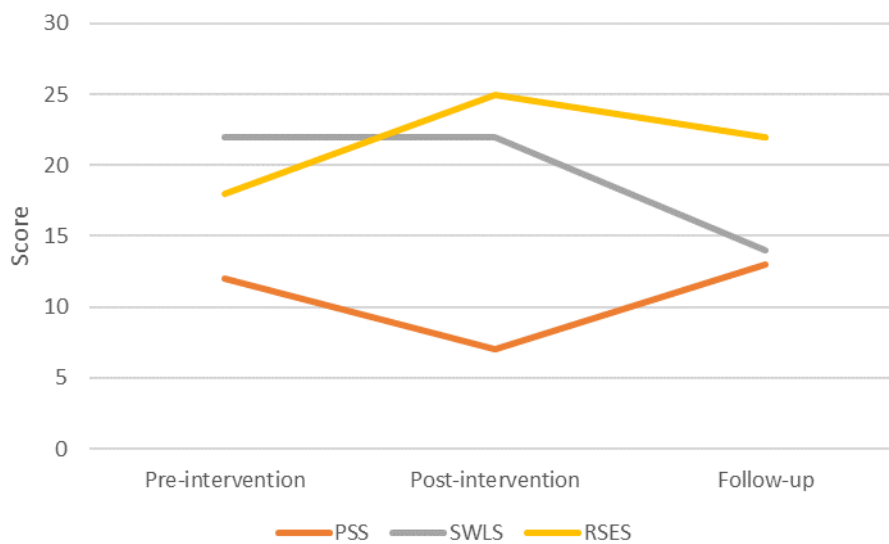


Figure L5. Participant two's scores on the PSS, SWLS and RSES across the three time points

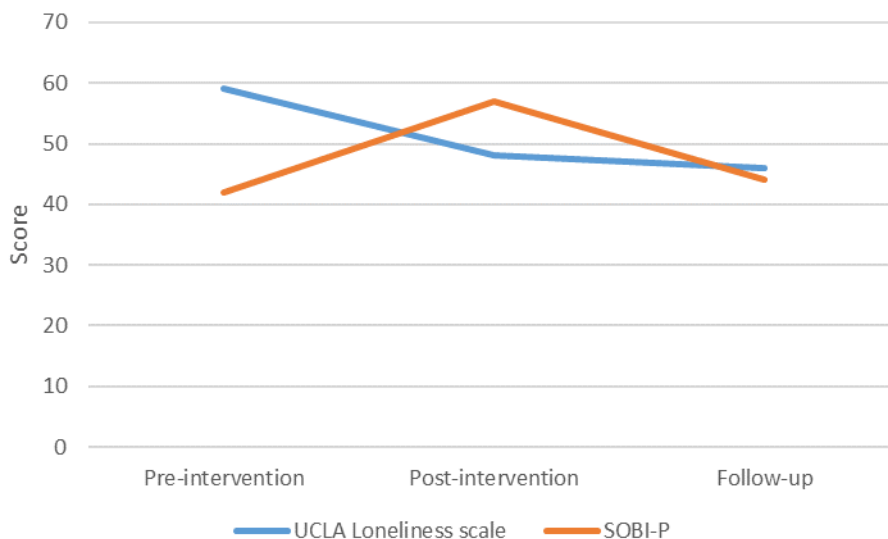


Figure L6. Participant two's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant three

Profile. A white British female, aged sixty-three, widowed and living alone in a supported living accommodation. Prior to participating in the research she had limited experience of using the computer, but she was able to access the internet. She had regular contact with her family and friends prior to participating in the research.

Intervention. During the intervention she spoke to her daughter and niece on video-communication, via the video-communication software 'Google Hangouts', accessed through her personal laptop.

Comparison of quantitative and qualitative data. Participant three's scores on the PSS, SWLS and the HADS-A were within the 'clinical' range at baseline. Although her scores on the HADS-A at follow-up were unchanged, her scores at post-intervention showed she 'recovered', suggesting that her anxiety reduced to a level that placed her within the 'non-clinical' range. During the interview the only mention about her anxiety was that she felt less anxious using computers, "I am a bit more confident compared to before. I now wouldn't be too scared to go on there and try different things now... Before I would wait for my daughter to come down and do it whereas now I turn it on and I get all flash with it". Furthermore, her scores on the PSS suggested that she recovered at post-intervention and this was maintained at follow-up, placing her within the 'non-clinical' range for her stress levels.

During the interview, however, she did not think the video-communication impacted upon her stress levels. Her score on the SWLS did not reliably change at post-intervention or follow-up and there was no mention of her satisfaction with life during the interview.

Participant three's scores on the HADS-D, UCLA Loneliness Scale, SOBI-P and the RSES were placed within the 'non-clinical' range at pre-intervention. Her SOBI-P, RSES and UCLA Loneliness scores were consistent with what she reported during the interview. She stated that prior to participating in the research she did not feel lonely. Her HADS-D score at baseline was not consistent with what she explained in-person; she stated before learning to use the video-communication that she felt low in mood as a result of becoming recently widowed.

Her scores on the SOBI-P at post-intervention and follow-up were unchanged in comparison to her baseline scores, and this was consistent with her comment during the interview that she did not feel the video-communication impacted upon how she fitted in, or belonged, to her family, because she already felt close to her family, as she saw them frequently in-person. Her scores on the RSES increased at post-intervention, albeit not demonstrating reliable change, and, in comparison to her scores at baseline, her scores at follow-up improved, suggesting that she gained higher self-esteem. These scores are consistent with what she reported during the interview in that using the video-communication increased her confidence and changed her view of herself, 'it's made me a little bit more confident... It gives you a little bit of a kick. I'm not so dumb as I make out'.

Although she reported during the interview that she did not think the video-communication impacted upon her mood or any feelings of loneliness, her scores on the HADS-D at post-intervention and follow-up showed that her scores improved, suggesting she felt brighter in mood, and her scores on the UCLA Loneliness scale improved at post-intervention, suggesting that she also felt less lonely. It is noteworthy, however, that she reported during the interview that she found that conversations via video-communication were 'nicer' than the telephone, because they were 'more personal' and resulted in her and her daughter being 'more engaged with each other'. Furthermore, she found it easier to have a conversation with her family as, being deaf, she was able to lip-read them. She further stated that she found it changed other people's responses to her because she could understand what they were saying. She mentioned that, 'people tend to get very short tempered when you are constantly saying pardon, or when you are saying can you speak up I can't hear you, where with skype you don't get that'.

Summary. Overall, although participant three stated during the interview that the video-communication did not impact considerably upon various aspects of her psychological well-being, apart from it making her feel more engaged with her daughter and niece when she spoke to them, it increased her confidence with computers and made her feel more competent. Furthermore, although her scores on the SOBI-P and the SWLS remained unchanged, her scores on the PSS, RSES, HADS-A, HADS-D and UCLA Loneliness Scale all showed improvement, compared to her baseline scores. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant three are shown in Table L3.

Table L3

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant three

Outcome Measure	Baseline to post-intervention	Baseline to follow-up
PSS	Recovered	Recovered
SWLS	Unchanged	Unchanged
HADS – A	Recovered	Unchanged
HADS – D*	Improved	Improved
RSES*	Unchanged	Improved
UCLA Loneliness Scale*	Improved	Unchanged
SOBI-P*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

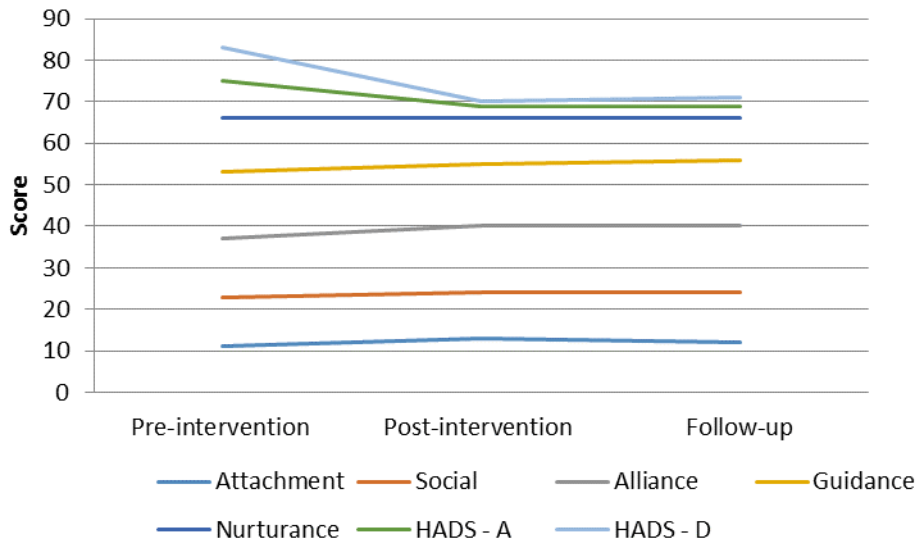


Figure L7. Participant three’s scores on the subscales of the social provision scale and the HADS across the three time points

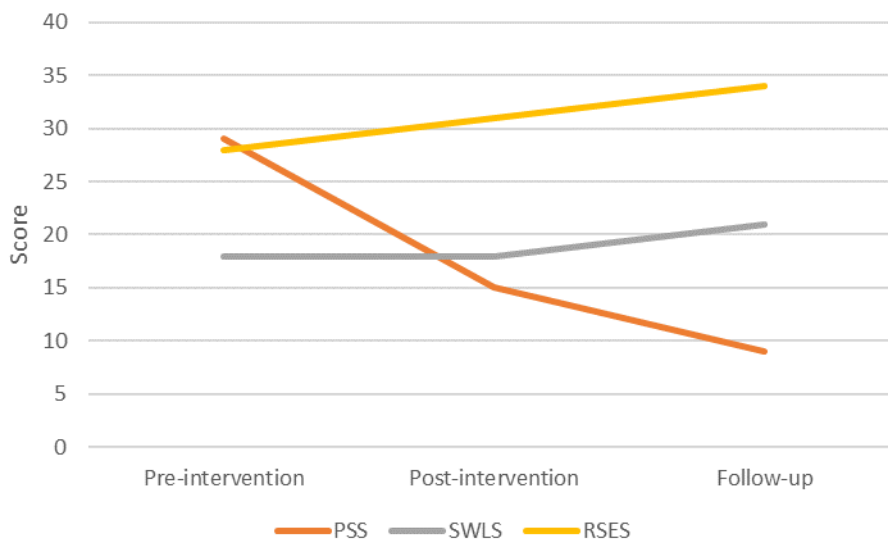


Figure L8. Participant three’s scores on the PSS, SWLS and RSES across the three time points

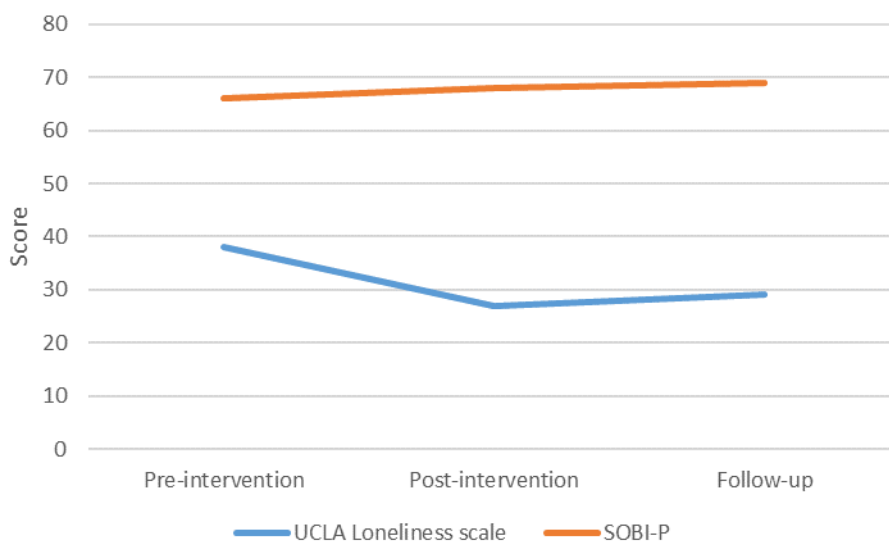


Figure L9. Participant three's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant four

Profile. A white British male, aged 62, unemployed, separated and living alone in supported living accommodation. He had experience of using computers and the internet prior to participating in the research, but he had not used the internet to communicate with others. Before the video-communication intervention he communicated with his son and daughter on a weekly basis by telephone or text message, but did not see them regularly.

Intervention. During the intervention he used the video-communication software, Facetime, accessed through his smartphone, to speak with his son and daughter at least seven times.

Comparison of quantitative and qualitative data. Participant four's scores of the measures at baseline, apart from the RSES, were within the 'clinical' range, which appeared consistent with his comments during the interview. He explained that he felt low in mood, often worried about his children and his finances, and he did not feel that he had a good quality of life.

Although all his scores, except his scores at follow-up on the RSES, were unchanged at post-intervention and follow-up from baseline, comments he made during the interview suggest the video-communication had some impact upon his psychological well-being. He mentioned that talking via video-communication resulted in him feeling emotionally closer to his children, "to talk to someone and to see that someone I just think its warmer and closer...

it just seems to make the bond that much stronger”. He explained that he also valued seeing his children because it enabled him to see their facial expressions which reassured him they wanted contact with him and it helped him judge if his children were okay, “I like seeing my son and I like seeing my daughter. I like to know if they are well. Alright they can tell me by text, ‘yeah I’m alright dad and this and the other’, but you just don’t know. At least I can see my daughter. I can see my son and I can know if something is not right”. This seemed to imply that the video-communication helped reduce his anxiety somewhat about his children’s well-being and whether they wanted contact with him.

Although his scores on the HADS-A did not change reliably, they improved in the desired direction at post-intervention. Participant four also stated during the interview that as a result of using the video-communication conversations with his son are more diverse and they share more information with each other, which has resulted in him gaining support from his son. Additionally, he reported that following talking to his children via video-communication he feels better in mood. He stated that, “If it’s just a normal conversation, yeah we’re fine dad, kids are fine, blah blah blah’, then I’m in a better mood because I’ve spoken to my daughter and everything is fine”.

Participant four’s scores on the RSES from baseline to follow-up showed his self-esteem deteriorated. However, although he did not specifically talk about his self-esteem in the interview, he stated that he felt younger as a result of using video-communication, suggesting that the video-communication may have had a positive impact on his self-esteem, ‘It makes me feel younger as well. I mean my kids are saying, hey, look my Dad’s Facetiming me, you know, so that sort of thing, he moving up with technology, so yeah I really like. I really enjoy it’.

He stated that the video-communication did not have any impact on reducing his stress levels or his feelings of loneliness, which is consistent with the quantitative data.

Summary. Overall, despite the scores showing no reliable change in the desired direction, participant four reported that he enjoyed and valued using video-communication; it led him to feel closer to his children, it helped him to feel less worried about them and it also made him feel brighter in mood after video-calling them. He stated that he wishes to continue using it with his children and he wants to contact other relatives via video-communication. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant four are shown in Table L4.

Table L4

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant four

Outcome Measure	Baseline to post-intervention	Baseline to follow-up
PSS	Unchanged	Unchanged
SWLS	Unchanged	Unchanged
HADS – A	Unchanged	Unchanged
HADS – D	Unchanged	Unchanged
RSES*	Unchanged	Deteriorate
UCLA Loneliness Scale	Unchanged	Unchanged
SOBI-P	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

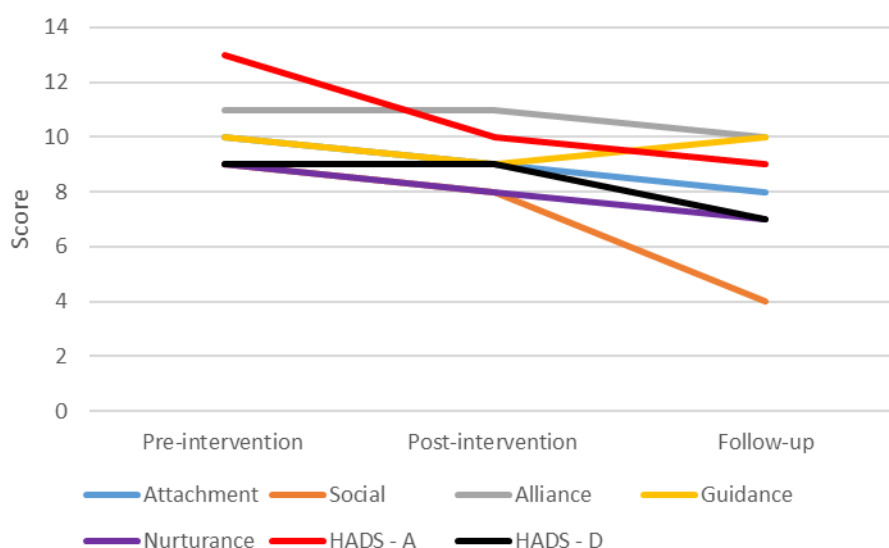


Figure L10. Participant four's scores on the subscales of the social provision scale and the HADS across the three time points

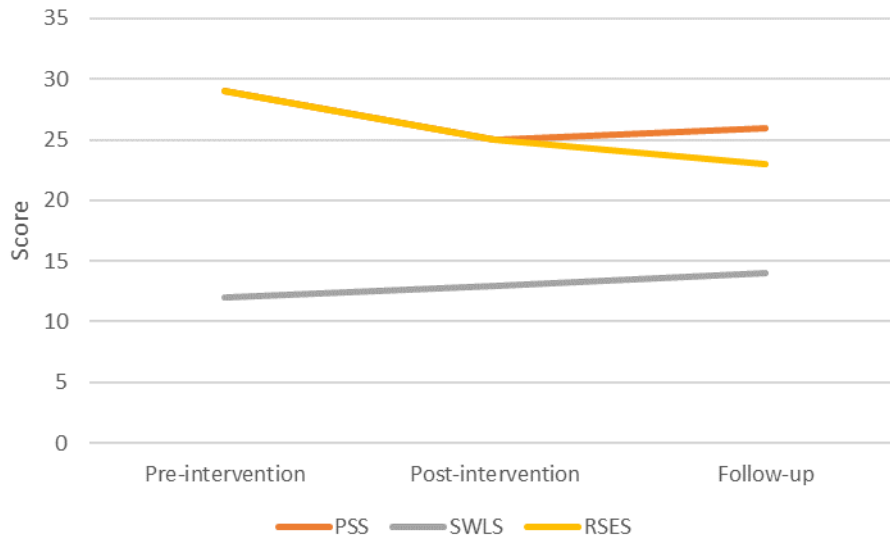


Figure L11. Participant four's scores on the PSS, SWLS and RSES across the three time points

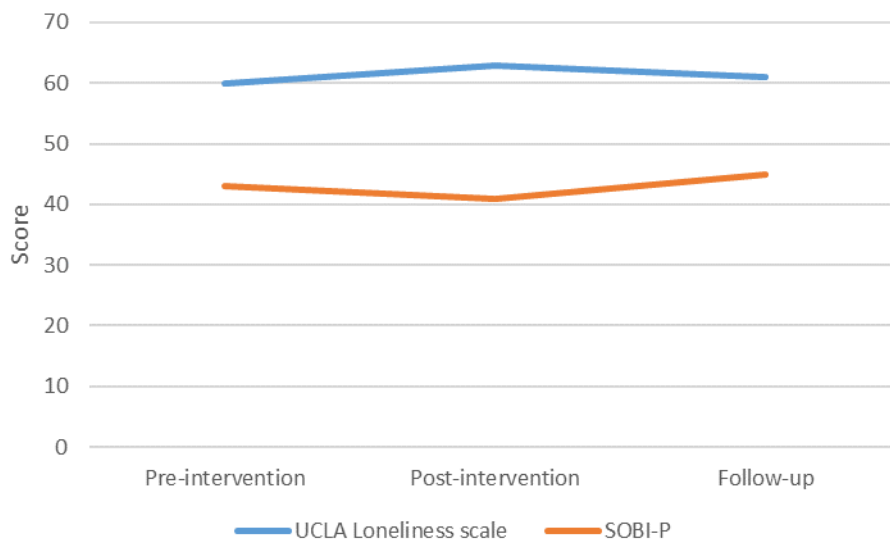


Figure L12. Participant four's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant five

Profile. A white British female, aged eighty-five, widowed and living alone in a supported living accommodation. She had very limited experience of using a computer and she had not used the internet to communicate with others prior to participating in the research. Prior to participating in the research she saw her family in-person at least weekly and sometimes up to three times a week. She spoke to her relatives about three times a day on the telephone.

Intervention. Participant five used the video-communication software, Skype via an iPad. During the research she exchanged video-calls with her daughter, son and grandson.

Comparison of quantitative and qualitative data. Participant five scored within the ‘non-clinical’ range on the measures of SWLS, RSES, UCLA Loneliness Scale and SOBI-P at baseline and, in comparison to these scores, her scores at post-intervention and follow-up showed no reliable change. Consistent with the UCLA Loneliness scores and the SOBI-P scores she reported during the interview that the video-communication did not impact upon any feelings of loneliness or how she fitted in with, or belonged to, her family. However, despite mentioning that she felt she looked older on video, she reported that she enjoyed using the video-communication to contact her relatives, describing it as the ‘next best thing to an in-person visit’. She mentioned that it made her feel good about herself and she felt clever, ‘I thought I was quite clever’. Furthermore, she mentioned feeling closer to her family and she enjoyed seeing her grandchildren on video, as she appreciated seeing their personalities and seeing them grow up. She also valued being able to see her children’s home environment to check how they were managing, but she acknowledged this could be frustrating at times.

Participant five’s scores on the PSS, HADS-D, HADS-A were placed within the ‘clinical’ range at baseline. In comparison to these scores her HADS-A and HADS-D scores at post-intervention and follow-up did not reliably change, and she reported during the interview that she felt that the video-communication impacted upon her mood or her levels of anxiety. Although she did not feel that the video-communication impacted upon her stress levels, in comparison to her baseline scores her scores at post-intervention and follow-up showed she ‘recovered’, suggesting her stress levels decreased to a level that was within the ‘non-clinical’ range.

Summary. Overall the results from the interview and the quantitative data seem to suggest that the video-communication did not impact upon participant five’s mood, anxiety

levels, sense of loneliness or her sense of belonging. She did however report feeling closer to her family as a result of using the video-communication. Although she stated the video-communication did not impact upon her stress levels, the quantitative data showed her stress levels reduced from being placed within the ‘clinical’ range at baseline to the ‘non-clinical’ range at post-intervention and follow-up. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant five are shown in Table L5.

Table L5

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up of participant five

Outcome Measure	Baseline to post-intervention	Baseline to follow-up
PSS	Recovered	Recovered
SWLS*	Unchanged	Unchanged
HADS – A	Unchanged	Unchanged
HADS – D	Unchanged	Unchanged
RSES*	Unchanged	Unchanged
UCLA Loneliness Scale*	Unchanged	Unchanged
SOBI-P*	Unchanged	Unchanged

Note. Participants’ scores within the ‘non-clinical’ range at baseline are indicated by an asterisk.

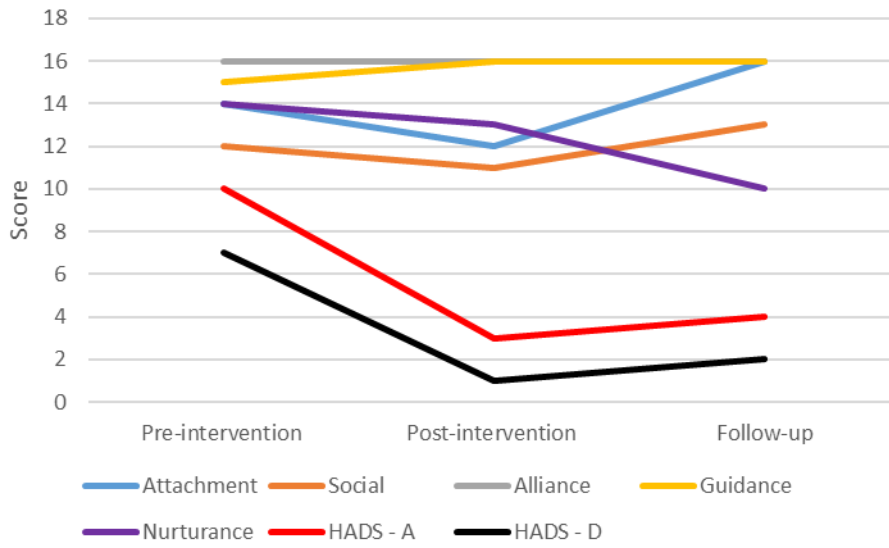


Figure L13. Participant five’s scores on the subscales of the social provision scale and the HADS across the three time points

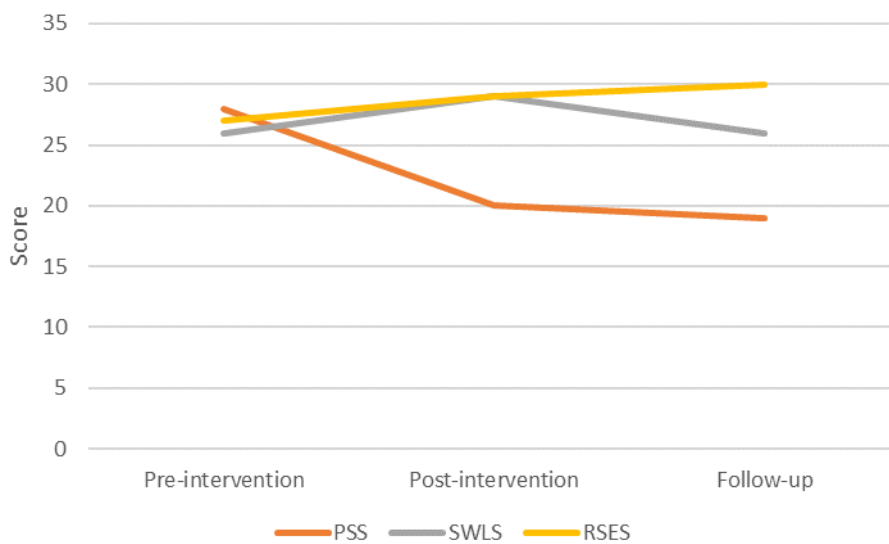


Figure L14. Participant five’s scores on the PSS, SWLS and RSES across the three time points

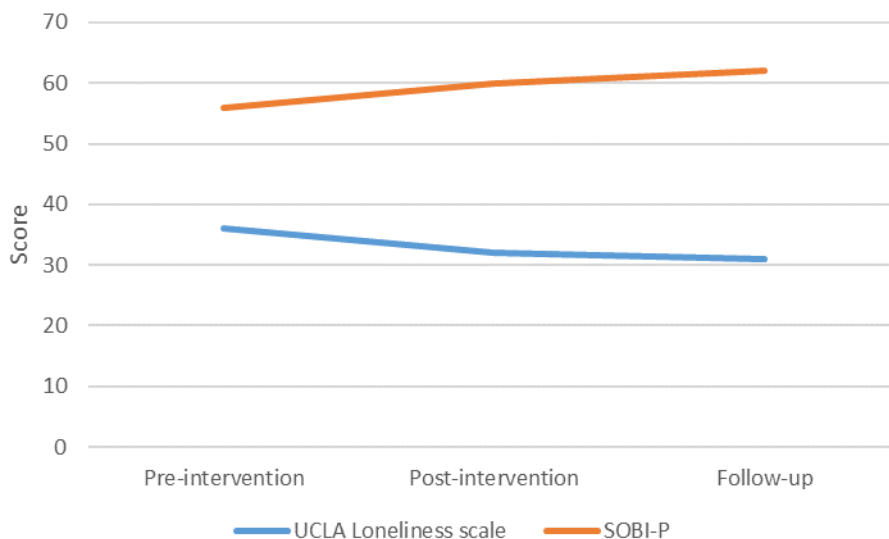


Figure L15. Participant five’s scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant six

Profile. A white British male, aged eighty-one, who was widowed and was living alone in a supported living accommodation. Prior to participating in the research he had some experience of using a computer and the internet, but he had not used the internet to communicate with others. In his spare time he engaged in many older adult social activities.

Intervention. Participant six used the video-communication software programme, Google Hangouts, accessed via a laptop, shared by the other residents.

Comparison of quantitative and qualitative data. Participant six’s scores on the measures of the PSS, SWLS, HADS-D, RSES, UCLA Loneliness Scale and SOBI-P were within the ‘non-clinical’ range at baseline. His scores on the HADS-D improved at post-intervention and remained improved at follow-up, which is consistent with his comment that he felt better in mood following using video-communication, “well once you’ve seen them, how can I put it. If you felt a bit, don’t get me wrong I do get sad. If you do erm feel that way inclined and then you phone them you feel much more elated afterwards”. His scores at post-intervention and follow-up for the other measures showed no reliable change in comparison to his baseline scores. Despite this, he reported that he felt more confident with learning how to use video-communication, “I’d have never thought in my wildest dreams that I would get on with a computer like I have done... it makes you feel more confident”, suggesting that his

self-esteem may have increased as a result of using the video-communication. Additionally, he talked about how the video-communication made him feel less alone and how it increased his feeling of belonging with his family, “It makes all those questions that you say about does anyone care and all that. That (video-communication) makes it all the much better... it makes me feel closer to my family”. He also stated that he now has more contact with his family and their conversations are more open, “when you can see them you can see the expressions on their face. How they feel when they are talking to you... You can see whether they are elated, interested or disinterested... and that to me I think makes it a lot more erm sincere”. He also stated, “when you speak to them, you know kids, they are all making faces you know and it makes it a much more pleasant conversation...it’s a happier conversation”.

Although participant six did not discuss his anxiety levels during the interview, his scores on the HADS-A showed that he recovered from being within the ‘clinical’ range at baseline to the ‘non-clinical’ range at post-intervention. However, this improvement was not sustained at follow-up.

Participant six generally spoke about how using the video-communication was a positive experience for him, “I thought it was good, very very good” and he appeared to value this channel of communication, ‘If you have never used a computer in your life, don’t scorn it. It’s (video-communication) the best thing I can say about computers. It brings you closer together (to family) and it’s a very good form of communication. Very very good indeed”. He could not think of any disadvantages of using video-communication; however, he mentioned that the telephone is a quicker way of communicating and getting directly to the person you want, as he has to set up the computer before making contact with his family.

Summary. Overall, participant six’s quantitative data showed that he felt less worried and brighter in mood following using the video-communication, and, although his scores on the other dimensions of psychological well-being showed no reliable change, the qualitative data suggest that the video-communication: increased his contact with his family; made conversations more engaging; made him feel closer to his family; and helped him feel less lonely. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant six are shown in Table L6.

Table 6

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up of participant six

Outcome Measure	Baseline to post-intervention	Baseline to follow-up
PSS*	Unchanged	Unchanged
SWLS*	Unchanged	Unchanged
HADS – A	Recovered	Unchanged
HADS – D*	Improved	Improved
RSES*	Unchanged	Unchanged
UCLA Loneliness Scale*	Unchanged	Unchanged
SOBI-P*	Unchanged	Unchanged

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

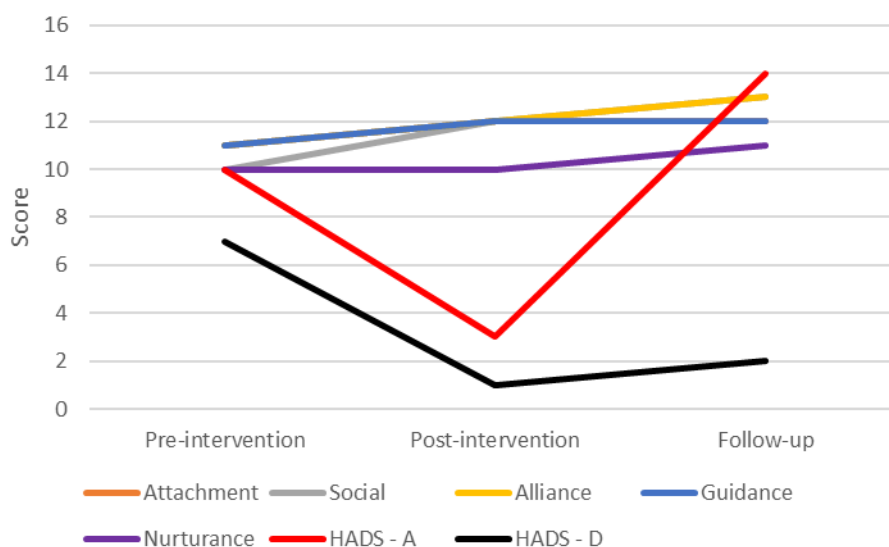


Figure L16. Participant six's scores on the subscales of the social provision scale and the HADS across the three time points

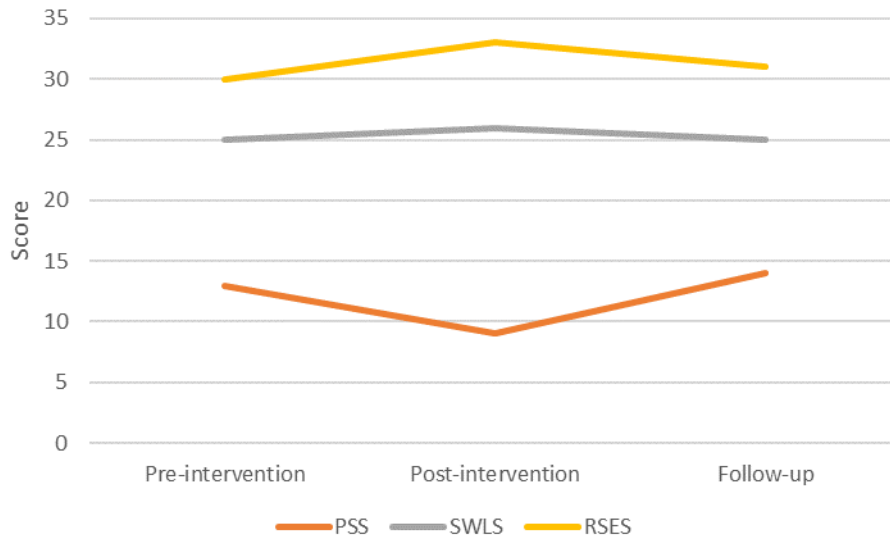


Figure L17. Participant six's scores on the PSS, SWLS and RSES across the three time points

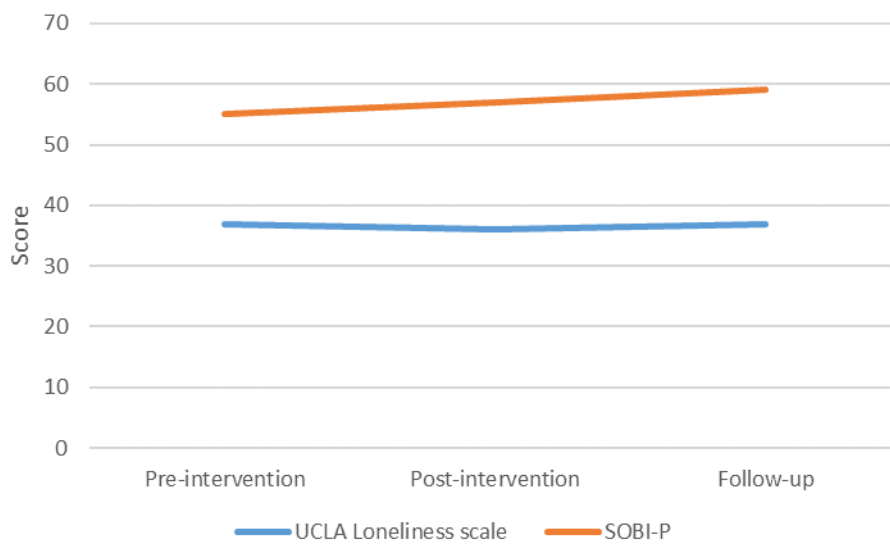


Figure L18. Participant six's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant seven

Profile. A white British female, aged seventy-one. She was in a relationship, but lived alone in a supported living accommodation. She had no experience of using computers prior to participating in the research.

Intervention. She participated in the project for four weeks, learning and using the video-communication software, Goggle Hangouts, with her boyfriend, which was accessed through a laptop shared by other residents. She spoke to her boyfriend three times on the video-communication; however, she reported connection difficulties. She completed the baseline and post-intervention questionnaires, but decided she no longer wanted to use it. Although she did not complete the follow-up data, she agreed to be interviewed about her experiences with using the video-communication.

Comparison of quantitative and qualitative data. Participant seven's scores on all the measures, except the SWLS, were placed with the 'non-clinical' range at baseline. In comparison to her scores at baseline, the scores at post-intervention showed no reliable change. The HADS-A was the only measure where, despite not showing reliable change, the change in the scores were somewhat marked and were towards improvement in the desired direction. There was, however, no mention of anxiety during the interview.

Participant seven explained that she was not interested in continuing to use the video-communication, as she believed it would be an invasion of her privacy. She stated, "I might just want to sit quietly and err, to have that where they want to see you all the time and talk, no I wouldn't like it...Because sometimes you'd rather not talk to that person, wouldn't you... And when they are there skypeing and they want to talk and you think, oh no... you might be at home sitting quietly and reading a book and you just want to relax and you don't feel like talking to anyone'. She acknowledged that she may have wanted to continue using the video-communication if she was exchanging calls with someone whom she wanted to talk to regularly, "If you're in a really happy relationship and you love seeing that person and you love being with that person and then yes then that would be absolutely wonderful to see them and talk to them, but on the other hand if you're not so happy and things aren't going great then you're not so bothered". Despite not wanting her children or her partner video-calling her she stated that learning and using the video-communication was a 'fun experience' and she imagined that talking to others via video-communication would make someone feel

closer to whom they were speaking to, “If you hadn’t seen them for the weekend and all of a sudden you can see them it would be a closer feeling”.

Summary. Overall participant seven’s quantitative data showed no reliable change on the psychological well-being measures from baseline to post-intervention. Although she envisaged feeling closer to someone if she was talking to them via video-communication, she did not like the idea that the video-communication might increase contact with her family and boyfriend. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant seven are shown in Table L7.

Table 7

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up of participant seven

Outcome Measure	Baseline to post-intervention
PSS*	Unchanged
SWLS	Unchanged
HADS – A*	Unchanged
HADS – D*	Unchanged
RSES*	Unchanged
UCLA Loneliness Scale*	Unchanged
SOBI-P*	Unchanged

Note. Participants’ scores within the ‘non-clinical’ range at baseline are indicated by an asterisk.

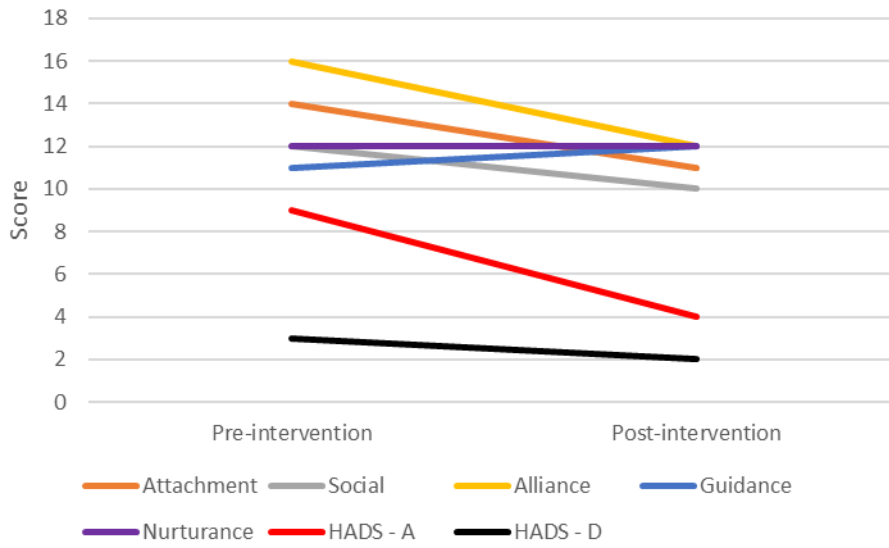


Figure L19. Participant seven’s scores on the subscales of the social provision scale and the HADS across the three time points

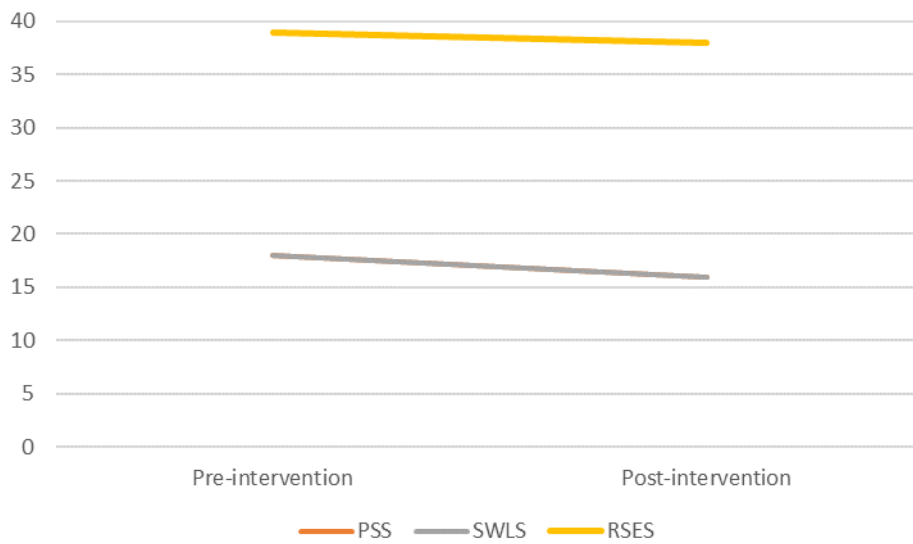


Figure L20. Participant seven’s scores on the PSS, SWLS and RSES across the three time points

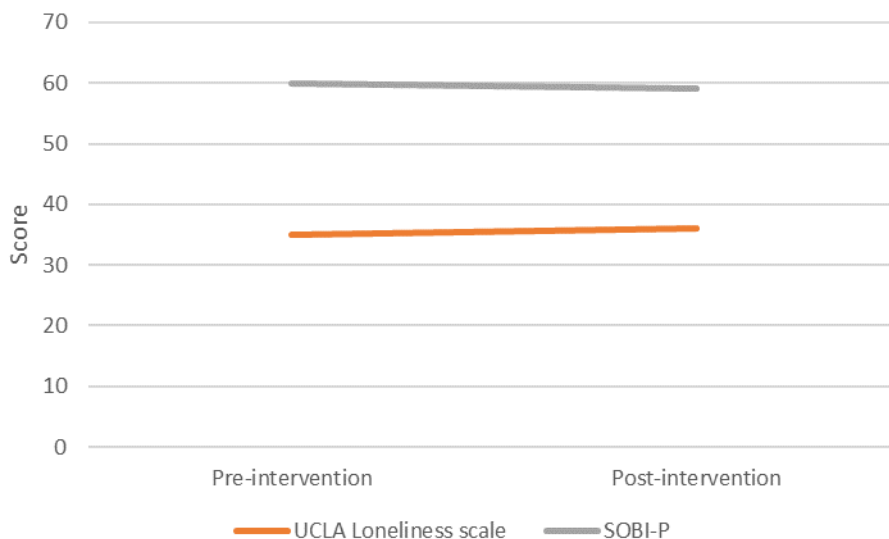


Figure L21. Participant seven's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant eight

Profile. A white British female, aged seventy-five. She was divorced and living alone in a supported living accommodation. She had no experience of using computers prior to participating in the research.

Intervention. She used the video-communication software, Google Hangouts, to communicate with her friend who lived within the same supported living accommodation. She planned to speak to her daughter as well, but her daughter's computer had technical difficulties when she was participating in the research. Participant eight did not complete the follow-up data or engage in the interview because she was waiting for her daughter's computer to be fixed.

Comparison of quantitative and qualitative data. Participant eight's scores on the SWLS, HADS-A, HADS-D, RSES at baseline were placed within the 'non-clinical' range and did not reliably change from baseline to post-intervention. Her scores on the PSS, UCLA Loneliness Scale and the SOBI-P fell within the 'clinical' range at baseline, but for the PSS and the SOBI-P the change in her scores showed she 'recovered', placing her scores within the 'non-clinical' range. Her scores on the UCLA Loneliness scale, however, remained

unchanged. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant eight are shown in Table L8.

Table 8

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up of participant eight

Outcome Measure	Baseline to post-intervention
PSS	Recovered
SWLS*	Unchanged
HADS – A*	Unchanged
HADS – D*	Unchanged
RSES*	Unchanged
UCLA Loneliness Scale	Unchanged
SOBI-P	Recovered

Note. Participants' scores within the 'non-clinical' range at baseline are indicated by an asterisk.

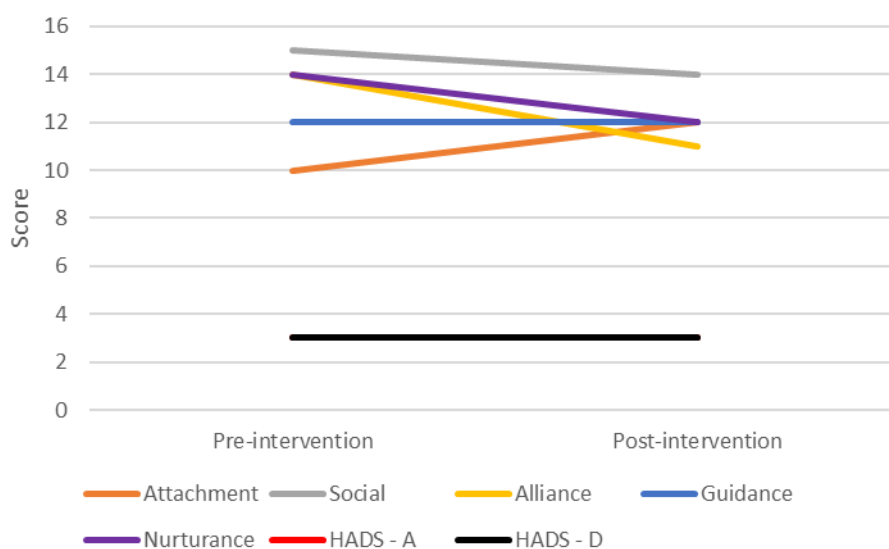


Figure L22. Participant eight's scores on the subscales of the social provision scale and the HADS across the three time points

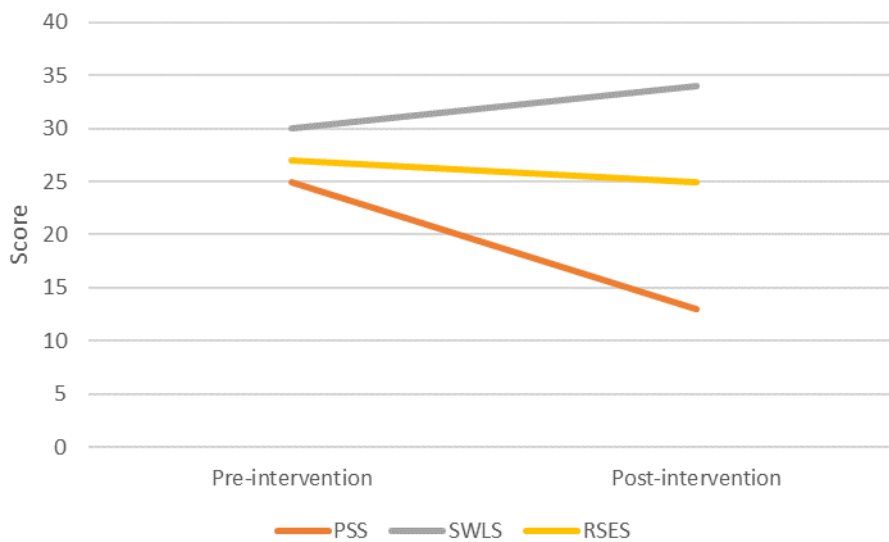


Figure L23. Participant eight's scores on the PSS, SWLS and RSES across the three time points

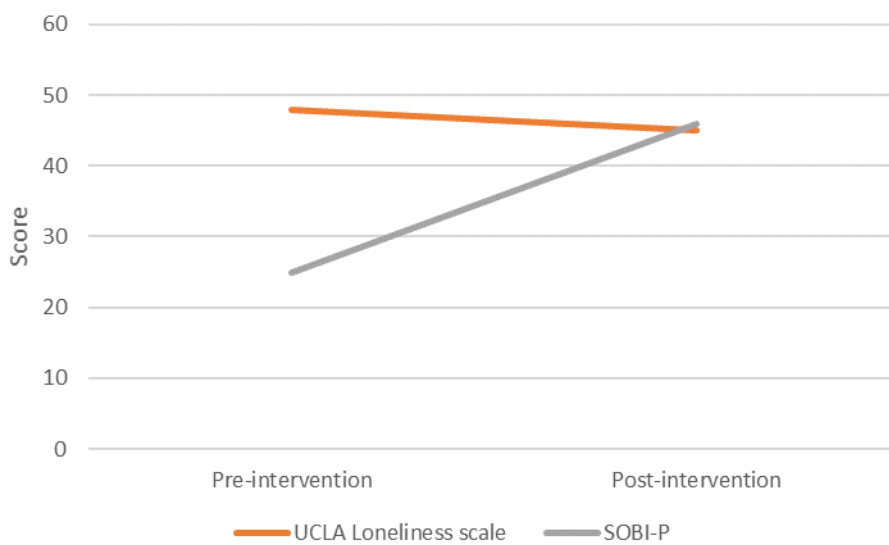


Figure L24. Participant eight's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points

Participant nine

Profile. A white British female, aged eighty five, who was widowed and was living alone in a supported living accommodation. She had some experience of using a computer and the internet, but she had not used the internet to communicate with others.

Intervention. She used the video-communication software application, Skype, accessed via her ipad. She spoke to her brother who she had not seen for years, her cousin and her sister, who she did not see regularly, and her niece who she saw in-person weekly.

Comparison of quantitative and qualitative data. Apart from her score on the HADS-A, participant nine scored within the ‘non-clinical’ range for all the outcome measures at baseline. For the HADS-A the change in her scores at post-intervention suggested she ‘recovered’, which placed her within the ‘non-clinical’ range. This seems consistent with what she reported during the interview in that she felt less worried about her relatives’ well-being by being able to see them via video, “when someone says to you they are fine you can tell can’t you by looking at them whether they are really... to actually see my brother, because he had been poorly one of the times I rang him and when I saw him he looked well. His blood pressure went up, but then he looked much better... but yeah it is reassuring dear... it’s so reassuring to see how well people look you know”. Although the scores on the HADS-A at follow-up increased, they remained lower than the value at baseline

Although the scores on the PSS did not change between baseline and post-intervention, the change in her scores between baseline and follow-up were found to be reliable and suggested that her stress levels reduced. This matches what was reported in the interview, “in a way it’s alleviated some of it (stress) because knowing that he is there and if I wanted to see him I could get in touch with him”.

Her scores on the SWLS, HADS-D, RSES, UCLA Loneliness Scale and the SOBI-P at baseline showed no reliable change at post-intervention or follow-up. However, the change that was made was in the desired direction. Furthermore, participant nine explained during the interview how she valued using the video-communication because it: enabled her to keep in touch with relatives and resulted in them contacting each more frequently, “we have made a pact that we do it and also my niece the one that you found for me, she’s got in touch with me, the one that lives in Dorset and so I’ve seen her”; made her feel closer to her family, both physically, “It’s as if they are in the same room as you, it’s lovely. You can reach out and touch them sort of thing” and emotionally, “It is really bring you together”;

provided her days with enjoyment, “it’s nice to see them in the evenings, it is and at bathtime you know. Its good fun”; enabled her to share things with family, “if I’ve done anything, like I’ve knitted something for her family and I can hold it up and she can see how I’m progressing with it and so it is, darling, it’s wonderful”; and resulted in her feeling better in mood, “it makes you feel better doesn’t it, because even though he’s on the other end of the world, he’s there isn’t he... I do feel better”. Participant nine also recommend video-communication for others. She stated, “it’s nothing like seeing them, especially if you are lonely. And people in my position, I think it’s a pity that more older people don’t get involved”.

Summary. Although participant nine’s quantitative data only showed reliable change in the desired direction on the measures of PSS and HADS-A, she reported that it made her feel better in mood, less worried about her family, less lonely and she stated that it made her feel closer to her family also. Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up for participant nine are shown in Table L9.

Table L9

Categorical ratings of the change in scores on the self-report measures between baseline and post-intervention and baseline and follow-up of participant nine

Outcome Measure	Baseline to post-intervention	Baseline to follow-up
PSS*	Unchanged	Improved
SWLS*	Unchanged	Unchanged
HADS – A	Recovered	Unchanged
HADS – D*	Unchanged	Unchanged
RSES*	Unchanged	Unchanged
UCLA Loneliness Scale*	Unchanged	Unchanged
SOBI-P*	Unchanged	Unchanged

Note. Participants’ scores within the ‘non-clinical’ range at baseline are indicated by an asterisk.

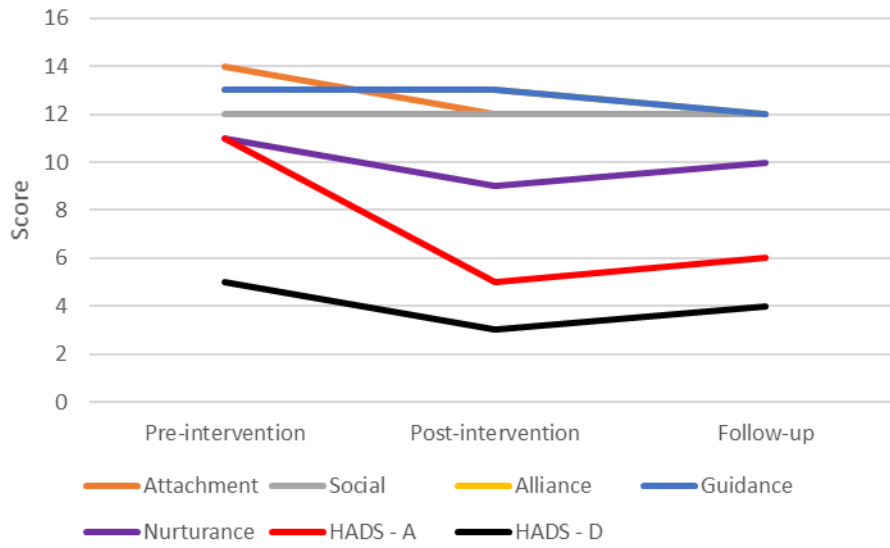


Figure L25. Participant nine's scores on the subscales of the social provision scale and the HADS across the three time points

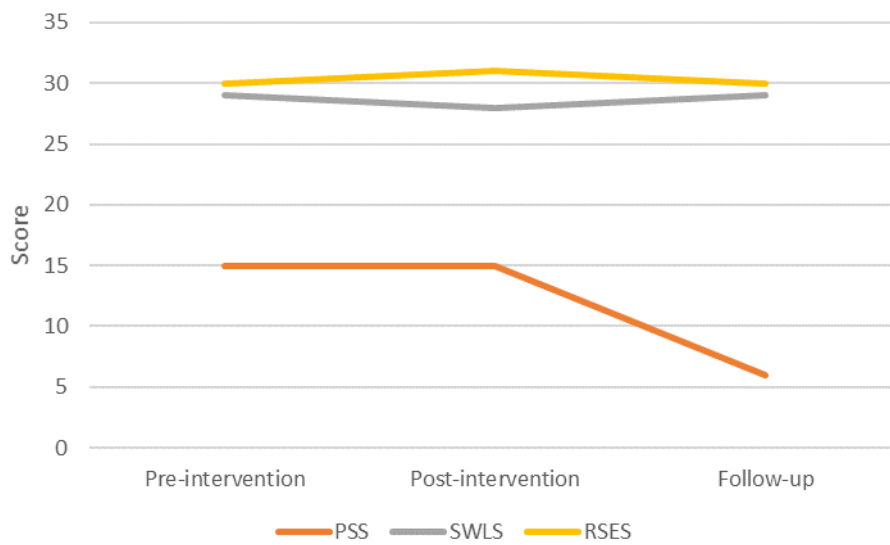


Figure L26. Participant nine's scores on the PSS, SWLS and RSES across the three time points

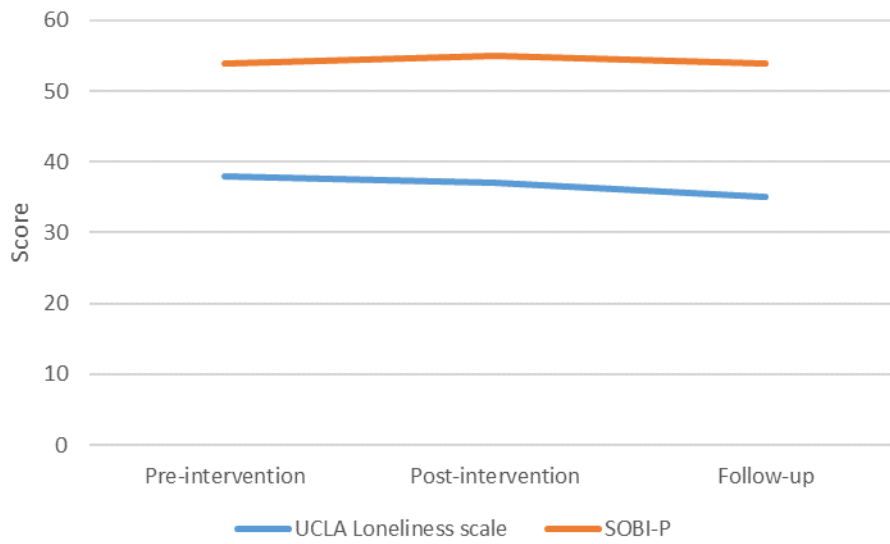


Figure L27. Participant nine's scores on the UCLA Loneliness Scale and the SOBI-P across the three time points