"First Do No Harm": Cross-sectional and longitudinal evidence for the impact of individual suicidality on the use of online health forums and support groups

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Abstract

Suicide is a leading cause of death worldwide, especially among the young. This study aims to disentangle the presumed causality between the use of online health forums or support groups and suicidality using a representative telephone survey and a two-wave online panel survey containing the same question wording. Cross-sectional data show positive correlations between suicidality and online health forum use, but not limited to the younger. Using longitudinal panel data and autoregressive models, a positive cross-lagged effect of suicidality on internet-based health forum use one month later was revealed. Despite the wide-spread notion that online health forums can increase suicidality the present study provides evidence for the preventive potential of accessible and helpful information online.

Keywords: Media use, suicidality, internet, online forums, online support groups

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1 Introduction

Suicide is a leading cause of death worldwide for which the media are a recognized risk factor (WHO, 2014). Especially since the triumph of the internet in modern societies, the chances and dangers of online media for individual well-being in general have been controversially discussed: Hence, the role of the internet for individual suicidality is best described as a "double-edged sword" meaning that the internet embraces both protective and harmful influences (Amichai-Hamburger, Klomek, Friedman, Zuckerman, & Shani-Sherman, 2014; Daine et al., 2013; Mok, Jorm, & Pirkis, 2015; Till & Niederkrotenthaler, 2014). Besides face-to-face communication, help-seeking behavior has been associated more and more frequently with computer-mediated communication (Barak, Boniel-Nissim, & Suler, 2008; Bell, 2014; Tanis, 2008). Hence, not only recently, researchers have shown interest in the importance of health forums and online support groups for user's health in general (Houston & Allison, 2002; Sueki & Eichenberg, 2012), often with a special focus on age differences (Bol et al., 2016; Miller Soederberg & Bell, 2012), and especially for suicidality (Bell, 2014; Chung, 2014; Daine et al., 2013; Eysenbach, 2004; Horne & Wiggins, 2009; Sueki, 2013). In the context of suicidality, the status quo is best reflected by a "functional paradox" of online health forums and support groups: A "suicide-preventive" as well as a "suicide-inducing function" (Sueki & Eichenberg, 2012, p. 565).

In the present study, we combine a cross-sectional representative sample to examine the extent to which suicidality can be predicted from the use of online health forums or support groups in the general population, and due to the heterogeneous sample, we lay a special focus on the moderating role of age. Moreover, using longitudinal panel data, we examine the temporal causality between suicidality and the use of health forums and support groups and want to add knowledge on

this so far uncleared issue. Therefore, our study aims at contributing to three major questions that are unanswered so far: 1) Where does it fall short when the discussion about helpful or harmful effects of the internet is limited to younger people (*range of effect*)? 2) Do the positive (suicide-preventing) or negative (suicide-inducing) effects of online health forums or support groups prevail (*valence of effect*)? 3) Is suicidality the driving force for specific internet use or is the use of specific websites the driving force for suicidality (*direction of causality*) (see Sueki, 2013, p. 348)? To address these research gaps this paper draws on a survey that is representative for the German general population ($N = 2002$) and an accompanying large-scale two-wave panel survey ($N = 1377$ completed interviews in both waves) in Germany with a different sample that use the same question wording. The first set of data is used to answer the question whether the use of online health forums and its potential effects are mainly confined to younger people. The latter dataset is used to disentangle the remaining two questions on the valence and causality of the media effect.

We begin by reviewing prior research on the effects of online forums and support groups on suicidality and then turn to the body of research that applies the opposite perspective and asks for the effects of suicidality on the use of online health forums and support groups. Although the dataset is surely limited in certain aspects (e.g. the use of health forums or support groups was measured with a single-item about the frequency of use), it offers a unique opportunity to analyze suicidality and the use of specific online media within the German population over 18 and over the course of a month. Moreover, the dataset is remarkable for using a very detailed measure of suicidality that is well-suited for measuring suicidality in the general population.

1.1 The Effects of Online Forums and Support Groups on Suicidality

The relevance of social support through computer-mediated communication for the psychosocial health of its users has been intensively discussed for years (Wright & Bell, 2003). Lately, Daine et al. (2013) presented a systematic review of studies on the positive and negative

effects of the internet on the individual suicidality especially of younger people. The study found both positive and negative influences of the internet on its users. Assets and drawbacks of online media such as health forums, newsgroups (Baume, Cantor, & Rolfe, 1997), or chats are often contrasted (Eichenberg, 2008; Fiedler, 2003), while some authors, at the same time, point to the fact that media influences on suicidality should not be overestimated at all (Fiedler, 2003).

Systematic reviews of the literature on the positive or negative effects of online support groups and virtual communities showed no clear evidence for virtual communities harming people (Eysenbach, 2004; Robert, Suelves, Armayones, & Ashley, 2015). Given the fact that most of the online support groups and forums are unmoderated, Eysenbach (2004) concludes that the "true" effectiveness of these resources is not yet sufficiently explored. At heart, this notion is in line with studies on the effects of online support groups showing that these websites can exert negative influences on self-stigmatization only when online support group visits are excessive (Lawlor & Kirakowski, 2014). If so, it is argued that the time spent on these websites is no longer available for social interaction or other social activities.

Overall, empirical studies on this issue are sparse. One exception is a study conducted by Miller and Gergen (1998) who analyzed 232 entries in an online mental health bulletin board with a more specific focus on suicide over eleven months and found that the majority of the entries was positive. More than half of the comments came from less than one quarter of the participants (Miller & Gergen, 1998, p. 195) indicating that while most visitors (actively or passively) use such online message boards occasionally there is a core group that substantially contributes to the board. And amazingly enough, most of all entries were categorized as help-seeking behaviors followed by empathic and encouraging responses (Miller & Gergen, 1998). Maintaining this perspective, we want to briefly discuss the assets and drawbacks of suicide forums and support groups on individual suicidality.

1.1.1 Beneficial effects of online activity on individual suicidality. Online forums about suicidality can have positive effects especially for those who avoid therapeutic treatment and can motivate them to seek help in the first place (Barak, 2007; Becker, Mayer, Nagenborg, El-Faddagh, & Schmidt, 2004; Gilat & Shahar, 2009). Moreover, online forums can provide emergency aid to those who are in acute danger of dying by suicide and they can also provide social support (Eichenberg, 2008; Gilat & Shahar, 2007). Accordingly, a multi-method study conducted by Winkel, Groen, and Petermann (2005) shows that the users of suicide websites obtained a broad range of social support with a low level of social strain. Forums and support groups can unburden and stabilize its users, provide them with helpful information about where and how to seek help, and can contribute to public destigmatization of suicidality and associated diseases such as depression (Houston, Cooper, & Ford, 2002). That is in line with the observation of Miller and Gergen (1998) who concluded that participants maintain a high degree of respect and care for each other. For clinicians and therapists, online forums can be an important source for after-care, e.g. with regard to people in sparsely inhabited regions or may be helpful in establishing a relationship between patient and therapist in the first place (Amichai-Hamburger et al., 2014).

1.1.2 Harmful effects of online activity on individual suicidality. Online forums and support groups can exert negative effects on its users when people use them to exchange means and instructions about how to die by suicide (A. L. Alao, Yolles, & Armenta, 1999). Moreover, such online discussions can destabilize vulnerable people and prevent them from seeking professional help. In addition, people can arrange to meet each other to die by suicide together (so called "suicide pacts") (Becker et al., 2004; Rajagopal, 2004). Whenever information is not professionally moderated or reviewed there is the danger of poor information about suicidality, no quality management or even the possibility of an abuse of the forum to insult other members, even for not being authentically suicidal. Horne and Wiggins (2009) show a paradoxical effect that not being

"authentically suicidal" in an online health forum can evoke offensive reactions of other forum members which in turn can enhance suicidal thoughts for those who were originally looking for helpful information (see Horne and Wiggins, 2009). Finally, Alao, Soderberg, Pohl, and Alao (2006, p. 490) summarize that especially young people put themselves in danger when surfing on suicide websites or using chat rooms as the younger "have a higher incidence of risk-taking behavior, co-morbid substance abuse, and depressive disorder"—especially those with only limited social support.

1.2 The Effects of Suicidality on the Use of Health Forums and Support Groups

While on the one hand the internet can contribute to triggering individual suicidality (i.e. help and harm; see Durkee, Hadlaczky, Westerlund, & Carli, 2011), the reverse perspective is that individual suicidality can trigger online behaviors in the same way. In this line of research, we find studies that examine specific online behaviors of suicidal persons as well as studies that focus on specific online behaviors of those bereaved by suicide. Lately, Mok et al. (2015) published their literature review on the use of the internet by suicidal people. Taken together, the literature either focuses on individual suicidality engendering either harmful or helpful suicide-related surfing behaviors. It is important to note that there is a wide range of different health-related online forums and websites to which suicidal persons might go to. It were Biddle et al. (2012) who provide an overview of the different websites suicidal persons have turned to find information about suicide. According to their analysis, the websites that were more frequently used by suicidal persons were "those containing professional information and resources (including online chemists), general knowledge sites (e.g. Wikipedia), or news sites, including BBC news. Specific 'suicide sites' were accessed less frequently" (p. 705). Moreover, based on a network analysis of suicide websites, Kemp and Collings (2011) found that information/education websites are the largest category, while harmful pro-suicide websites are generally only poorly linked with other websites. Taken together,

the range of relevant websites for suicidal people extends beyond health forums and support groups, but such websites are used as sources of suicide-relevant information among suicidal users as well (Biddle et al., 2012).

1.2.1 Evidence for suicidality engendering helpful surfing behavior. Eichenberg (2008) conducted a survey in a suicide forum in Germany and reports that suicidal people visited an internet message board to meet other suicidal people or to share their own problems with others. In contrast, seeking information about professional help or finding someone for a "suicide pact" were by far less important motives to visit the website. Another very insightful study was conducted by Harris, McLean, and Sheffield (2009) who compared online behaviors of suicide-risk individuals who go online for suicidal purposes and suicidal online users who do not go online for suicide-related purposes. The study shows that suicide-risk individuals are less likely to seek help and perceive less social support. In addition, suicidal users regularly go online mainly to get information and support, and to communicate with others. Although most of the suicidal online users searched for suicide related-information, only about 2% of the suicidal user sample in this study ($N = 165$) used the internet for obtaining information about suicide methods Harris et al. (2009, p. 269). The most frequently used websites of suicidal users were open forums where users can find people similar to them and that were described as "supportive rather than negative" (Harris et al., 2009, p. 270). With regard to specific online communication purposes, suicidal users indicated that they primarily wanted to talk to other users (56.1%), being helped other users (49.1%) or ask for help by themselves (28.1%). Moreover, most of the suicidal users reported that they had contact with similar persons online (Harris et al., 2009, pp. 270-271). Most importantly, 69.7% of the suicidal online users ($N = 165$) indicated that going online for suicidal purposes helped them to overcome acute suicidality. Although these exploratory results offer promising insights into the spectrum of helpful media effects in the context of suicidality, the authors acknowledge that

their sample is not representative of (suicidal) online users (Harris et al., 2009, p. 273) and that causality could not be tested as they used cross-sectional data. D. Baker and Fortune (2008) take the same line, by interviewing 10 suicidal users of so called pro-suicide websites considered being harmful. The study provides further evidence for the fact that suicidal users turn to these websites to obtain empathy and understanding of other users, to feel part of a community, and to cope with their problems. Finally, the impact of suicidality on the use and helpfulness of health forums or support groups is not limited to those who are suicidal themselves but also to people bereaved by the suicide of a friend or relative (Kramer et al., 2015; Krysinska & Andriessen, 2010; Stjernsward & Ostman, 2011). Taken together, there is existing evidence that internet users turn to a wide range of health-related websites obtain helpful information and social support when feeling suicidal (Recupero, Harms, & Noble, 2008; Till & Niederkrotenthaler, 2014; Wong et al., 2013). Till and Niederkrotenthaler (2014) found that protective characteristics on suicide-related websites outweighed the number of harmful characteristics by approximately 2:1. Nevertheless, research also suggests that individual suicidality may influence to what degree people are looking for help online. Hence, until now, research lacks from empirical evidence based upon large samples and longitudinal data to explore the influence of suicidality on the use of helpful websites which would be an important indicator for the suicide preventive potential of these websites.

1.2.2 Evidence for suicidality engendering harmful surfing behavior. On the other hand, (Becker et al., 2004) describe the probably worst scenario: They present a case report of a 17-year-old female with a history of suicide ideation who visited unmoderated online forums searching for reliable methods for committing suicide. Here, a history of suicidality is responsible for specific online search behaviors that are aimed at committing suicide. In line with this research is a study of Chapple and Ziebland (2011) that uses a maximum variation sample of forty men and women bereaved by suicide. They found that in most cases, people bereaved by suicide are looking for

information and social support (besides offline support), but they also actively set up online memorials for their lost friends or relatives to cope with suicide. Nevertheless, the authors also express their concerns about specific online behaviors of those bereaved by suicide. Bereaved people expressed that they were afraid of googling 'suicide' to prevent that others might think that they were suicidal themselves. Others expressed that the internet is too impersonal for them, while again others report addictive surfing behaviors while disregarding offline therapy or social activities which they regarded as harmful for themselves (Chapple & Ziebland, 2011). Finally, Sueki (2012) found that young people predisposed to suicidality are more prone to search for harmful information online. This finding is based on a cross-sectional online study with a young non-probability sample of 1000 participants that reveals that harmful internet search behaviors are significantly associated with increased suicidality of the users. Sueki (2012, p. 453) concludes that suicidal people are more likely to require help than people with better mental health status. Nevertheless, Sueki (2012, p. 453) expressed two shortcomings of the study: sample bias and a lack of longitudinal data. Both shortcomings were addressed in a subsequent longitudinal study (Sueki, 2013). The two-wave panel study yielded a heterogeneous sample of 850 participants who provided answers in both waves. The study shows that browsing websites about suicide methods increased suicidal ideation and the greater the individual suicide ideation, the more was the use of the internet. Observed effect sizes were only of medium strength ($r < .18$) and no form of suicide-related internet use could decrease individual suicide risk. But, the author concludes that "findings on the causal relationship between Internet usage and suicide [should be accumulated]" (Sueki, 2013, p. 352).

In a prospective cohort study using a young and middle aged sample Sueki, Yonemoto, Takeshima, and Inagaki (2014) show that increased suicidal ideation was associated with suicide-related internet use (i.e. disclosing one's suicidal ideation or browsing for information about suicide) during the 6-week period of the study. Effect sizes were medium strong ($.37 < \beta < .55$) and consistently pointing in the same (harmful) direction. Nevertheless, prospective research on this field is sparse (see Carli et al., 2013) and more empirical evidence is necessary to estimate the potentials or dangers of the internet for suicide prevention. Hence, cross-cultural replications are urgently required, especially with insights into the age range of observed effects.

It was Sueki (2013) who first explored both cross-lagged and synchronous effects of internet usage on different psychological variables. However, the author failed at reaching reliable goodness-of-fit values for the cross-lagged model and thus only presented the results of the synchronous model. While Sueki (2013) explored a survey interval of three months between the two waves of the panel design.

Our study addresses the three research gaps in existing research: These are 1) whether helpful or harmful effects of the internet is limited to younger people, 2) whether positive or negative effects of online health forums or support groups prevail, and 3) whether suicidality is the driving force for specific internet use or vice versa. We will address the three research gaps by answering to our two research questions. Until now, most of the existing studies assume that younger people will be more prone to negative health-related internet effects (Chen & Persson, 2002; Daine et al., 2013; Dunlop, More, & Romer, 2011), although studies point to the importance of the internet for health related issues or the well-being of older people as well (Gatto & Tak, 2008; McMillan & Macias, 2008; Sueki et al., 2014; Sum, Mathews, Pourghasem, & Hughes, 2008). It is often argued that the younger will feel more socially isolated when using the internet more frequently, while older internet users have the positive feeling to have learned something new and

feel less stressed when receiving online support (Chen & Persson, 2002). First, as most research is limited to the younger, our first research question (addressing research gap 1) is the following:

RQ1: In how far is the association between the use of online health forums or support groups and individual suicidality limited to younger age groups?

Second, research offers hints for both helpful and harmful media effects of online media on suicidality. The presented review of the existing literature on this topic has shown that suicidality may influence online search behavior, but that online search behavior can also have an impact on individual suicidality. Our second research question (addressing research gaps 2 and 3) therefore aims at disentangling this relationship:

RQ2: What is the temporal-causal relationship between individual suicidality and the use of online health forums or support groups?

2 Method

To answer our two research questions, we use a cross-sectional probability sample (CATI survey) of the German population and a longitudinal non-probability sample (online panel data). Both studies are part of a large-scale research project on the interplay about suicide and the media, and thus, question wordings were the same in both surveys, of which only some items were of particular relevance for the present paper. Both surveys were conducted at the same time, to keep influences of global media coverage constant during field phase. The time lag between the two panel waves was guided by the duration of the CATI survey and resulted in a time lag of one month. The rationale behind the combination of two parallelized surveys was to generate cross-sectional and longitudinal knowledge on the individual influence patterns between suicidality and mass media. The first research question will be answered based on the telephone survey (CATI) that was conducted in summer 2013. The second research question will be answered based on the simultaneously conducted two-wave online panel survey.

2.1 Participants and Procedure

The *telephone survey (CATI)* yielded a total sample of 2002 completed interviews (51.3% female, age range: 18-99 years, $M = 48.92$, $SD = 17.32$; RR1 = .08, RR3 = .09; American Association for Public Opinion Research, 2011). The probability sample is representative for the German population aged 18 or older living in private households. The sampling procedure included both landline and mobile phone telephone numbers which is concurrently considered as the gold standard for telephone sampling (Peytchev & Neely, 2013). On average, an interview lasted 31 minutes (SD = 7) as the survey is part of a large-scale funded research project and includes more individual suicide-related measures (e.g., satisfaction with life), predispositions (e.g., depression; loneliness; self-esteem), and media use (e.g., TV-genre preferences) that are not within the focus of this paper. Data were weighted with regard to sex, age and formal education to adjust for differences between the sample and official census data. Weights were trimmed to a maximum value of two in accordance with the estimated mean square error trimming procedure to avoid extraordinarily high weights especially within sub-group analyses (e.g. different age groups); weights were normalized (Lee, Lessler, Stuart, & Biondi-Zoccai, 2011).

The *two-wave online panel survey* yielded in a non-probability sample of 2634 finished interviews in the first wave of which 1377 also completed the second wave of the panel survey (participants first wave: 61.3% female, age range: 14-93 years, $M = 36.26$, $SD = 15.11$; first wave RR1 = .15, RR3 = .16; second wave RR1 = .49, RR3 = .49; American Association for Public Opinion Research, 2011). Participants were recruited from an online access panel in which they have registered themselves voluntarily and for which they do not obtain monetary compensation. Only those participants found an invitation to the second wave of the panel survey who had already clicked on the invitation link for the first wave. The “within-panel response rate” in both waves of the panel survey was comparable to other studies recruiting participants from this online access

panel (Leiner, 2012). The panel survey was conducted simultaneously with the telephone survey resulting in a time-lag between the first (t_0) and the second wave (t_1) of about one month.[1] We used unweighted online panel data.

In both studies, procedure and question wording were approved by the university ethical review committee. To avoid the unlikely case that participants would take part in both the offline and the online survey, participants of the online panel survey were asked if they had been contacted or participated in a telephone study on the same topic.

2.2 Measures

2.2.1 Use of internet-based health forums or support groups. In both surveys, participants were asked for how long they used the internet on workdays. Those participants who indicated that they use the internet at all were asked for more specific applications and to what extent they were using these applications. Amongst other applications or websites, participants were asked to indicate to what extent they use "internet-based health forums or support groups" on a scale ranging from 1 "(almost) never" to 5 "(almost) every day".

2.2.2 Suicidality. In both surveys, individual suicidality was assessed using 16 yes/no questions on suicidality (e.g., "Have you ever attempted to kill yourself" or "Are there important family or job obligations resting on you?"; Pöldinger, 1968) that were combined to a sum index. Although the scale might seem outdated, it includes well-established harmful and protective factors for suicide that are based on still valid epidemiological findings that are reflected by most other existing suicidality scales (Brown, 2001) and, moreover, it is generally timesaving. Participants had to answer to all 16 questions to be included in the statistical analyses. By doing so we could disentangle whether lower degrees of suicidality stem from incomplete answering or from de facto lower individual suicidality measured by a completed instrument.

As our study was set out for the purpose of suicide prevention, we included a warning sign for all participants in both surveys who exceeded a previously defined cut-off threshold value of eight points or higher. The cut-off value was set in accordance with existing studies (Dieris-Hirche, Gieler, Kupfer, & Milch, 2009). The warning sign was programmed to directly show up on the screen during the online panel survey or was read clearly and loudly by the intensively instructed telephone interviewers immediately after the threshold value was exceeded. The warning sign promoted telephone helplines and websites for people with increased suicidality as well as the emergency helpline for acute suicidality. Comparable procedures even had suicide preventive effects and, hence, are strongly recommended for similar studies (Gould, 2005; Smith, Poindexter, & Cukrowicz, 2010).

2.3 Data Analysis

For this analysis, we used the unweighted data from the two-wave online panel survey. Cases with missing data were excluded from the analysis resulting in a sample of $n = 1265$. Because not all variables were normally distributed we used a maximum likelihood estimator with robust standard errors (MLR) that is contained in the Mplus statistical software package. A path analysis approach was used to analyze cross-lagged panel data (see Kenny, 2014) and we were especially interested in the cross-lagged effect patterns between the use of online health forums or support groups and the individual suicidality.

3 Results

With regard to the use of internet-based health forums or support groups both studies show comparably low averages (CATI: n = 1543, $M = 1.75$, $SD = 1.12$; *Online Panel*: $n_{t0} = 1361$, $M_{t0} = 1.74$, $SD_{t0} = 1.00$; $n_{t1} = 1367$, $M_{t1} = 1.63$, $SD_{t1} = 1.00$). The same is true for suicidality but with regard to the online panel survey there is a drop of suicidality risk for the time lag of one month

between the two waves (*CATI*: $n = 1907$; $M = 3.40$, $SD = 1.83$; *Online Panel*: $n_{t0} = 1335$, $M_{t0} = 4.17$, $SD_{t0} = 2.22$; $n_{t1} = 1326$, $M_{t1} = 2.75$, $SD_{t1} = 1.78$).[2]

Our first research question targets the association between the use of online health forums or support groups and individual suicidality. Using telephone survey data we can firstly address the so far unanswered question whether such associations are limited to the younger—which is suggested by the literature—and how these associations differ between different age groups. Answering our first research question, we define six age groups and look at the Pearson correlations coefficients between the use of internet-based health forums or support groups and individual suicidality (Table 1).

**** Table 1 about here ****

We find that the age range of significant associations is wider than often presumed in the literature. Nevertheless, observed effect sizes are small to medium in general and, surprisingly, highest for participants aged 50-59 years ($n = 283$, Pearson´s $r = .29$, $p < .01$). However, we also find the smallest effect sizes for the group aged 60-69 years. In order to address differences between correlations by age groups more precisely, we calculated z-values according to Eid, Gollwitzer, and Schmitt (2011). We found that the correlations between the use of online health forums or support groups and individual suicidality are comparably strong for people aged 18-49 years and aged older than 70 years. The correlations were significantly higher for people aged 50-59 years as compared to younger age groups (people aged 18-49 years; Fisher r-to-z transformation used to test for significant differences between correlation coefficients). Moreover, correlations were significantly lower for people aged 60-69 years as compared to people aged 30-59 years and those aged over 70y. Following a more analytical approach, we calculated moderated regression

models using the Process macro developed by Hayes (2013) with online health forum use as a predictor of individual suicidality and age as the moderator. These moderated regression models show significant influences of suicidality on the use of health forums the use (β = +.11; 95%-CI[+.02; +.21]) explaining 1.5% of the observed variance (R^2). Further added interaction terms in these models lead to only a marginal change in R^2 less than .001. Nevertheless, applying the Johnson-Neyman technique (see Hayes, 2013) to identify regions of significance for moderating age effects on the model, we found significant moderating age effects within the age range from 18 to 62 years with the respective unstandardized influences decreasing from β = +.10 at an age of 18y to β = +.05 at an age of 62y.

In order to answer our second research question, we calculated a cross-lagged panel model depicted in Figure 1.

**** Figure 1 about here ****

First, internet-based health forum or support group use and individual suicidality are quite stable over the observed timespan of one month (time lag between t_0 and t_1). The respective path coefficients reflect strong autoregressive effects ($\beta_{health\ forum\ use}$ = .583, p < .001; $\beta_{suicidality}$ = .528, p < .001). But, the time-lagged effect patterns between the variables are pivotal to answering our second research. We find that the use of internet-based health forums or support groups at t_0 is not significantly associated with individual suicidality one month later (t_1) with the respective cross-lagged effect being β = .04, p = .101. At the same time, we see an inverse effect of individual suicidality at t_0 on the use of internet-based health forums one month later. The respective cross-lagged effect is β = .07, p = .004.[3] Our model explains 35% of the observed variance of the use of

internet-based health forums or support groups and 29% of the observed variance of the individual suicidality (both at t_1).

4 Discussion

Until today, the findings regarding the influence of suicide-related internet use on suicidal ideation over time are mixed (Dunlop et al., 2011; Eichenberg, 2008; Robert et al., 2015; Sueki & Eichenberg, 2012). Moreover, as Mok et al. (2015, p. 6) point out, findings are limited in their generalizability as most studies focus on suicide forums instead of a wider variety of subjectively important websites. Hence the present paper set out to explore the range, valence and causal direction of the relationship between individual suicidality and the use of health forums or support groups in a wider sense.

The study demonstrates that the subjective relevance projected in online health forums or support groups by people of different age is probably wider than presumed before. Using a probability sample, our study provides evidence for relevant associations between individual suicidality and the use of online health forums that are observable for people aged 30 to 59 years and for those over 70. Therefore, the societal relevance of this topic should no longer be reduced to the younger for unwarranted reasons. The present study shows that the societal relevance of these websites has probably been underestimated and scientific discussions have not reflected the whole spectrum of conceivable media effects. Moreover, the present paper is, to the best of our knowledge, the first study that provides acceptable evidence for the patterns of temporal causality between the use of internet-based health forums or support groups and individual suicidality. The paper shows that higher degrees of suicidality enhance modestly the use of health forums or support groups online, while an inverse effect is not observable. Taking these results together in an altogether different light, the present paper provides evidence that the association between the use of online health forums and individual suicidality is not only limited to younger age groups and will

be of increasing importance when older people take advantage of the internet to a greater extent. Moreover, the study primarily shows that higher individual suicidality increases the odds of using health forums or support groups online. These findings are in line with the central finding of the study conducted by (Mok et al., 2015, p. 7) which is that "individuals use the internet for suicide-related reasons in a number of ways"—not only for harmful or even self-destructive reasons (see also Mars et al., 2015; Mok, Jorm, & Pirkis, 2016).

From a theoretical point of view, the present study connects theories of media effects and health behavior. In line with the Cognitive-Behavioral Theory (Bandura, 2001) and the stages-of-change framework introduced by Slater (1999), suicide-related online information seeking behaviors are an integral part of the preparation stage which is last before the action stage. In line with the presumptions made by these theories, the present study shows that suicidal people are de facto more likely to search for information online using different sources, such as health forums or support groups and thus to prepare for a certain action. As in this phase, people are likely to be especially accessible of behavior-relevant information and supportive attitudes and are likely to show increased self-efficacy (which has not been investigated in the present study). Future studies should further investigate on the influence patterns at this stage of behavioral change last before action. Against this theoretical background, the present study used longitudinal panel survey data and found evidence for increased information-seeking behavior, which was in turn not associated with increased suicidality one month later. Theoretically this study adds that the seeking of information related to suicidality does not necessarily mean that people are looking for specific means or methods for enacting suicidal behaviors, but also for overcoming them. Moreover, in contrast to other nationally representative research (see, e.g.,Ybarra & Suman, 2006) according to which the typical non-Internet user is older and non-health information seekers were more middle-aged (see also Rice, 2006) the representative cross-sectional sample within this study shows that

seeking health-related information online is not necessarily limited to younger age groups. Nevertheless, it might be the case that older persons with more health concerns use health forums more frequently and, thus, if this person starts having suicidal thoughts, it would be habitual behavior to use health forums. Taken together, using 1) a representative cross sectional survey, the present study offers new insights into the relevant age range of health-related information seeking behavior in the context of suicidality for the German general population. Moreover, using 2) a heterogeneous two-wave panel survey, we offer insights into the temporal causality between suicidality and the use of health forums and online support groups.

4.1 Limitations

There are several limitations to our findings. First, we combined two different datasets, a telephone survey for obtaining overarching association patterns between the use of online health forums or support groups and individual suicidality in the general population and online panel data to obtain hints for patterns of temporal causality between these variables. Hence, we cannot draw cross-conclusions between the two datasets. Second, suicidality is a complex societal problem that embraces a wealth of important correlates. Although many of these epidemiologically established contributing factors to individual suicidality are reflected by the scale proposed by Pöldinger (1968) there may be more psychological or socio-demographic driving forces that are not included in our simple model. These influences are not excluded from the statistical cross-lagged effects model at t_0. Nevertheless, research would take a step forward by developing more elaborate models that include other measures of suicidality. Third, we cannot differentiate more fine grainedly between pro-suicide, suicide prevention and support websites or both. This is a well-known problem for studies on this issue (Eichenberg, 2008; Harris et al., 2009; Sueki & Eichenberg, 2012). Future studies will have to disentangle the remaining questions. Moreover, the use of an overall measure of health forum or support group use includes no information about the kind of website used or their

focus on suicidality. Observed effect sizes are likely to be small when people visited health forums for reasons completely not (directly or even indirectly) related to feeling suicidal. Future studies will have to control for the seriousness of medical condition or fears about the individual health situation.

Nevertheless, Sueki (2013) investigated more in detail what people were exactly doing on a suicide website. The study differentiates between consulting a website, sharing suicide ideation on that website, searching for suicide methods information on that website, and viewing suicide methods on that website. Of course, conclusions drawn of this approach are more specific. But, the present study targets a more general aim and is, thus, less detailed in that hindsight. Maybe the best bet is to combine both approaches in future studies and ask for more specific ways of using different websites that are not only limited to the so called suicide websites. Fourth, the observed differences in the direction of causality can be a function of the type of website, which is untested in the present study and should be explored more deeply in future studies (see Biddle et al., 2016). If so, the blurred line between suicide-promoting and suicide-preventive websites calls for elaborate content analyses to differentiate between the plethora of websites (Till & Niederkrotenthaler, 2014) that are used for a wide range of reasons Ybarra and Suman (2006). Fifth, methodologically, we are not able to disentangle problems with recall bias as we used retrospective questions (see Mok et al., 2015, p. 7). Moreover, question wording was very general on the one hand (the use of health forums) and on the other hand one could argue that asking participants only for the use of specific online media does not really reflect actual multi-media use nowadays. To do so, it would be an improvement to ask people for their use patterns of different media, such as television, newspapers and/or specific websites. It is important to note that existing research often offers a narrow vision of the importance of suicide forums or suicide chat rooms on individual suicidality while there has been research that points to the fact that also other health forums can contribute to suicidality or

help against higher degrees of suicidality (Houston et al., 2002). Finally, the timespan between the two panel waves has been tied down to one month to ensure that both the telephone survey and the online panel survey take place in a roughly comparable media environment. This decision can of course be questioned. Plus, with regard to the very low response rates in both the CATI and the online panel survey, we do not intend to overdo the importance of our findings—especially with regard to the generalizability of our findings.

4.2 Conclusion and implications

Let us get back to the three major questions raised at the beginning of this paper. Firstly, it was questioned whether the discussion about helpful or harmful effects of the internet on suicidality falls short when it is limited to the younger? Our paper provides evidence for the fact that relevant associations between the use of online health forums or support groups and individual suicidality are not limited to younger users, but instead, are observable for people aged 30 to 59. This finding has also important implications for the future especially when older people will find their way online in greater numbers. It will be of increasing importance to bring this issue up routinely even though the interplay of suicidality and the media is often considered a taboo.

Secondly, it was questioned whether the positive or the negative effects of online health forums or support groups prevail. Based on longitudinal online panel data, we conclude that individual suicidality does not increase over the timespan of one month when health related websites were more intensively visited. Instead, we provide proof for the inverse effect that higher suicidality contributes to an increased use of internet-based health forums or support groups. Based on this main finding, the present study implies that detectable and adequately designed web forums or support groups can be helpful in terms of suicide prevention. This is in line with Sueki (2012) who points to the fact that providing helpful information on suicide-related websites or search pages may facilitate help-seeking behaviors. This finding somewhat implies that preventive forums and

support groups prevail in contrast to pro-suicide websites when people are surfing for suicide. Nevertheless, this brings up an urgent follow-up question that is unanswered so far: What are the websites put forward by common search engines when users seek for information about suicide or support when feeling suicidal? Future studies will have to address this question.

Thirdly, it was questioned whether suicidality is the driving force for specific internet use or whether it is the other way round (see Sueki, 2013). Based on our findings, we conclude that individual suicidality is the driving force behind the use of specific websites that are generally related to health issues or social online support. Hence, our study pushes forward an issue that has been criticized by (Mok et al., 2015, p. 7): More longitudinal studies with large, widely recruited samples are necessary to face the unknown influence patterns between the individual suicidality and the use of online health forums or support groups. In research practice, there are always ethical concerns due to potential threats to the privacy and anonymity of users, as well as iatrogenic effects (i.e. harmful effects resulting from the mere exposure to questions about suicidality). There are only few studies that directly survey internet users and, hence, only little is known about their characteristics. To this shortcoming the present paper can contribute that the relevant age range is counter-intuitively large—especially with regard to highest correlations being observable for those aged 50-59 and over 70.

Due to the increasing importance of the internet as a source of health information, targeted research efforts are needed to disentangle helpful and harmful online risk factors for suicidality. Based on our findings, future discussions must not only include elder people but should also think of helpful media effects or at least media effects that do not harm. It is important to profit from this finding insofar as mass media will be de facto deemed as a key factor tackling the global imperative of suicide prevention (WHO, 2014).

References

Alao, A. L., Yolles, J. C., & Armenta, W. (1999). Cybersuicide: The internet and suicide. *The American Journal of Psychiatry, 156*(11), 1836–1837. doi:10.1176/ajp.156.11.1836-a

Alao, A. O., Soderberg, M., Pohl, E. L., & Alao, A. L. (2006). Cybersuicide: Review of the role of the internet on suicide. *CyberPsychology & Behavior, 9*(4), 489–493. doi:10.1089/cpb.2006.9.489

American Association for Public Opinion Research. (2011). Standard definitions: Final dispositions of case codes and outcome rates for surveys. from http://www.aapor.org/AM/Template.cfm?Section=Standard_Definitions2&Template=/CM/ContentDisplay.cfm&ContentID=3156

Amichai-Hamburger, Y., Klomek, A. B., Friedman, D., Zuckerman, O., & Shani-Sherman, T. (2014). The future of online therapy. *Computers in Human Behavior, 41*, 288–294. doi:10.1016/j.chb.2014.09.016

Azocar, F., McCabe, J. F., Wetzel, J. C., & Schumacher, S. J. (2003). Datapoints: Use of a behavioral health web site and service utilization. *Psychiatric Services, 54*(1), 18. doi:10.1176/appi.ps.54.1.18

Baker, D., & Fortune, S. (2008). Understanding self-harm and suicide websites: A qualitative interview study of young adult website users. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 29*(3), 118–122. doi:10.1027/0227-5910.29.3.118

Baker, L., Wagner, T. H., Singer, S., & Bundorf, M. K. (2003). Use of the internet and e-mail for health care information: Results from a national survey. *JAMA, 289*(18), 2400–2406. doi:10.1001/jama.289.18.2400

Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology, 3*(3), 265–299. doi:10.1207/S1532785XMEP0303_03

Barak, A. (2007). Emotional support and suicide prevention through the internet: A field project report. *Computers in Human Behavior, 23*(2), 971–984. doi:10.1016/j.chb.2005.08.001

Barak, A., Boniel-Nissim, M., & Suler, J. (2008). Fostering empowerment in online support groups. *Computers in Human Behavior, 24*(5), 1867–1883. doi:10.1016/j.chb.2008.02.004

Baume, P., Cantor, C. H., & Rolfe, A. (1997). Cybersuicide: The role of interactive suicide notes on the internet. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 18*(2), 73–79. doi:10.1027/0227-5910.18.2.73

Becker, K., Mayer, M., Nagenborg, M., El-Faddagh, M., & Schmidt, M. H. (2004). Parasuicide online: Can suicide websites trigger suicidal behaviour in predisposed adolescents? *Nordic Journal of Psychiatry, 58*(2), 111–114. doi:10.1080/08039480410005602

Bell, J. (2014). Harmful or helpful?: The role of the internet in self-harming and suicidal behaviour in young people. *Mental Health Review Journal, 19*(1), 61–71. doi:10.1108/MHRJ-05-2013-0019

Biddle, L., Derges, J., Mars, B., Heron, J., Donovan, J. L., Potokar, J., . . . Gunnell, D. (2016). Suicide and the internet: Changes in the accessibility of suicide-related information between 2007 and 2014. *Journal of Affective Disorders, 190*, 370-375. doi:10.1016/j.jad

Biddle, L., Gunnell, D., Owen-Smith, A., Potokar, J., Longson, D., Hawton, K., . . . Donovan, J. (2012). Information sources used by the suicidal to inform choice of method. *Journal of Affective Disorders, 136*(3), 702–709. doi:10.1016/j.jad.2011.10.004

Bol, N., van Weert, J. C. M., Loos, E. F., Romano Bergstrom, J. C., Bolle, S., & Smets, E. M. A. (2016). How are online health messages processed? Using eye tracking to predict recall of information in younger and older adults. *Journal of Health Communication*, 1-10. doi:10.1080/10810730.2015.1080327

Brezo, J., Paris, J., Tremblay, R., Vitaro, F., Hébert, M., & Turecki, G. (2007). Identifying correlates of suicide attempts in suicidal ideators: A population-based study. *Psychological Medicine, 37*(11), 1551–1562. doi:doi:10.1017/S0033291707000803

Brown, G. K. (2001). A review of suicide assessment measures for intervention research with adults and older adults. from http://sbisrvntweb.uqac.ca/archivage/15290520.pdf

Carli, V., Durkee, T., Wasserman, D., Hadlaczky, G., Despalins, R., Kramarz, E., . . . Kaess, M. (2013). The association between pathological internet use and comorbid psychopathology: A systematic review. *Psychopathology, 46*(1), 1–13. doi:10.1159/000337971

Chapple, A., & Ziebland, S. (2011). How the internet is changing the experience of bereavement by suicide: A qualitative study in the uk. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine, 15*(2), 173–187. doi:10.1177/1363459309360792

Chen, Y., & Persson, A. (2002). Internet use among young and older adults: Relation to psychological well-being. *Educational Gerontology, 28*(9), 731–744. doi:10.1080/03601270290099921

Chung, J. E. (2014). Social networking in online support groups for health: How online social networking benefits patients. *Journal of Health Communication, 19*(6), 639–659. doi:10.1080/10810730.2012.757396

Daine, K., Hawton, K., Singaravelu, V., Stewart, A., Simkin, S., Montgomery, P., & García, A. V. (2013). The power of the web: A systematic review of studies of the influence of the internet on self-harm and suicide in young people. *PLoS One, 8*(10), e77555. doi:10.1371/journal.pone.0077555

Dieris-Hirche, J., Gieler, U., Kupfer, J. P., & Milch, W. E. (2009). Suizidgedanken, angst und depression bei erwachsenen neurodermitikern [suicide ideation, anxiety and depression in

adult neurodermatitis patients]. *Der Hautarzt, 60*(8), 641–646. doi:10.1007/s00105-009-1744-y

Dunlop, S. M., More, E., & Romer, D. (2011). Where do youth learn about suicides on the internet, and what influence does this have on suicidal ideation? *The Journal of Child Psychology and Psychiatry, 52*(10), 1073–1080. doi:10.1111/j.1469-7610.2011.02416.x

Durkee, T., Hadlaczky, G., Westerlund, M., & Carli, V. (2011). Internet pathways in suicidality: A review of the evidence. *International Journal of Environmental Research and Public Health, 8*(10), 3938–3952. doi:10.3390/ijerph8103938

Eichenberg, C. (2008). Internet message boards for suicidal people: A typology of users. *CyberPsychology & Behavior, 11*(1), 107–113. doi:10.1089/cpb.2007.9924

Eid, M., Gollwitzer, M., & Schmitt, M. (2011). *Statistik und forschungsmethoden [statistics and research methods]*. Weinheim: Beltz.

Eysenbach, G. (2004). Health related virtual communities and electronic support groups: Systematic review of the effects of online peer to peer interactions. *BMJ, 328*(7449), 1166–1171. doi:10.1136/bmj.328.7449.1166

Fiedler, G. (2003). Suizidalität und neue medien: Gefahren und möglichkeiten [suicidality and new media: Pitfalls and possibilities]. In E. Etzersdorfer, G. Fiedler & M. Witte (Eds.), *Neue medien und suizidalität [new media and suicidality]* (pp. 19–55). Göttingen: Vandenhoeck & Ruprecht.

Gatto, S. L., & Tak, S. H. (2008). Computer, internet, and e-mail use among older adults: Benefits and barriers. *Educational Gerontology, 34*(9), 800–811. doi:10.1080/03601270802243697

Gilat, I., & Shahar, G. (2007). Emotional first aid for a suicide crisis: Comparison between telephonic hotline and internet. *Psychiatry: Interpersonal and Biological Processes, 70*(1), 12–18. doi:10.1521/psyc.2007.70.1.12

Gilat, I., & Shahar, G. (2009). Suicide prevention by online support groups: An action theory-based model of emotional first aid. *Archives of Suicide Research, 13*(1), 52–63. doi:10.1080/13811110802572148

Gould, M. S. (2005). Evaluating iatrogenic risk of youth suicide screening programs: A randomized controlled trial. *JAMA: The Journal of the American Medical Association, 293*(13), 1635–1643. doi:10.1001/jama.293.13.1635

Harris, K., McLean, J., & Sheffield, J. (2009). Examining suicide-risk individuals who go online for suicide-related purposes. *Archives of Suicide Research, 13*(3), 264–276. doi:10.1080/13811110903044419

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford.

Horne, J., & Wiggins, S. (2009). Doing being 'on the edge': Managing the dilemma of being authentically suicidal in an online forum. *Sociology of Health & Illness, 31*(2), 170–184. doi:10.1111/j.1467-9566.2008.01130.x

Houston, T. K., & Allison, J. J. (2002). Users of internet health information: Differences by health status. *Journal of Medical Internet Research, 4*(2), e7. doi:10.2196/jmir.4.2.e7

Houston, T. K., Cooper, L. A., & Ford, D. E. (2002). Internet support groups for depression: A 1-year prospective cohort study. *American Journal of Psychiatry, 159*(12), 2062–2068. doi:10.1176/appi.ajp.159.12.2062

Kemp, C. G., & Collings, S. C. (2011). Hyperlinked suicide: Assessing the prominence and accessibility of suicide websites. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 32*(3), 143–151. doi:10.1027/0227-5910/a000068

Kenny, D. A. (2014). Cross-lagged panel design. *Wiley StatsRef: Statistics Reference Online.* from http://dx.doi.org/10.1002/9781118445112.stat06464

Kramer, J., Boon, B., Schotanus-Dijkstra, M., van Ballegooijen, W., Kerkhof, A., & van der Poel, A. (2015). The mental health of visitors of web-based support forums for bereaved by suicide. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 36*(1), 38–45. doi:10.1027/0227-5910/a000281

Krysinska, K., & Andriessen, K. (2010). On-line support and resources for people bereaved through suicide: What is available? *Suicide and Life-Threatening Behavior, 40*(6), 640–650. doi:10.1521/suli.2010.40.6.640

Lawlor, A., & Kirakowski, J. (2014). Online support groups for mental health: A space for challenging self-stigma or a means of social avoidance? *Computers in Human Behavior, 32*, 152–161. doi:10.1016/j.chb.2013.11.015

Lee, B. K., Lessler, J., Stuart, E. A., & Biondi-Zoccai, G. (2011). Weight trimming and propensity score weighting. *PLoS One, 6*(3), e18174. doi:10.1371/journal.pone.0018174

Leiner, D. J. (2012). *Sosci panel: The noncommercial online access panel*. Paper presented at the GOR 2012, Mannheim. https://www.soscisurvey.de/panel/download/SoSciPanel.GOR2012.pdf

Mars, B., Heron, J., Biddle, L., Donovan, J. L., Holley, R., Piper, M., . . . Gunnell, D. (2015). Exposure to, and searching for, information about suicide and self-harm on the internet: Prevalence and predictors in a population based cohort of young adults. *Journal of Affective Disorders*. doi:10.1016/j.jad.2015.06.001

McMillan, S. J., & Macias, W. (2008). Strengthening the safety net for online seniors: Factors influencing differences in health information seeking among older internet users. *Journal of Health Communication, 13*(8), 778–792. doi:10.1080/10810730802487448

Miller, J. K., & Gergen, K. J. (1998). Life on the line: The therapeutic potentials of computer-mediated conversation. *Journal of Marital and Family Therapy, 24*(2), 189–202. doi:10.1111/j.1752-0606.1998.tb01075.x

Miller Soederberg, L. M., & Bell, R. A. (2012). Online health information seeking: The influence of age, information, trustworthiness, and search challenges. *Journal of Aging and Health, 24*(3), 525-541. doi:10.1177/0898264311428167

Mok, K., Jorm, A. F., & Pirkis, J. (2015). Suicide-related internet use: A review. *Australian and New Zealand Journal of Psychiatry, 49*(8), 697–705. doi:10.1177/0004867415569797

Mok, K., Jorm, A. F., & Pirkis, J. (2016). The perceived impact of suicide-related internet use: A survey of young australians who have gone online for suicide-related reasons. *Digital Health, 2*. doi:10.1177/2055207616629862

Pescosolido, B. A., & Georgianna, S. (1989). Durkheim, suicide, and religion: Toward a network theory of suicide. *American Sociological Review, 54*(1), 33-48.

Peytchev, A., & Neely, B. (2013). Rdd telephone surveys: Toward a single-frame cell-phone design. *Public Opinion Quarterly, 77*(1), 283–304. doi:10.1093/poq/nft003

Pöldinger, W. (1968). *Die abschätzung der suizidalität [suicidality assessment]*. Bern: Huber.

Rajagopal, S. (2004). Suicide pacts and the internet. *BMJ, 329*(7478), 1298–1299. doi:10.1136/bmj.329.7478.1298

Recupero, P. R., Harms, S. E., & Noble, J. M. (2008). Googling suicide: Surfing for suicide information on the internet. *The Journal of Clinical Psychiatry, 69*(6), 878–888. doi:10.4088/JCP.v69n0601

Rice, R. E. (2006). Influences, usage, and outcomes of internet health information searching: Multivariate results from the pew surveys. *International Journal of Medical Informatics, 75*(1), 8-28. doi:10.1016/j.ijmedinf.2005.07.032

Robert, A., Suelves, J. M., Armayones, M., & Ashley, S. (2015). Internet use and suicidal behaviors: Internet as a threat or opportunity? *Telemedicine and e-Health*, 150205135144008. doi:10.1089/tmj.2014.0129

Slater, M. D. (1999). Integrating application of media effects, persuasion, and behavior change theories to communication campaigns: A stages-of-change framework. *Health Communication, 11*(4B), 335-354.

Smith, P., Poindexter, E., & Cukrowicz, K. (2010). The effect of participating in suicide research: Does participating in a research protocol on suicide and psychiatric symptoms increase suicide ideation and attempts? *Suicide and Life-Threatening Behavior, 40*(6), 535–543. doi:10.1521/suli.2010.40.6.535

Stjernsward, S., & Ostman, M. (2011). Illuminating user experience of a website for the relatives of persons with depression. *International Journal of Social Psychiatry, 57*(4), 375–386. doi:10.1177/0020764009358388

Sueki, H. (2012). Association between deliberate self-harm-related internet searches and the mental states and lifetime suicidal behaviors of japanese young adults. *Psychiatry and Clinical Neurosciences, 66*(5), 451–453. doi:10.1111/j.1440-1819.2012.02357.x

Sueki, H. (2013). The effect of suicide-related internet use on users' mental health: A longitudinal study. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 34*(5), 348–353. doi:10.1027/0227-5910/a000201

Sueki, H., & Eichenberg, C. (2012). Suicide bulletin board systems comparison between japan and germany. *Death Studies, 36*(6), 565–580. doi:10.1080/07481187.2011.584012

Sueki, H., Yonemoto, N., Takeshima, T., & Inagaki, M. (2014). The impact of suicidality-related internet use: A prospective large cohort study with young and middle-aged internet users. *PLoS One, 9*(4), e94841. doi:10.1371/journal.pone.0094841

Sum, S., Mathews, M. R., Pourghasem, M., & Hughes, I. (2008). Internet technology and social capital: How the internet affects seniors' social capital and wellbeing. *Journal of Computer-Mediated Communication, 14*(1), 202–220. doi:10.1111/j.1083-6101.2008.01437.x

Tanis, M. (2008). Health-related on-line forums: What's the big attraction? *Journal of Health Communication, 13*(7), 698–714. doi:10.1080/10810730802415316

Till, B., & Niederkrotenthaler, T. (2014). Surfing for suicide methods and help. *The Journal of Clinical Psychiatry, 75*(08), 886–892. doi:10.4088/JCP.13m08861

WHO. (2014). Preventing suicide: A global imperative. from http://www.who.int/entity/mental_health/suicide-prevention/exe_summary_english.pdf?ua=1

Winkel, S., Groen, G., & Petermann, F. (2005). Soziale unterstützung in suizidforen. [Social support in suicide forums]. *Praxis der Kinderpsychologie und Kinderpsychiatrie, 54*, 714–727.

Wong, P. W.-C., Fu, K.-W., Yau, R. S.-P., Ma, H. H.-M., Law, Y.-W., Chang, S.-S., & Yip, P. S.-F. (2013). Accessing suicide-related information on the internet: A retrospective observational study of search behavior. *Journal of Medical Internet Research, 15*(1), e3. doi:10.2196/jmir.2181

Wright, K. B., & Bell, S. B. (2003). Health-related support groups on the internet: Linking empirical findings to social support and computer-mediated communication theory. *Journal of Health Psychology, 8*(1), 39–54. doi:10.1177/1359105303008001429

Ybarra, M. L., & Suman, M. (2006). Help seeking behavior and the internet: A national survey. *International Journal of Medical Informatics, 75*(1), 29–41. doi:10.1016/j.ijmedinf.2005.07.029

Footnotes

[1] Existing studies on the process of decision-making and support-seeking around health-related information would support time-lags between 1 and 4 months (Azocar, McCabe, Wetzel, & Schumacher, 2003; L. Baker, Wagner, Singer, & Bundorf, 2003). But, studies that investigated time-lagged effect patterns between individual suicidality and suicide-related internet use over a 4-month period strongly recommend a shorter interval for examining cross-lagged media effects on suicidality, which can change greatly in a short period of time (Sueki, 2013).

[2] Although we used the same suicidality measure suggested by Pöldinger in both studies (CATI survey and two wave online panel survey), it seems that suicidality is volatile—especially with regard to the online panel survey. In the 1 month interval between the two panel waves, the mean suicidality measure dropped from $M_{t0} = 4.17$ ($SD_{t0} = 2.22$) to $M_{t1} = 2.75$ ($SD_{t1} = 1.78$) which is in line with the widely held clinical impression that suicidality is transient and volatile, especially in younger populations (e.g. Brezo et al., 2007). With regard to suicide rates in Germany, one has to bear in mind that suicides rates are usually lower in countries where religions play an important role within the society with lowest suicide rates in Catholic or Protestant countries (see e.g., Pescosolido & Georgianna, 1989). Nevertheless, as religion has not been controlled in the present study, we cannot rule out this potential influence on our results. This is especially relevant, because Germany has no official state religion and potential suicide rates are e.g., higher for Atheists (see Pescosolido & Georgianna, 1989, p. 44)

[3] Moreover, we calculated cross-lagged effects models for the same age groups as in the correlational analysis. Results of these additional analyses confirm that the observed cross-lagged effects over the different age groups are not very strong (all < .16) and reach significance only for participants under the age of 30. Here, we must again point to the fact that we used a non-probability sample that is not representative for any population.

Table 1

Bivariate correlations between suicidality and internet-based health forum use for different age groups in a German representative survey

	internet-based health forum or support group use					
	18-29y	30-39y	40-49y	50-59y	60-69y	70y+
suicidality	.11	.14*	.15*	.29**	–.04	.17*
n	302	261	354	283	159	103

Note. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Suicidality was measured by the suicidality scale suggested by Pöldinger (1968) and consisted of 16 yes/no questions. Internet-based health forum or support group use was measured on a 5-point Likert-like scale ranging from 1 “(almost) never“ to 5 “(almost) every day“.

* $p < .05$. ** $p < .01$ (one-tailed significance).

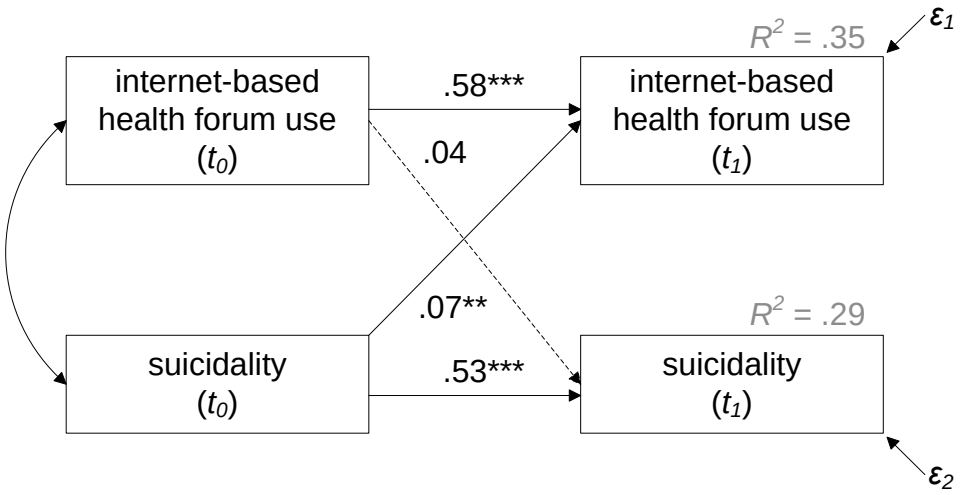

Figure 1. Higher suicidality (t_0) influences the use of internet-based health forums or support groups one month later (t_1).

Participants (n = 1265) were recruited from an online access panel (SoSci Panel).
Suicidality was measured by the suicidality scale suggested by Pöldinger (1968) and consisted of 16 yes/no questions. Internet-based health forum or support group use was measured on a 5-point Likert-like scale ranging from 1 “(almost) never“ to 5 “(almost) every day“. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed.
Coefficients are standardized coefficients. MLR estimator robust to non-normally distributed variables.

* p < .05. ** p < .01. *** p < .001
χ^2 = 9.68, df = 1, p < .01; *RMSEA* = .08; *SRMR* = .02; *CFI* = .99; *TLI* =.94