

RESEARCH ARTICLE

Frequency of contact with friends and relatives via internet and psychosocial factors in middle-aged and older adults during the COVID-19 pandemic. Findings from the German Ageing Survey

André Hajek  | Hans-Helmut König

Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Hamburg Center for Health Economics, Hamburg, Germany

Correspondence

André Hajek, Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Hamburg Center for Health Economics, Martinistr. 52, 20246 Hamburg, Germany.

Email: a.hajek@uke.de

Funding information

Open access funding enabled and organized by Projekt DEAL

Abstract

Objectives: Previous studies have examined the association between frequency of contact with friends and relatives via internet and psychosocial factors (in terms of loneliness, life satisfaction and depressive symptoms). However, far less is known about such a link during the COVID-19 pandemic, particularly based on nationally representative samples. Therefore, the aim of this study was to examine this association among middle-aged/older adults.

Methods/Design: Data were taken from the short survey of the German Ageing Survey (June/July 2020, 3134 individuals in the analytical sample). The De Jong Gierveld scale was used to quantify loneliness, the Satisfaction with Life Scale was used to quantify life satisfaction and the 10-item version of the Center for Epidemiological Studies-Depression was used to quantify depressive symptoms.

Results: Regressions showed that—compared to daily users—less frequent users of the internet for contact with friends and relatives reported increased loneliness, lower life satisfaction and more depressive symptoms. With regard to covariates, better psychosocial factors were associated with medium education (compared to low education), living with partner in the same household (compared to singles), better self-rated health, and favourable COVID-19 factors (in terms of decreased feeling that the Corona crisis is a threat for oneself, not having an infection with the coronavirus and an increased feeling that you can influence an infection with the coronavirus yourself).

Conclusions: Data suggest that individuals with a high frequency of contact with friends and relatives via internet reported better psychosocial factors. Future research in other cultural settings are required.

KEYWORDS

cognitive well-being, Corona, COVID-19, depression, depressive symptoms, E-mail, Facebook, friends, information and communication technologies, internet, life satisfaction, loneliness,

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2021 The Authors. International Journal of Geriatric Psychiatry published by John Wiley & Sons Ltd.

online, psychosocial, SARS-CoV-2, satisfaction with life, Skype, social isolation, social media, social network, video chat

Key points

- Nationally representative data were used (collected during the pandemic).
- Compared to daily users-less frequent users of the internet for contact with friends and relatives reported increased loneliness, lower life satisfaction and more depressive symptoms.
- Daily contact with friends and relatives via internet may be particularly helpful when other ways to stay in regular contact (e.g., personal contact) are difficult or nearly impossible.
- Knowledge about such associations may assist in addressing individuals at risk for adverse psychosocial outcomes.

1 | INTRODUCTION

In the past few decades, contact with friends and relatives via internet (e.g., using e-mail, online social network sites such as Facebook or video telephone such as Skype) has become increasingly popular (e.g., due to increasing geographical distance to friends or relatives). While this is particularly the case among younger individuals, this is also the case for middle-aged and older adults. Since most of the individuals currently in middle age are familiar with those technical solutions to stay in contact, it is expected that the proportion of individuals in late life using such options will considerably increase in the upcoming years and decades. Moreover, in times of the COVID-19 pandemic, these technological solutions can help to stay in contact while practicing social distancing.

Thus far, a recent review¹ summarised the studies examining the association between online social media sites/video calls and loneliness among older adults based on nationally representative samples. This review concluded that the existing findings are mixed.¹ Moreover, they noted that the existing studies refer to a time period prior to COVID-19.¹ Similarly, only a few studies examined the association between contact with friends and relatives via internet and depressive symptoms as well as life satisfaction.² Another very recent scoping review identified positive associations between online social networking and life satisfaction, an enhanced communication with relatives and friends and decreased depressive symptoms.²

For example, based on data from a national representative sample of older adults in the United States, a recent study showed that users of video chat (such as Skype) had a lower risk of developing depression compared to non-users.³ Similarly, another study based on community-dwelling Medicare beneficiaries aged 65 and older in the United States showed that information and communication technologies (ICT) for different purposes can contribute to better self-rated health and a reduced likelihood of major depression.⁴ A recent German study also showed that individuals who used web-connected ICT reported lower levels of loneliness among the oldest old.⁵ However, these existing studies did not explicitly examine the association between contact with friends and relatives

via internet and psychosocial factors and were conducted prior to the COVID-19 pandemic. During times of the COVID-19 pandemic, individuals are forced to avoid personal contact ("social distancing"). Thus, modern technologies may particularly assist in maintaining contacts with friends and relatives during these times. Therefore, the aim of this present study was to fill this gap in knowledge based on data from a nationally representative sample during the COVID-19 pandemic.

Knowledge about such associations may assist in addressing individuals at risk for adverse psychosocial outcomes. For example, a recent study provided preliminary evidence that digital mental health interventions could reduce feelings of loneliness.⁶ In sum, this knowledge is important since these psychosocial factors are associated with successful ageing and mortality.⁷⁻⁹

We hypothesise that regular contact with friends and relatives via internet is associated with favourable psychosocial outcomes (i.e., decreased loneliness, higher life satisfaction and fewer depressive symptoms). Such contact via internet may—at least partly—compensate for a lack of personal contact—which may be unavailable due to time or geographic restrictions or due to social distancing during times of the COVID-19 pandemic. Thus, regular users may feel less lonely than individuals with less frequent contact with friends and relatives via internet. This regular contact via internet may also assist in maintaining old friendships and stay in contact with close relatives.² These (online) social contacts may ultimately contribute to increased satisfaction with life and fewer depressive symptoms.²

2 | MATERIALS AND METHODS

2.1 | Sample

Cross-sectional data was drawn from the German Ageing Survey (German language: "Deutscher Alterssurvey", DEAS), a nationally representative sample of individuals ≥ 40 years in Germany (i.e., second half of life). This wave (called "short survey") took place between 8 June and 22 July 2020 and focused on the COVID-19

pandemic and the living situation as well as everyday life of individuals in the second half of life.

This PAPI (Paper And Pencil Interview) survey included panel participants (i.e., participants who had participated in at least one former wave). In total, 4823 individuals took part in this wave. Among individuals with access to the internet, 3817 individuals responded to the outcome measure (analytical samples ranged from 3101 individuals to 3134 individuals due to missing values).

The response rate in this wave was 56.5%—which is similar to other German survey studies.¹⁰ Additional details with regard to the DEAS study can be found elsewhere.¹¹

2.2 | Dependent variables

The De Jong Gierveld scale was used to quantify loneliness. The short version consists of six items.¹² By averaging the items, the score was computed which ranges from 1 to 4 (with higher values reflecting higher loneliness). In our current study, Cronbach's alpha was 0.79. Favourable psychometric characteristics of this scale have been shown.¹²

Life satisfaction was assessed using the Satisfaction with Life Scale (SWLS)¹³ consisting of five items. By averaging the items, the final scale was calculated. It ranges from 1 to 5, with higher values corresponding to higher life satisfaction. Cronbach's alpha was 0.87 in our current study. Favourable psychometric properties of the SWLS have been shown.¹³

The 10-item version of the Center for Epidemiological Studies-Depression¹⁴ (CES-D) was used to quantify depressive symptoms. A sum score was calculated which ranges from 0 to 30 (with higher values reflecting more depressive symptoms). Cronbach's alpha equalled 0.85 in our study. It has very good psychometric properties.¹⁵

2.3 | Independent variables

Among individuals with access to the internet, the frequency of contact with friends and relatives via internet was used to quantify the key independent variable (exact wording: "Contact with friends and relatives (e.g. e-mail, Facebook, chat, video telephony like Skype)"—with the categories: never; 1 to 3 times a month; once a week; less often; several times a week; daily).

Several factors (socioeconomic factors, factors related to lifestyle, factors related to health and factors related to COVID-19) were included as covariates in our regression model: Age in years, sex (women; men), level of education (low education; medium education; high education; ISCED-97 classification¹⁶), labour force participation (currently employed; in retirement; currently not employed), situation of living (with partner in household; with partner, but without a common household; single), one or more children (absence of a child; presence), background of migration (no; yes), income (monthly household net income in Euro), region (East Germany; West

Germany), as well as type of district (rural districts; urban-rural districts; urban cities; large cities). Furthermore, frequency in physical activities and the frequency of walks was included in our regression model. In both cases, with the categories 'daily', 'several times a week', 'once a week', '1–3 times a month', 'less often' or 'never'. Moreover, self-rated health (ranging from 1 (very good) to 5 (very bad)) was included in our regression model. Additionally, the feeling that the Corona crisis is a threat for oneself (ranging from 0 [not at all a threat for me] to 10 [extreme threat for me]), the infection with the coronavirus of people in one's own personal environment (yes; no; don't know), one's own infection with the coronavirus (yes; no; don't know), and the feeling that you can influence an infection with the coronavirus yourself (from 1 = not at all to 7 = entirely) were included in our regression model.

2.4 | Statistical analysis

First, sample characteristics were calculated (stratified by the frequency of contact with friends and relatives via internet). Second, multiple linear regressions were performed to examine the association between the frequency of contact with friends and relatives via internet and social isolation and psychosocial factors. In a robustness check, full-information maximum likelihood (FIML) was used to deal with missing values. Statistical significance was set at $p < 0.05$. Stata 15.0 (Stata Corp) was used to conduct statistical analysis.

3 | RESULTS

3.1 | Description of the sample

Stratified by the frequency of contact with friends and relatives via internet, sample characteristics are shown in Table 1. On average, individuals were 67.6 years old (SD: 9.7 years; 46–98 years), with 49.4% being female.

The frequency of contact with friends and relatives via internet was associated with all three outcome measures and the majority of independent variables (except for region, income, and one's own infection with the coronavirus). For example, while individuals with daily contact with friends and relatives via internet had an average CES-D score of 7.7 (SD: 4.7), never users had an average CES-D score of 8.7 (SD: 4.8).

3.2 | Regression analysis

Findings of multiple linear regressions are shown in Table 2. Multiple linear regressions showed that—compared to daily users—less frequent users of the internet for contact with friends and relatives reported increased loneliness (e.g., once a week, $\beta = 0.12$, $p < 0.001$), lower life satisfaction (1–3 times a month, $\beta = 0.09$, $p < 0.05$) and

TABLE 1 Sample characteristics stratified by the frequency of contact with friends and relatives via internet (German Ageing Survey, short survey, n = 3817)

	Daily N = 1063	Several times a week N = 1315	Once a week N = 391	1–3 times a month N = 304	Less often N = 503	Never N = 241	Total N = 3817	p-value
Sex: N (%)								<0.001
Men	453 (23.5%)	694 (36.0%)	220 (11.4%)	171 (8.9%)	279 (14.5%)	113 (5.9%)	1930 (100.0%)	
Women	610 (32.3%)	621 (32.9%)	171 (9.1%)	133 (7.0%)	224 (11.9%)	128 (6.8%)	1887 (100.0%)	
Age (in years): Mean (SD)	65.1 (9.5)	68.1 (9.5)	69.8 (9.5)	69.1 (10.1)	69.4 (9.6)	67.5 (9.9)	67.6 (9.7)	<0.001
Educational level (ISCED-97 classification): N (%)								<0.001
Low (ISCED 0–2)	30 (27.8%)	35 (32.4%)	10 (9.3%)	9 (8.3%)	14 (13.0%)	10 (9.3%)	108 (100.0%)	
Medium (ISCED 3–4)	446 (26.4%)	526 (31.1%)	169 (10.0%)	127 (7.5%)	277 (16.4%)	145 (8.6%)	1690 (100.0%)	
High (ISCED 5–6)	587 (29.1%)	754 (37.4%)	212 (10.5%)	168 (8.3%)	211 (10.5%)	86 (4.3%)	2018 (100.0%)	
Employment status: N (%)								<0.001
Employed	423 (35.4%)	395 (33.0%)	102 (8.5%)	82 (6.9%)	124 (10.4%)	70 (5.9%)	1196 (100.0%)	
Retired	582 (24.0%)	854 (35.3%)	276 (11.4%)	206 (8.5%)	350 (14.5%)	153 (6.3%)	2421 (100.0%)	
Non-employed	37 (25.9%)	44 (30.8%)	13 (9.1%)	12 (8.4%)	22 (15.4%)	15 (10.5%)	143 (100.0%)	
Living situation: N (%)								0.01
Single	215 (29.1%)	219 (29.6%)	69 (9.3%)	58 (7.8%)	115 (15.6%)	63 (8.5%)	739 (100.0%)	
With partner in the same household	782 (27.4%)	1012 (35.4%)	309 (10.8%)	226 (7.9%)	359 (12.6%)	168 (5.9%)	2856 (100.0%)	
With partner without a common household	54 (31.6%)	60 (35.1%)	11 (6.4%)	14 (8.2%)	24 (14.0%)	8 (4.7%)	171 (100.0%)	
Having at least one child: N (%)								<0.01
No	75 (23.2%)	100 (31.0%)	27 (8.4%)	32 (9.9%)	56 (17.3%)	33 (10.2%)	323 (100.0%)	
Yes	945 (28.5%)	1158 (34.9%)	348 (10.5%)	253 (7.6%)	418 (12.6%)	198 (6.0%)	3320 (100.0%)	
Migration background: N (%)								0.02
No	1002 (27.6%)	1240 (34.1%)	374 (10.3%)	297 (8.2%)	488 (13.4%)	233 (6.4%)	3634 (100.0%)	
Yes	60 (33.9%)	72 (40.7%)	17 (9.6%)	7 (4.0%)	13 (7.3%)	8 (4.5%)	177 (100.0%)	
Household net income: Mean (SD)	4184.5 (6951.7)	4106.5 (7360.1)	5906.6 (31466.9)	4059.5 (9651.6)	3428.3 (8624.6)	3071.3 (2792.4)	4158.0 (12326.0)	0.057
Region: N (%)								0.058
West Germany	787 (28.7%)	960 (35.0%)	279 (10.2%)	211 (7.7%)	336 (12.2%)	173 (6.3%)	2746 (100.0%)	
East Germany	276 (25.8%)	355 (33.1%)	112 (10.5%)	93 (8.7%)	167 (15.6%)	68 (6.3%)	1071 (100.0%)	
Type of district: N (%)								0.01
Large cities	301 (28.3%)	395 (37.2%)	105 (9.9%)	82 (7.7%)	127 (12.0%)	52 (4.9%)	1062 (100.0%)	

TABLE 1 (Continued)

	Daily N = 1063	Several times a week N = 1315	Once a week N = 391	1-3 times a month N = 304	Less often N = 503	Never N = 241	Total N = 3817	p-value
Urban cities	412 (28.6%)	502 (34.8%)	149 (10.3%)	121 (8.4%)	163 (11.3%)	94 (6.5%)	1441 (100.0%)	
Urban-rural cities	215 (27.9%)	234 (30.4%)	85 (11.0%)	58 (7.5%)	121 (15.7%)	57 (7.4%)	770 (100.0%)	
Rural districts	135 (24.8%)	184 (33.8%)	52 (9.6%)	43 (7.9%)	92 (16.9%)	38 (7.0%)	544 (100.0%)	
Engagement in physical activities: N (%)								<0.001
Daily	167 (36.5%)	138 (30.1%)	37 (8.1%)	35 (7.6%)	53 (11.6%)	28 (6.1%)	458 (100.0%)	
Several times a week	418 (29.9%)	532 (38.0%)	140 (10.0%)	97 (6.9%)	155 (11.1%)	57 (4.1%)	1399 (100.0%)	
Once a week	178 (25.3%)	253 (36.0%)	82 (11.7%)	66 (9.4%)	87 (12.4%)	37 (5.3%)	703 (100.0%)	
1-3 times a month	56 (22.0%)	90 (35.4%)	26 (10.2%)	31 (12.2%)	33 (13.0%)	18 (7.1%)	254 (100.0%)	
Less often	180 (26.5%)	207 (30.4%)	75 (11.0%)	50 (7.4%)	115 (16.9%)	53 (7.8%)	680 (100.0%)	
Never	59 (19.5%)	87 (28.8%)	30 (9.9%)	24 (7.9%)	56 (18.5%)	46 (15.2%)	302 (100.0%)	
Frequency of walks: N (%)								<0.001
Daily	249 (34.7%)	224 (31.2%)	71 (9.9%)	42 (5.9%)	88 (12.3%)	43 (6.0%)	717 (100.0%)	
Several times a week	397 (27.3%)	545 (37.5%)	155 (10.7%)	108 (7.4%)	168 (11.5%)	82 (5.6%)	1455 (100.0%)	
Once a week	172 (26.5%)	228 (35.1%)	70 (10.8%)	69 (10.6%)	73 (11.2%)	38 (5.8%)	650 (100.0%)	
1-3 times a month	71 (25.6%)	88 (31.8%)	25 (9.0%)	32 (11.6%)	42 (15.2%)	19 (6.9%)	277 (100.0%)	
Less often	134 (23.4%)	189 (33.0%)	56 (9.8%)	48 (8.4%)	104 (18.2%)	41 (7.2%)	572 (100.0%)	
Never	36 (29.5%)	30 (24.6%)	12 (9.8%)	5 (4.1%)	21 (17.2%)	18 (14.8%)	122 (100.0%)	
Self-rated health (from 1 = very good to 5 = very bad): Mean (SD)	2.3 (0.8)	2.4 (0.7)	2.5 (0.8)	2.5 (0.8)	2.5 (0.8)	2.5 (0.8)	2.4 (0.8)	<0.001
Feeling that the Corona crisis is a threat for oneself (from 0 = not at all a threat for me to 10 = extreme threat for me): Mean (SD)	3.9 (2.1)	4.1 (2.1)	4.0 (2.0)	4.3 (2.2)	3.9 (2.1)	4.2 (2.4)	4.0 (2.1)	0.04
Infection with the coronavirus of people in one's own personal environment: N (%)								<0.001
Yes	125 (40.6%)	107 (34.7%)	25 (8.1%)	23 (7.5%)	19 (6.2%)	9 (2.9%)	308 (100.0%)	
No	896 (26.7%)	1154 (34.4%)	350 (10.4%)	269 (8.0%)	462 (13.8%)	220 (6.6%)	3351 (100.0%)	
Don't know	33 (25.0%)	48 (36.4%)	11 (8.3%)	10 (7.6%)	19 (14.4%)	11 (8.3%)	132 (100.0%)	
One's own infection with the coronavirus: N (%)								0.97
Yes	4 (23.5%)	8 (47.1%)	1 (5.9%)	2 (11.8%)	1 (5.9%)	1 (5.9%)	17 (100.0%)	
No	991 (27.9%)	1227 (34.5%)	365 (10.3%)	282 (7.9%)	464 (13.1%)	226 (6.4%)	3555 (100.0%)	

(Continues)

TABLE 1 (Continued)

	Daily N = 1063	Several times a week N = 1315	Once a week N = 391	1–3 times a month N = 304	Less often N = 503	Never N = 241	Total N = 3817	p-value
Don't know	56 (26.0%)	75 (34.9%)	20 (9.3%)	20 (9.3%)	31 (14.4%)	13 (6.0%)	215 (100.0%)	
Feeling that you can influence an infection with the coronavirus yourself (from 1 = not at all to 7 = entirely): Mean (SD)	4.6 (1.4)	4.6 (1.3)	4.6 (1.4)	4.7 (1.3)	4.3 (1.5)	4.2 (1.8)	4.5 (1.4)	<0.001
Loneliness (6-item De Jong Gierveld loneliness scale; from 1 to 4, with higher values reflecting higher loneliness levels): Mean (SD)	1.8 (0.5)	1.9 (0.5)	1.9 (0.5)	2.0 (0.5)	2.0 (0.5)	2.0 (0.6)	1.9 (0.5)	<0.001
Life satisfaction (Satisfaction with Life Scale (SWLS); with from 1 to 5, with higher values corresponding to higher satisfaction with life): Mean (SD)	3.9 (0.7)	3.9 (0.7)	3.9 (0.6)	3.8 (0.7)	3.8 (0.7)	3.7 (0.8)	3.9 (0.7)	<0.001
Depressive symptoms (10-item CES-D; from 0 to 30, with higher values reflecting more depressive symptoms): Mean (SD)	7.7 (4.7)	8.1 (4.6)	8.5 (4.8)	9.0 (5.0)	8.7 (4.6)	8.7 (4.8)	8.2 (4.7)	<0.001

more depressive symptoms (e.g., 1–3 times a month, $\beta = 0.60$, $p < 0.01$).

With regard to covariates, all psychosocial outcomes were associated with medium education (compared to low education), living with partner in the same household (compared to singles), better self-rated health, and favourable COVID-19 factors (in terms of decreased feeling that the Corona crisis is a threat for oneself, not having an infection with the coronavirus and an increased feeling that you can influence an infection with the coronavirus yourself).

Moreover, being female was associated with lower loneliness and higher life satisfaction. However, it was also associated with increased depressive symptoms.

In a robustness check, FIML was used to handle missing values. However, the association between the frequency of contact with friends and relatives via internet and the psychosocial factors remained nearly the same (results not shown, but available upon request).

4 | DISCUSSION

Drawing on data from a large nationally representative sample, the aim of this study was to clarify the association between frequency of contact with friends and relatives via internet and psychosocial factors (in terms of loneliness, life satisfaction and depressive symptoms) in middle-aged and older adults. Compared to individuals with daily contact with friends and relatives via internet, less frequent users reported worse psychosocial factors. In sum, this study adds to the limited knowledge regarding the frequency of contact with friends and relatives via internet and psychosocial factors based on nationally representative data.^{1–5}

Particularly in times of increasing geographic distances to relatives and friends as well as in times of the COVID-19 pandemic with its social distancing actions, it seems reasonable that ways to stay in regular contact with friends and relatives are important for individual psychosocial well-being (in terms of reduced loneliness, increased life satisfaction and fewer depressive symptoms). Thus, a possible mechanism may be that regular contact with friends and relatives via internet can enhance the communication with relatives and friends.² Such social interactions may therefore lead to better psychosocial well-being.²

Based on these results one could assume that daily contact with friends and relatives via internet may be particularly helpful when other ways to stay in regular contact (e.g., personal contact) are difficult or nearly impossible. However, future research is required to clarify whether daily contact with friends and relatives via internet is just as enriching and fulfilling in terms of psychosocial factors when personal contact with friends and relatives is also available without any major restrictions (e.g., in more rural regions where friends and relatives often live nearby).

With regard to sociodemographic and health-related covariates, our findings are mainly in accordance with previous

TABLE 2 Correlates of loneliness, life satisfaction and depressive symptoms. Results of multiple linear regression analysis (German Ageing Survey, short survey)

Independent variables	Loneliness	Life satisfaction	Depressive symptoms
Frequency of contact with friends and relatives via internet: - Several times a week (ref.: Daily)	0.04 (0.02)	-0.02 (0.03)	0.24 (0.18)
Once a week	0.12*** (0.03)	-0.07+ (0.04)	0.50* (0.26)
1-3 times a month	0.13*** (0.04)	-0.09* (0.04)	0.60** (0.28)
Less often	0.12*** (0.03)	-0.06 (0.04)	0.41* (0.23)
Never	0.15*** (0.05)	-0.08 (0.05)	0.13 (0.31)
Sex: Women (ref.: Men)	-0.05** (0.02)	0.09*** (0.02)	0.82*** (0.15)
Age	-0.01*** (0.00)	0.01*** (0.00)	-0.00 (0.01)
Educational level (ISCED-97 classification): - Low education (ref.: Medium education)	0.15* (0.07)	-0.20* (0.08)	1.40*** (0.51)
High education	-0.01 (0.02)	0.04+ (0.02)	-0.03 (0.15)
Employment status: - Retired (ref.: Employed)	0.02 (0.03)	-0.03 (0.04)	-0.41* (0.24)
Non-employed	0.00 (0.06)	-0.14+ (0.08)	-0.06 (0.41)
Living situation: - With partner in the same household (ref.: Single)	-0.15*** (0.03)	0.35*** (0.03)	-0.81*** (0.20)
With partner without a common household	-0.06 (0.05)	0.13* (0.06)	-0.37 (0.38)
Having at least one child: - Yes (ref.: No)	-0.05 (0.03)	0.02 (0.04)	0.01 (0.27)
Migration background: - Yes (ref.: No)	0.08+ (0.05)	-0.21*** (0.06)	-0.01 (0.34)
Household net income (in 1000 €)	-0.00 (0.00)	0.00+ (0.00)	-0.00 (0.01)
Region: East Germany (ref.: West Germany)	-0.14*** (0.02)	-0.01 (0.03)	-0.40** (0.17)
Type of district: - Large cities (ref.: Rural districts)	-0.02 (0.03)	0.02 (0.04)	0.02 (0.23)
Urban cities	0.03 (0.03)	0.05 (0.04)	0.23 (0.23)
Urban-rural cities	0.03 (0.03)	0.08* (0.04)	0.03 (0.23)

(Continues)

TABLE 2 (Continued)

Independent variables	Loneliness	Life satisfaction	Depressive symptoms
Frequency of physical activities: - Daily (ref.: Never)	0.03 (0.03)	-0.01 (0.04)	0.18 (0.23)
Several times a week	0.04 (0.03)	-0.05 (0.04)	0.58** (0.26)
1-3 times a month	0.05 (0.04)	-0.05 (0.05)	0.29 (0.34)
1-3 times a month	0.03 (0.04)	-0.07 (0.04)	0.72*** (0.27)
Less often	0.03 (0.05)	-0.06 (0.06)	0.86** (0.39)
Frequency of walks: - Daily (ref.: Never)	-0.03 (0.03)	0.06+ (0.03)	0.01 (0.21)
Several times a week	-0.05 (0.03)	0.06 (0.04)	-0.38 (0.24)
1-3 times a month	-0.00 (0.04)	0.06 (0.05)	-0.23 (0.32)
1-3 times a month	-0.03 (0.03)	-0.01 (0.04)	0.22 (0.26)
Less often	-0.03 (0.07)	-0.09 (0.09)	-0.44 (0.48)
Self-rated health (from 1 = very good to 5 = very bad)	0.15*** (0.01)	-0.35*** (0.02)	2.97*** (0.11)
Feeling that the Corona crisis is a threat for oneself (from 0 = not at all a threat for me to 10 = extreme threat for me)	0.03*** (0.00)	-0.03*** (0.01)	0.24*** (0.04)
Infection with the coronavirus of people in one's own personal environment: - No (ref.: Yes)	0.02 (0.03)	-0.04 (0.04)	0.13 (0.27)
Don't know	-0.02 (0.06)	-0.14+ (0.08)	0.64 (0.49)
One's own infection with the coronavirus: - No (ref.: Yes)	0.42*** (0.12)	-0.37*** (0.06)	5.09** (2.32)
Don't know	0.53*** (0.13)	-0.45*** (0.08)	5.75** (2.33)
Feeling that you can influence an infection with the coronavirus yourself (from 1 = not at all to 7 = entirely)	-0.02** (0.01)	0.03*** (0.01)	-0.25*** (0.05)
Constant	1.90*** (0.16)	3.84*** (0.14)	-4.40* (2.45)
Observations	3101	3120	313
R ²	0.14	0.27	0.33

Note: Beta-coefficients (unstandardised) are reported; robust standard errors in parentheses; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.

research (e.g.,¹⁷⁻²⁰). Interestingly, favourable COVID-19 factors (in terms of decreased feeling that the Corona crisis is a threat for oneself, not having an infection with the coronavirus and an increased feeling that you can influence an infection with the coronavirus yourself) are associated with better psychosocial factors. We assume that these COVID-19 related factors reflect positive attitudes (e.g., optimism or general self-efficacy). However, since studies are missing particularly based on nationally representative samples, future research is needed to confirm the association between COVID-19 factors and psychosocial variables.

Our study has some strengths. To the best of our knowledge, the current study is the first investigating the association between the use of contact with friends and relatives via internet and psychosocial factors based on a nationally representative sample of older adults during the COVID-19 pandemic. The outcome measures were quantified using well-established and widely used tools. It was adjusted for several potential confounders. However, it should be noted that the key independent variable was rather broadly quantified (contact with friends and relatives via internet). For example, it could also involve smartphone use. Furthermore, it was not distinguished between, for example, video chat and e-mail communication. Thus, future studies with more pronounced questions are required. Additionally, curvilinear relationships between social communication technologies and psychosocial factors could be further explored.²¹ Furthermore, technology factors such as connectivity (e.g., poor/intermittent connection vs. good quality connection) may have an impact on the association between contact with friends and relatives via internet and psychosocial outcomes. Thus, the role of technology factors in this association should be further explored. Similarly, the role of providing private care for individuals in poor health in this association could be examined in upcoming studies. Moreover, a slight sample selection bias has been identified in the DEAS study.¹¹ Furthermore, the possibility cannot be dismissed that the directionality is from, for example, depressive symptoms to frequency of contact with friends and relatives via internet.

In conclusion, data suggest that individuals with a high frequency of contact with friends and relatives via internet reported better psychosocial factors. Efforts related to broadband infrastructure may mitigate the impact of future pandemics on psychosocial factors. Future research in other cultural settings is required. Moreover, the underlying reasons should be further explored. Additionally, longitudinal studies are needed to clarify the directionality.

ACKNOWLEDGEMENT

This research received no external funding.

Open access funding enabled and organized by Projekt DEAL.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICS APPROVAL STATEMENT

The study was conducted in accordance with the Declaration of Helsinki. All participants provided a written consent to participate

in the DEAS study. An ethics statement for the DEAS study was not needed, as the criteria for it were not met (e.g., examination of patients, risk for the respondents, or the use of invasive methods).

DATA AVAILABILITY STATEMENT

The anonymised data used in this study were obtained from the 'Deutsches Zentrum für Altersfragen'. Access can be obtained after application, please visit the following website for further information Access to DEAS data: Deutsches Zentrum für Altersfragen (dza.de).

PATIENT CONSENT STATEMENT

Not applicable.

PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

Not applicable.

CLINICAL TRIAL REGISTRATION

Not applicable.

ORCID

André Hajek  <https://orcid.org/0000-0002-6886-2745>

REFERENCES

- Hajek A, König H-H. Social isolation and loneliness of older adults in times of the CoViD-19 pandemic: can use of online social media sites and video chats assist in mitigating social isolation and loneliness? *Gerontology*. 2021;67(1):121-124.
- Chen E, Wood D, Ysseldyk R. Online social networking and mental health among older adults: a scoping review. *Can J Aging/La Revue canadienne du vieillissement*. 2021:1-14.
- Teo AR, Markwardt S, Hinton L. Using Skype to beat the blues: longitudinal data from a national representative sample. *Am J Geriatr Psychiatry*. 2019;27(3):254-262.
- Kim J, Lee HY, Won CR, Barr T, Merighi JR. Older adults' technology use and its association with health and depressive symptoms: findings from the 2011 National Health and Aging Trends Study. *Nurs Outlook*. 2020;68(5):560-572.
- Schlomann A, Seifert A, Zank S, Woopen C, Rietz C. Use of information and communication technology (ICT) devices among the oldest-old: loneliness, anomie, and autonomy. *Innov Aging*. 2020;4(2):igz050.
- Boucher EM, McNaughton EC, Harake N, Stafford JL, Parks AC. The impact of a digital intervention (Happify) on loneliness during COVID-19: qualitative focus group. *JMIR Ment health*. 2021;8(2):e26617.
- Newall NE, Chipperfield JG, Bailis DS, Stewart TL. Consequences of loneliness on physical activity and mortality in older adults and the power of positive emotions. *Health Psychol*. 2013;32(8):921-924.
- Vahia IV, Meeks TW, Thompson WK, et al. Subthreshold depression and successful aging in older women. *Am J Geriatr Psychiatry*. 2010;18(3):212-220.
- Wiest M, Schüz B, Wurm S. Life satisfaction and feeling in control: indicators of successful aging predict mortality in old age. *J Health Psychol*. 2013;18(9):1199-1208.
- Neller K. Kooperation und Verweigerung. Eine Non-Response-Studie [Co-operation and refusal: a non-response study]. *ZUMA Nachr*. 2005;29(57):9-36.

11. Klaus D, Engstler H, Mahne K, et al. Cohort profile: the German ageing survey (DEAS). *Int J Epidemiol*. 2017;46(4):1105-1105g.
12. Gierveld DJJ, Tilburg TV. A 6-item scale for overall, emotional, and social loneliness: confirmatory tests on survey data. *Res aging*. 2006;28(5):582-598.
13. Pavot W, Diener E. Review of the satisfaction with life scale. *Psychol Assess*. 1993;5(2):164-172.
14. Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: evaluation of a short form of the CES-D. *Am J Prev Med*. 1994;10(2):77-84.
15. Mohebhi M, Nguyen V, McNeil JJ, et al. Psychometric properties of a short form of the Center for Epidemiologic Studies Depression (CES-D-10) scale for screening depressive symptoms in healthy community dwelling older adults. *Gen Hosp Psychiatr*. 2018;51: 118-125.
16. UNESCO. *International Standard Classification of Education*. ISCED 1997. Re-edition ed. UNESCO; 2006.
17. Dahlberg L, McKee KJ, Frank A, Naseer M. A systematic review of longitudinal risk factors for loneliness in older adults. *Aging Ment Health*. 2021;1-25.
18. Diener E, Lucas RE, Oishi S. Subjective well-being: the science of happiness and life satisfaction. In: Lopez SJ, Snyder CR, eds. *The Oxford Handbook of Positive Psychology*. 2. Oxford University Press; 2002:187-194.
19. Hajek A, König H-H. Which factors contribute to loneliness among older Europeans? Findings from the survey of health, ageing and retirement in europe: determinants of loneliness. *Arch Gerontol Geriatr*. 2020;89:104080.
20. Wang J, Wu X, Lai W, et al. Prevalence of depression and depressive symptoms among outpatients: a systematic review and meta-analysis. *BMJ open*. 2017;7(8):e017173.
21. Resor J, Cooke S, Katz B. The role of social communication technologies in cognition and affect in older adults. *Ageing Soc*. 2021:1-29.

How to cite this article: Hajek A, König H-H. Frequency of contact with friends and relatives via internet and psychosocial factors in middle-aged and older adults during the COVID-19 pandemic. Findings from the German Ageing Survey. *Int J Geriatr Psychiatry*. 2021;1-10. <https://doi.org/10.1002/gps.5623>