Technology and loneliness in old age

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R. Kaspar. Technology and Loneliness in Old Age. Gerontechnology 2004; 3(1): 42-48. The ability to use complex technology has become a key competence for independent and successful living. Elderly people, as is often assumed, might lose out in the trend towards modernization because they are less likely to have technological know-how. Against this general background, this paper aims to link new technology with loneliness in advanced age. Although lack of social contact and social support are hypothesized to be essential influences on loneliness, this study seeks to enrich the psychological understanding of loneliness by introducing a new flow of arguments including technology issues as follows: First, two key elements of technological competence, i.e., experience with and acceptance of technology, are assumed to positively influence one's perception of 'being in control'. Going further, they may also prevent older adults from feeling obsolete or marginal in an increasingly hi-tech world. Second, individual dispositions such as control beliefs or perceived obsolescence may contribute to the interpretation of and response to deficits in social relationships and thus mediate technology effects on the experience of loneliness in old age. Supporting empirical evidence for this conceptual avenue is presented.

Keywords: technology, loneliness, obsolescence, control beliefs, social relations

Increasing implementation of technology has contributed to the development of modern society as a whole and changed many aspects of individuals' everyday life such as social interaction and feelings of competence. Modern technology is linked to loneliness in old age in various and potentially opposite ways[1,2]. On the one hand, the use of assistive and communication devices contributes to the maintenance of social participation in old age. On the other hand, trends towards automation, miniaturisation, or virtualisation are supposed to jeopardise older people's possibilities for social interaction by demanding equipment and user competence that many elders do not possess[3]. Cognitive discrepancy models of loneliness have expanded the understanding of loneliness beyond the mere amount of social contact and introduced individual tendencies in perceiving and interpreting social relations as crucial determinants of loneliness. As the ability to use complex technology has become a key competence for successful ageing also in the social domain, a lack thereof may cause feelings of inadequacy and dependency. Individual dispositions such as control beliefs or perceived obsolescence may in turn influence the way deficits in social relationships are interpreted and responded to and thus mediate the effect of technology on the experience of loneliness in old age. This work provides an empirical test of such argumentation.

METHODS

Participants

Data stem from a national representative survey conducted in 1999 as part of the interdisciplinary research project 'Everyday Technology for Senior Households (Sentha)'[4]. The sample consisted of 1,417 community dwelling individuals between the age of 55 and 98 (M±SD = 69.7±8.7 years, 701 men, 716 women).

Measures

Loneliness was measured with a 14-item subset of the revised UCLA Loneliness Scale[5]. Respondents were asked to indicate their agreement to each of these items (e.g., 'There are people who really understand me') on a 5-point-scale from 1='not at all' to 5='very much'. In concordance with prior findings[6-8], item analysis revealed strong evidence for the unidimensionality of this instrument. Furthermore, the reduced scale showed good psychometric properties highly similar to those reported for the original 20-item scale[5,9].

Two dimensions of social interaction with persons outside of the household were differentiated, i.e., face-to-face and telephone contacts. To assess the amount of face-to-face contacts, participants were asked to indicate how often they engaged in each of five given social activities (e.g., visiting family members) on a 5-point-scale ('daily', 'once a week', 'once a month', 'more rarely', 'never'). Likewise, participants indicated their customary frequency of telephone contacts on a 5-point-scale from 'never' to 'daily' to 'never'. For both indicators of social contact, higher scores represent higher contact frequency.

Feelings of perceived obsolescence were measured with a 5-item subscale (e.g., 'More and more, I have the feeling that I have been passed over by the times') of the 'Future Time Perspectives and Future Meaning Scale'[10,11]. Perceived obsolescence addresses both a gradual loss of social integration (e.g. 'It has become increasingly difficult for me to accept the ideas and mores of the younger generation') as well as a perceived lack of competence to cope with modern and technological society (e.g. 'For me, life has become more and more complicated, more difficult to comprehend'). Again, as for all of the remaining constructs,

respondents answered on a five categories agreement scale (1='not at all', 5='very much'), with higher scores indicating higher levels of the respective attributes.

Individual control beliefs were measured with a 12-item subset of the locus of control scale developed in the Berlin Aging Study (BASE)[12,13]. Three different control foci (i.e. internal, external chance, and external powerful others) were distinguished. Persons with a strong internal control focus refer to own decisions and actions as the determinants of desirable or undesirable outcomes (e.g. 'I can make sure that good things come my way'), whereas other people or chance are held responsible for pleasant and unpleasant outcomes when there are strong external control foci (e.g. 'The good things in my life are determined by other people'; 'If I get what I want, it's mostly because I am lucky.').

Technological experience was measured with a newly developed 7-item scale designed to address life-long tendencies of technology avoidance (e.g. 'I have avoided using technology wherever possible') and general interest in innovative technical devices (e.g. 'I have always been interested in learning how to use new or improved devices').

The instrument included to assess participants' overall acceptance of technology comprises both an emotional global evaluation of technology (e.g. 'Technology threatens people more than it helps them') as well as a more rational balancing of the pros/cons of technological progress (e.g. 'If you would like to maintain a modern standard of living, then you must keep pace with technological developments, whether you want to or not')[14].

Analyses

Loneliness is widely defined as a feeling resulting from the interplay of both situational and person variables. Nevertheless, many empirical studies fail to concisely explicate and test the relationship between those determinants of loneliness. Therefore, in a first step, multiple regression analyses were performed to test whether individual control beliefs and obsolescence moderate the effects of relationship between both face-to-face or telephone contact on and reported loneliness. Technically speaking, tests for such moderation afford the introduction of interaction terms into the regression model. Second, technology issues are hypothesized to impact on loneliness via social contacts and person variables. To test for mediating effects of individual dispositions such as locus of control or perceived obsolescence on the relation between various aspects of technological competence and the experience of loneliness, hierarchical regression analyses were computed. In a first step, both loneliness and individual dispositions were regressed on technology issues. In a subsequent step, loneliness was predicted by both technology issues as well as individual dispositions conjointly, the latter being interpreted as mediator variables if technology issues' power to predict loneliness decreased by a substantial portion. However, due to the correlational nature of the survey data used, these analyses do not allow for causal interpretations of the reported relationships between the different concepts of technology issues, social integration, personality, and loneliness.

RESULTS

Individual dispositions as moderators of the relationship between social contacts and loneliness.

Individual control beliefs as well as perceived obsolescence were found to be of significant predictive value for participants' reported loneliness (Table 1, columns entitled 'MOD'). Feelings of being able to actively influence the good

Table 1. Control beliefs and perceived obsolescence as moderators of the relation between social contacts and reported loneliness. Database: Sentha Survey 1999; N=1,417

	Predictor variable (PV)											
	telephone contact (PV_1)						face-to-face contact (PV_2)					
Moderator (MOD)	MOD[a]		PV_1[a]		MOD	xPV_1[a]	MOD[a]		PV_2[a]		MOD	xPV_2[a]
Internal	-.22	***	-.22	n.s.	.08	n.s.	-.25	***	-.57	***	.31	*
External	.40	***	-.04	n.s.	-.06	n.s.	.42	***	-.14	*	-.13	n.s.
Social External chance	.29	***	-.06	n.s.	-.09	n.s.	.27	***	-.24	*	-.04	n.s.
Obsolescence	.64	***	.19	**	-.26	***	.62	***	.04	n.s.	-.26	***

[a] standardized beta; p<|t|; * p<.05; ** p<.01; *** p<.001; n.s. = not significant

things in one's life (i.e., internal control beliefs) were negatively related to feelings of loneliness, while both the dimensions of chance and powerful others were associated with increased levels of loneliness. Similarly, feelings of obsolescence were found to be highly predictive for loneliness. This pattern of results remained largely invariant whether personal or telephone contacts were included as indicators for social integration.

The predictive potential of telephone and face-to-face contacts were found to depend on individual dispositions (Table 1, columns entitled 'PV_1' and 'PV_2'). More specifically, the strong effect for the interaction term (column '$MODxPV_1$') indicates that, although frequent telephone contact may be supposed to generally reduce feelings of loneliness, substantial covariation could only be found in conjunction with high levels of obsolescence. That is, persons who described themselves as 'up-to-date' and embracing current trends and lifestyles showed low levels of loneliness no matter if they had few or many telephone contacts. In fact, predicted loneliness was even tentatively higher for frequent telephone contact under this condition (Figure 1).

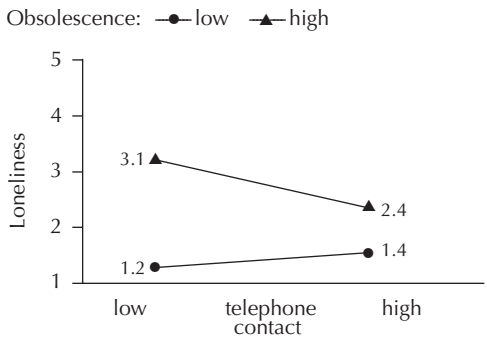

Figure 1. Relationship between telephone contact and loneliness and its moderation by perceived obsolescence. The interaction graph shows values of loneliness resulting for the four combinations of minimum/maximum observed values of obsolescence and frequency of telephone contact.

Similarly, the detrimental effect of low face-to-face personal contact seems to be compounded by the feeling of a person to have outlived his or her times. In contrast, feelings of obsolescence show only minor impact on loneliness if a person engages in many activities with face-to-face contacts (Table 1, column '$MODxPV_2$'). Finally, internal control beliefs are found to moderate the relationship between low levels of personal contact and feelings of loneliness. Sparse social contacts were associated with higher levels of loneliness

Table 2. Obsolescence-mediated effects of technological experience and acceptance on loneliness. Database: Sentha Survey 1999; N=1,417

		Mediator (MED): Perceived Obsolescence							
		Step 1				Step 2			
Predictor variable (PV)		PV[a]		PV→MED[a]		MED[a]		$PV_{Reduction}$[a,b]	
Technological Experience	Avoidance of technology	.18	***	.27	***	.55	***	.15	n.s.
	Interest in innovation	-.19	***	-.31	***	.55	***	.17	n.s.
Acceptance of Technology	Emotional global evaluation	.19	***	.29	***	.54	***	.16	n.s.
	Rational balance of pros/cons	-.19	***	-.28	***	.54	***	.14	n.s.

[a] Standardized beta; p<|t|; * p<.05; ** p<.01; *** p<.001

[b] Reduction in PV's power to predict loneliness when MED is included.

when a person perceived little personal control over his or her (social) situation.

Individual dispositions as mediators of technology effects on loneliness

Participants' experience with and acceptance of technology were found to be only weak, yet significant predictors for reported loneliness (Table 2, column 'PV' of 'Step 1'). Life-long avoidance of technology and a negative emotional evaluation of technology's overall effects were found to be substantial predictors for feelings of obsolescence (column 'PV→MED' of 'Step 1'). On the other hand, persons who reported a strong interest in innovative technology and supported the accompanying demands of technological progress reported lower levels of obsolescence.

Including perceived obsolescence as a second predictor of loneliness reduced the predictive power of technological experience and reception on loneliness to non-significance (Table 2, column '$PV_{Reduction}$' of 'Step 2'). With this pattern of results, the effects meaning of technology avoidance, orientation towards innovation, as well as the impact of individual technology reception and evaluation on loneliness can be regarded as mediated by feelings of obsolescence.

Corresponding analyses revealed no evidence for control-mediated effects of technology issues on loneliness. Although substantive relations between loneliness, control beliefs, and technology use as well as technology acceptance were found, simultaneously regressing both aspects on loneliness did not lead to remarkable reduction in technology's explanatory power.

DISCUSSION

In an attempt to contribute to a better understanding of the link between modern technology and loneliness in old age, this paper points to the vital role of individual dispositions. A construct sensitive to both technological as well as societal change, perceived obsolescence was shown to influence the way personal and telephone contacts were responded to. With low social contacts and high obsolescence being detrimental to feelings of social and societal integration in their own rights, their

combination may compound feelings of loneliness far beyond additivity. Going further, feelings of being out of step with modern times were found to mediate the effects impact of low technological competence on loneliness. Given the accelerated obsolescence of both technological devices and user know-how, to keep up with technological progress may become a challenge not only for those persons who never learned how to use a computer. Thoughtful design and implementation of technology is needed to assure access to and orientation within modern society despite varying technological backgrounds and competences[15,16]. Low levels of personal contact were found to be less detrimental to those who reported a strong internal control focus. Though internal as well as external control beliefs were of predictive value for loneliness, individual experience with and acceptance of technology could not be found to influence control beliefs in a way that accounts for variation in reported loneliness. This failure to ascertain control-mediated effects of technology issues on loneliness challenges one of the most crucial links between technology and loneliness from a psychological point of view.

Although technological competence, i.e., individual experience with and positive appraisal of technology, can contribute to maintaining a sense of belonging and self-determination in old age, its mediated effects on loneliness are yet to be explored. It may also be worth the effort to rethink the current understanding of loneliness to better address some of those facets of social integration that may gain in relevance in old age.

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