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Virtual empathy: Positive and negative impacts of going online upon empathy in young adults

L. Mark Carrier *, Alexander Spradlin [1], John P. Bunce [2], Larry D. Rosen

Department of Psychology, California State University Dominguez Hills, Carson, CA 90747, USA

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ABSTRACT

People can show empathic responses to others online, but at the same time empathy has been declining in young people since technology-based communication has become prevalent. Displacement of face-to-face time by online activities would be expected to negatively impact empathic skills. Since there is little direct empirical research on this topic, the present study sought to determine the nature of the relationship between Internet usage and empathy. More than 1000 young adults completed an anonymous online questionnaire that asked about daily media usage, real-world empathy, virtual empathy, social support and demographic information. The results showed that, in general, going online had very small negative impacts upon cognitive and affective real-world empathy and actually improved time spent in face-to-face communication. Video gaming reduced real-world empathy in both females and males but did not reduce face-to-face time. Also, virtual empathy was positively correlated with real-world empathy, although virtual empathy scores were lower than real-world empathy scores for both sexes. Finally, both real-world empathy and virtual empathy are positively related to social support but real-world empathy demonstrated a 5–6 times stronger relationship. The findings show that spending time online does not displace face-to-face time nor reduce real-world empathy, and suggest that perhaps the lack of nonverbal cues in the online world contributes to overall lower levels of virtual empathy compared to the real world. The negative effects of being online upon empathy appear to be due to specific activities such as video gaming rather than total quantity of online time.

1. Introduction

A mutual friend of the present authors recently posted on Facebook about her mother's surgery for cancer: "Wish I could have the surgery tomorrow so my mom didn't have to. :/ screw you cancer. You suck. Your getting cut the hell outta my mom's kidney tomorrow!!!!!!! buh-bye! So long! Good riddance!" The conversation on Facebook that followed depicted understanding of our friend's emotions and compassion for her situation. "...prayers her way...," "Send her my love pls, she is in my thoughts!!!:)", and "I hope all goes well:) be strong" were just some of the reactions from her Facebook connections. Empathy has been defined as the understanding of and sharing in another's emotional state or context (Cohen & Strayer, 1996), as well as the behavior of comforting others (Caplan & Turner, 2007). The example shows that it is possible to have empathy—"virtual empathy"—through computer-mediated communication. Further, it has been proposed that electronic communication environments such as social media could facilitate empathy through the easy and frequent access to other people in similar situations (Caplan & Turner, 2007).

Studies have identified empathic behavior online on health organization websites and health support communities. For example, Nambisan (2011a, 2011b) administered questionnaires to users of online health communities at health care organization websites, finding that part of the user experience involved perceived empathy. Pfeil and Zaphiris (2007) did a content analysis of 400 messages from a depression support community and developed a coding scheme to analyze empathy online. The researchers found that empathy was expressed and facilitated in this online discussion board. They observed a pattern of virtual empathy in which self-disclosure triggered empathic communication that consisted of empathic responses that were either more self-disclosing messages or support messages. Preece (1999) analyzed the content of 500 messages from an online bulletin board connected to a

* Corresponding author. Tel.: +1 310 243 2325.
E-mail addresses: lcarrier@csudh.edu (L.M. Carrier), a.spradlin@email.wsu.edu (A. Spradlin), jbunce@ucmerced.edu (J.P. Bunce), lrosen@csudh.edu (L.D. Rosen).
[1] Present address: Department of Psychology, Washington State University, USA.
[2] Present address: Department of Psychological Sciences, University of California, Merced, USA.

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website related to damage to the anterior cruciate ligament. She divided the messages into five types: non-empathic, personal narrative, empathic, question/answer and other. Strikingly, empathic messages made up 44.8% of the postings. Finally, Preece and Ghozati (2001) examined messages in 100 online communities and found that many of them contained empathic messages, with empathy being high in support communities and low in some other types of online communities (e.g., religious). Thus, the online world can be empathic and can have people showing empathic responses.

But, does going online affect empathy? Although just being online does not seem to eliminate empathy, Konrath's (2013) review of personality traits in the era of the Internet showed declines in some personality variables, including empathy. Research showed lower empathy scores for contemporary college students in comparison to college students over the last 30 years (Konrath, O'Brien, & Hsing, 2010). Konrath raised the possibility that the declines in empathy could be related to people spending time online and engaging in superficial interactions with others. Small and Vorgan (2008) said that being online reduces an individual's capacity for empathy. Primarily, this claim was based on the assumption that going online reduces the amount of time spent face-to-face with others. For sure, elements of non-verbal communication essential to reading emotions, such as facial expressions, body posture, eye contact, gestures, and touch, are missing from texts, instant messages, and social networking conversations. However, Caplan and Turner's (2007) description of online comforting behavior argued that being online can support empathy or even increase it.

Since there has been very little past empirical research on this issue, the present study sought to determine the nature of the relationship between Internet usage and empathy. We used a large sample of members of the "Net Generation" to compare people's empathy levels—using a standard self-report real-world empathy measure and an adapted version to assess online or virtual empathy—to how much time those people spend online. The Net Generation is comprised of the first children, "tweens," and teenagers—now grown up—to have been raised in a world where nearly everything is computerized (Rosen, 2007; Tapscott, 1997). More specifically, the present study tested the claim (Small & Vorgan, 2008) that Internet usage affects empathy negatively though a reduction of face-to-face time. This led to the following:

> Research Question 1: Does going online affect empathy through a reduction of face-to-face time?

If Small and Vorgan (2008) are right, then there should be an inverse relationship between going online and empathy, mediated by a reduction in face-to-face interactions as a result of going online.

Additionally, the likelihood that people can show empathy online in some form led to the goal of comparing empathy online to real-world empathy. We used the adapted measure of virtual empathy and compared virtual empathy to real-world empathy and generated the following research question:

> Research Question 2: How does virtual empathy compare to real-world empathy?

Based on the views of Small and Vorgan (2008), virtual empathy should be lower than standard empathy, and Internet exposure should be inversely related to virtual empathy. On the other hand, if others such as Caplan and Turner (2007) are right, then there should be no relationship, or even a positive relationship between time spent online and empathy. If that is true, then virtual empathy should be equal to or higher than real-world empathy and Internet exposure should either not be related to or be positively related to virtual empathy.

2. Method

2.1. Participants

An initial sample of 1726 adult members of the Net Generation (i.e., born since 1980) started an online anonymous questionnaire hosted on SurveyMonkey.com. All participants were Internet users, recruited by word-of-mouth through General Education courses at a university in southern California. Students in the courses, as well as their friends and relatives, were eligible to participate in the study. One thousand, three hundred and ninety participants completed the entire questionnaire. No incentive or compensation for the participants was provided; however, students in the courses received extra credit for recruiting participants. The participants' mean age was 23.39 years ($SD = 3.11$). The sample consisted of 806 females (58.0%) and 584 males (42.0%). The ethnic/cultural composition of the sample was 46.3% Hispanic ($n = 643$), 21.6% Caucasian ($n = 300$), 14.7% Black ($n = 205$), 12.9% Asian ($n = 179$), and 4.5% "Other" ($n = 63$).

2.2. Materials and apparatus

Daily Media Usage. Use of the Internet, along with engagement in other technology-based activities, and talking face-to-face was measured using a Daily Media Usage scale that was previously used by Carrier, Cheever, Rosen, Benitez, and Chang (2009) and Rosen, Chang, Erwin, Carrier, and Cheever (2010). In addition to the items used in the original studies, the present study included several detailed items related to video gaming. The reason for adding these items was to measure variants of video game use that did or did not involve socializing with others. Playing games on a gaming console alone, with others in the same room, and with others in a different location (i.e., over the Internet) were queried. Also, playing games on the computer alone, with others in the same room, and with others in a different location were queried. Overall, the scale presented participants with 24 activities, each of which was rated to indicate how many hours the activities were performed on a "typical day." The ratings were provided using an 9-point scale that included: "Not at all," "Less than 1 h/day," "1 h/day," "2 h/day," "3 h/day," "4–5 h/day," "6–8 h/day," "9–10 h/day," and "More than 10 h/day." The final set of activities that was queried is shown in Table 1. Each response was recoded into hours per day using the response category label (or the midpoint of the response category label range). Responses of "More than 10 h/day" were recoded as 11 h per day.

Basic Empathy Scale. Jolliffe and Farrington's (2006) Basic Empathy Scale (BES) was used to measure participants' empathy levels. This self-report scale, designed for adolescents, is comprised of 20 items that measure the cognitive (9 items) and affective aspects of empathy (11 items). The cognitive aspect of empathy relates to a person's ability to recognize and comprehend the emotions of another person. The affective aspect of empathy relates to a person's ability to experience the emotions of another person. Higher scores on each indicate more empathy. Items on the scale were rated on a 5-point, Likert-type rating scale, with 1 being "Strongly Disagree," 5 being "Strongly Agree," and 3 being "Neutral." Some of the items require reverse coding. An example item from the affective aspect of empathy is "My friend's emotions don't affect me much" (reverse coded). An example item from the cognitive aspect of empathy is "I find it hard to know when my friends are frightened" (reverse coded). Joliffe and Farrington found evidence among English adolescents to support the

Table 1
Activities performed on a "typical day" by members of the net generation.

Activity	Mean hours	SD
Texting	4.37	3.85
Talking F2F	4.22	3.26
Listening to Music	3.68	3.24
Visiting Websites	3.11	2.54
Offline Computing	2.69	2.46
Watching TV	2.37	2.12
Online Social Networking	2.33	2.53
Emailing	1.86	2.32
Telephoning	1.68	2.02
IM/Chat	1.59	2.39
Watching DVDs	1.27	1.63
Video Gaming	1.21	1.98
Pleasure Reading	1.21	1.70
Gaming, Alone on Console	.87	1.68
Shopping Online	.75	1.34
Gaming, Online on Console	.69	1.60
Gaming, Alone on Computer	.67	1.56
Gaming, Group on Console	.64	1.45
Virtual Worlds	.57	1.54
Skype/Video Chat	.57	1.38
Gaming, Online on Computer	.53	1.44
Online Classes	.47	1.23
Gaming, Group on Computer	.46	1.35

Note. Activities are listed in descending order based on mean hours performed.

two-factor solution (cognitive and affective empathy) for these 20 items using confirmatory factor analysis. Further, they found that, as expected, females showed higher empathy scores than males. The BES subsequently has been applied to samples from other countries, including China (Geng, Xia, & Qin, 2012), France (D'Ambrosio, Olivier, Didon, & Besche, 2009), and Italy (Albiero, Matricardi, & Toso, 2010), finding support for the existence of the two subcomponents of empathy in adolescents.

In the present sample as a whole, both subscales showed acceptable interitem reliability: $\alpha = .75$ for cognitive empathy and $\alpha = .83$ for affective empathy. No significant increases in reliability could be achieved by deleting any of the items. For females, the mean empathy subscale scores were 3.79 (SD = .51) for cognitive empathy and 3.54 (SD = .59) for affective empathy. For males, the means were 3.66 (SD = .56) and 3.03 (SD = .62), respectively. A two-way analysis of variance with subscale (cognitive versus affective) and gender (females versus males) as factors showed that cognitive empathy scores were significantly higher than affective empathy scores, $F(1, 1388) = 697.47$, $p < .001$, $\eta^2 = .33$, females scored significantly higher than males, $F(1, 1388) = 155.98$, $p < .001$, $\eta^2 = .10$, and that there was a significant interaction between subscale and gender, $F(1, 1388) = 126.67$, $p < .001$, $\eta^2 = .08$, with the advantage for females being greater on the affective subscale than on the cognitive subscale.

Virtual empathy scale. A virtual empathy scale was created by adapting the items from the BES. The wording for each item on the BES was changed to clearly indicate an online context for the question (e.g., "My online friend's emotions don't affect me much."). Due to experimenter error, one of the affective items was not included in the online questionnaire. Therefore, the affective subscale (discussed later) was comprised of 10—not 11—items as in the BES. Analysis of this scale is presented below in Section 3.

Social support. Perceived social support was measured using the 12-item Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). Perceived social support refers to the emotional, informative and applied functions provided by family, friends and significant others that result in beneficial consequences. Zimet et al. (1988) found that the scale showed good internal consistency ($\alpha = .88$) and adequate stability over time with a test–retest reliability after 2–3 months of .85. A later study confirmed the internal reliability of the measure in three different subject groups—pregnant women, European adolescents, and pediatric residents (Zimet, Powell, Farley, Werkman, & Berkoff, 1990).

Demographics. Demographic information was collected from each participant including age, sex, ethnicity, educational level, student status, employment status, and ZIP code (to mark the geographic region in which the respondent lives).

3. Results

3.1. Does going online affect empathy through a reduction of face-to-face time?

Association between online activity and real-world empathy. For purposes of answering Research Question 1, responses on several of the Daily Media Usage items were combined in order to create a variable that represented time spent "behind the screen," either a television screen, a computer screen, or a portable phone screen. The items (shown in Table 1) included Visiting Websites, Offline Computing, E-mailing, IMing, Texting, Video Gaming, Watching Television, Playing in Virtual Worlds, Attending Online Classes, Video Chatting, Social Networking, Watching DVDs, and Online Shopping. Inspection of Pearson correlation coefficients between the 13 items revealed that every item had a correlation of .30 with at least one other item. Further, a reliability analysis showed that the new scale had a Cronbach's alpha of .81. The mean hours spent behind the screen for the entire sample was 23.15 (SD = 15.81). It is highly likely that many of those hours were spent multitasking, i.e., being engaged in more than one of the activities simultaneously (see Carrier et al., 2009; Rideout, Foehr, & Roberts, 2010; Roberts, Foehr, & Rideout, 2005). In this way, the mean can appear to be unusually high for a 24-h day.

The first step in the analysis was to examine the raw correlations between online activity and the two forms of real-world empathy. Over several decades, there has been scientific consideration of sex differences in empathy. There is a fairly consistent pattern in the literature that sex differences favor women over men in the capacity for empathy; however, there has been debate over whether the observed differences reflect biological forces, sociocultural forces or a methodological artifact (Christov-Moore & SimPlease update reference 'Christov-Moore et al., in press; Eisenberg & Lennon, 1983; Lennon & Eisenberg, 1987). Nonetheless, because of the possibility that men and women might have quantitatively or even qualitatively different empathic capacities (e.g., Rueckert & Naybar, 2008) and because there is scientific interest in whether females and males function differently when it comes to empathy, the correlations were calculated separately for females and males (Table 2). The results showed that being Behind the Screen did not have sizable relationships with either form of real-world empathy for either gender. However, females did show a statistically significant negative relationship between cognitive real-world empathy with increases in time spent behind a screen.

The role of face-to-face communication (F2F)—or, specifically, the lack thereof—in the relationship between online activity and real-world empathy was investigated through two planned mediator analyses of the correlational data for each gender. The relationships between online activity and each empathy measure (Cognitive Real-World Empathy, Affective Real-World Empathy) were calculated directly and also were calculated through regression analyses after taking into account the impact of the number of hours spent in F2F communication. Thus, the mediator analyses show what happens to the relationship between online activity and empathy when F2F communication is factored out of the relationship via a linear regression analysis. Inclusion of the

Table 2
Pearson's product moment correlations for real-world empathy subscales with time spent behind a screen by gender.

Type of Real-World Empathy	Gender	
	Female (n = 806)	Male (n = 584)
Cognitive	−.09**	−.02
Affective	−.03	−.05

* $p < .05$; ** $p < .01$; *** $p < .001$.

background variables of age and ethnicity did not change the patterns of results in the analyses that follow.

Fig. 1 shows the results of the analyses for females. Although there was a significant negative impact of online activity upon Cognitive Real-World Empathy, F2F communication was not a mediator of this relationship. F2F communication had a positive influence upon Cognitive Real-World Empathy, but removing the influence of F2F communication from the effect of online activity did not eliminate or reduce the impact of online activity upon Cognitive Real-World Empathy. Rather, the negative impact of online activity on empathy was strengthened when the influence of F2F communication was removed. Thus, there appeared to be two pathways of influence of online activity upon Cognitive Real-World Empathy. In one, online activity that leads to F2F communication had a positive impact upon Cognitive Real-World Empathy. In the other, online activity that does not lead to F2F communication had a negative impact upon Cognitive Real-World Empathy. Being behind the screen was not associated with changes in Affective Real-World Empathy for female young adults; therefore, there was no relationship between these variables that could be mediated by F2F communication. Indeed, when F2F communication was factored out of the relationship, the relationship between online activity and affective empathy changed only slightly and remained non-significant.

Fig. 2 shows the mediator analyses for males. Neither Cognitive Real-World Empathy nor Affective Real-World Empathy was correlated with online activity, so there was no relationship to be mediated by F2F communication. Further, when F2F communication was factored out of the association between these two variables, the impact of being online upon empathy remained small and non-significant. The results for Cognitive Real-World Empathy did reveal that online activity that leads to F2F communication has a positive impact upon Cognitive Real-World Empathy.

In order to provide insight into what specific types of online activities might contribute to changes in real-world empathy, a series of planned analyses were conducted examining how the relationship between online activity and real-world empathy varies with the type of online activity. The first step was to reduce the overall number of variables in the analyses by reducing the set of behind-the-screen variables using factor analysis. The general-purpose video gaming item was replaced with the more specific video gaming items (see Table 1) to give more detail about video gaming use. Inter-item correlations showed that each item was correlated .3 with at least one other item. The Kaiser–Meyer–Olkin measure of sampling adequacy was .90, above the commonly recommended value of .60 (Tabachnick & Fidell, 2001), and Bartlett's test of sphericity was significant ($\chi^2(153) = 11853.88$ $p < .001$). The communalities were all above .30 (see Table 3), further confirming that each item shared some common variance with other items.

Given these overall indicators, factor analysis was deemed to be suitable with all 18 items. Principal components analysis with Varimax rotation was used. Initial eigenvalues indicated that the first three factors explained 32.06%, 16.36%, and 8.87% of the variance, respectively. The fourth through eighteenth components had eigenvalues less than 1. All of the items had factor loadings of at least .50 on one factor and none of the items had factor loadings of at least .50 on more than one factor. The final factor-loading matrix for this solution is presented in Table 3.

The first factor label was derived from the names of the top loading items. The first six of the ten items on factor 1 all involve playing video games; therefore, the factor was labeled, "Play video games." For the second factor label, prior research on the technology-related behaviors of young persons at home provided insight. Foehr (2006) found that, in the United States, the computer—desktop or laptop—served as a locus of multitasking in the home, with adolescents engaging in multiple activities such as e-mail, website browsing, and instant messaging, while on the computer. She described the computer as a "gateway" to other activities. Therefore, the second factor was labeled "Computer as gateway." The third factor, containing TV viewing and DVD watching, clearly linked together two activities that involve television sets in the typical cases. However, the factor also included texting. Therefore, this factor was labeled, "TV & Texting." The inter-item reliabilities (Cronbach's alpha) for Play Video Games and Computer As Gateway were acceptable, alpha = .91 (10 items)

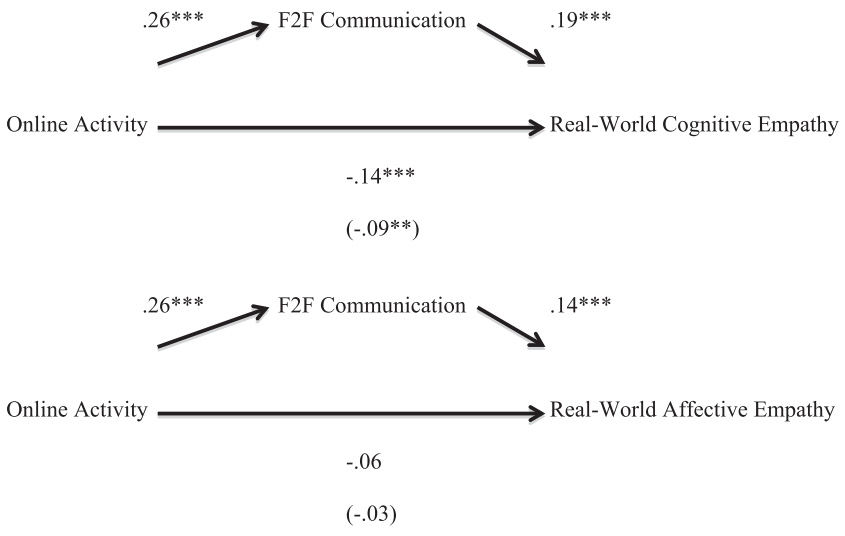

Fig. 1. Mediator analyses of F2F communication and the relationship between being behind the screen and real-world empathy measures for females. Numbers represent beta weights from regression analyses. The numbers in parentheses are the zero-order correlations between online activity and the real-world empathy measures. * $p < .05$; ** $p < .01$; *** $p < .001$.

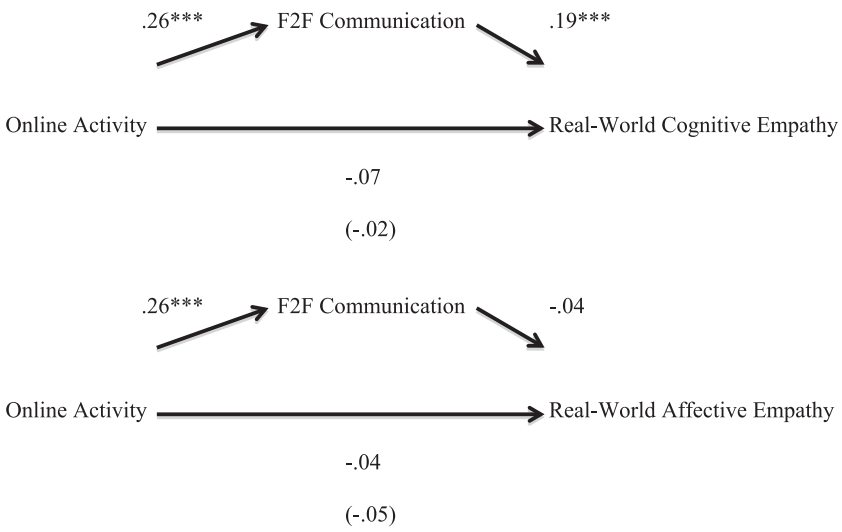

Fig. 2. Mediator analyses of F2F communication and the relationship between being "behind the screen" and empathy measures for males. Numbers represent beta weights from regression analyses. The numbers in parentheses are the zero-order correlations between online activity and the real-world empathy measures. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3
Factor loadings and communalities based on a principal components analysis with Varimax rotation for 18 items assessing being behind the screen ($N = 1390$).

Item	Play Video Games	Computer as Gateway	TV & Text	Communality
Play video games on a computer with other people IN DIFFERENT LOCATIONS	.84			.71
Play video games on a console with other people IN DIFFERENT LOCATIONS	.83			.70
Play video games on a computer with other people IN THE SAME ROOM	.79			.64
Play video games on a console with other people IN THE SAME ROOM	.78			.63
Play video games on a computer BY YOURSELF	.77			.63
Play video games on a console, BY YOURSELF	.77			.61
Spend time in an online virtual world	.71			.55
Skype or video chat	.69			.53
Attend classes online	.59			.37
Shop online	.55			.37
Use a computer for purposes other than being online…		.80		.65
Use e-mail		.76		.59
Go online and visit websites		.74		.59
Instant message or participate in online chats		.71		.58
Go online to social networking sites		.60	.43	.58
Watch television			.69	.52
Watch DVDs	.45		.63	.60
Text		.39	.57	.49

Note. Factor loadings <.30 are suppressed.

and alpha = .81 (5 items), respectively. The third subscale, TV & Text, showed poor reliability, alpha = .40 (3 items). Further, Cronbach's alpha could not be raised appreciably by deleting any one of the items from the subscale. Therefore, consideration of the third subscale was discontinued.

The next step was to conduct mediator analyses of the role of face-to-face communication using the newly created subscales that capture more detail about being behind the screen. The results of these analyses are shown in Figs. 3 and 4. For females (Fig. 3), F2F communication was not a mediator of any of the relationships between online activities and real-world empathy. However, other patterns emerged. Cognitive Real-world Empathy was negatively impacted by playing video games, irrespective of how much time was spent in F2F communication. Using the computer as a gateway to other activities appeared to be related to cognitive real-world empathy in two ways. First, it predicted increased amounts of F2F communication that then predicted increased empathy. Second, gateway activities that did not predict F2F communication negatively predicted cognitive real-world empathy. The patterns for affective real-world empathy were similar in some ways and different in others. Playing video games predicted decreased affective real-world empathy, irrespective of the amount of F2F communication, as it had done with cognitive real-world empathy. In contrast, using the computer as a gateway to other activities predicted increased F2F communication which had a positive relationship with affective empathy, while using the computer for activities that do not lead to F2F communication was not related to affective empathy.

For males, some of the same relationships emerged (Fig. 4). Cognitive empathy was negatively impacted by playing video games, regardless of the role of F2F communication. In other words, the negative impact of video gaming was not due to a loss of F2F time. Unlike the females, cognitive empathy was not impacted by using the computer as a gateway to other activities, save for a positive impact when those activities led to increased F2F communication. Affective empathy was not affected at all by any of the online activities.

3.2. How does virtual empathy compare to real-world empathy?

The first step in addressing Research Question 2 was to assess the reliability of the virtual empathy scale. It was intended that

the virtual empathy scale would measure the same two types of empathy as the Basic Empathy Scale: cognitive and affective. The items on the virtual empathy scale that corresponded with the two types of items on the BES were assessed for inter-item reliability using Cronbach's alpha. Reliability for the cognitive subscale was .73 (9 items) and reliability for the affective subscale was .82 (10 items). No appreciable increases in reliability could be attained by dropping any items from the subscales.

Comparison of virtual empathy to real-world empathy was made using Pearson correlation coefficients calculating the strengths of the relationships among all of the subscales (Table 4). It was expected that real-world empathy and virtual empathy would be correlated at the level of the subscales. The results are somewhat consistent with this expectation. For cognitive empathy, the real-world and online versions were significantly correlated but only moderately; further, the online cognitive empathy was correlated more strongly with real-world cognitive empathy than with offline affective empathy. For affective real-world empathy, there was a strong positive correlation between the real-world and online versions, and online affective empathy was correlated more strongly with real-world affective empathy than with real-world cognitive empathy. Additionally, both subscales of the online measure were significantly positively correlated with the measure of general social support, albeit the relationships were weaker than those involving the real-world measure.

Next, the mean levels of real-world and virtual empathy were compared using a 2 (real-world versus online) × 2 (cognitive versus affective) repeated-measures ANOVA. The means are shown in Figs. 5 and 6 for females and males, separately. For females, the results showed that real-world empathy scores were higher than virtual empathy scores, $F(1, 713) = 896.15$, $p < .001$, $\eta^2 = .56$, that cognitive empathy scores were higher than affective empathy scores, $F(1, 713) = 122.7$, $p < .001$, $\eta^2 = .15$, and that there was a significant but small interaction between the version and the subscale, $F(1, 713) = 27.38$, $p < .001$, $\eta^2 = .04$, such that cognitive empathy scores were affected more than affective empathy scores by a change in version. A similar pattern was found for the males (Fig. 6). Real-world empathy scores were significantly higher than virtual empathy scores, $F(1, 492) = 363.36$, $p < .001$, $\eta^2 = .42$, cognitive empathy scores were higher than affective empathy scores, $F(1, 492) = 378.89$, $p < .001$, $\eta^2 = .44$, and there was a significant interaction between the two variables such that cognitive empathy was impacted more by the version than was affective empathy, $F(1, 492) = 89.86$, $p < .001$, $\eta^2 = .15$.

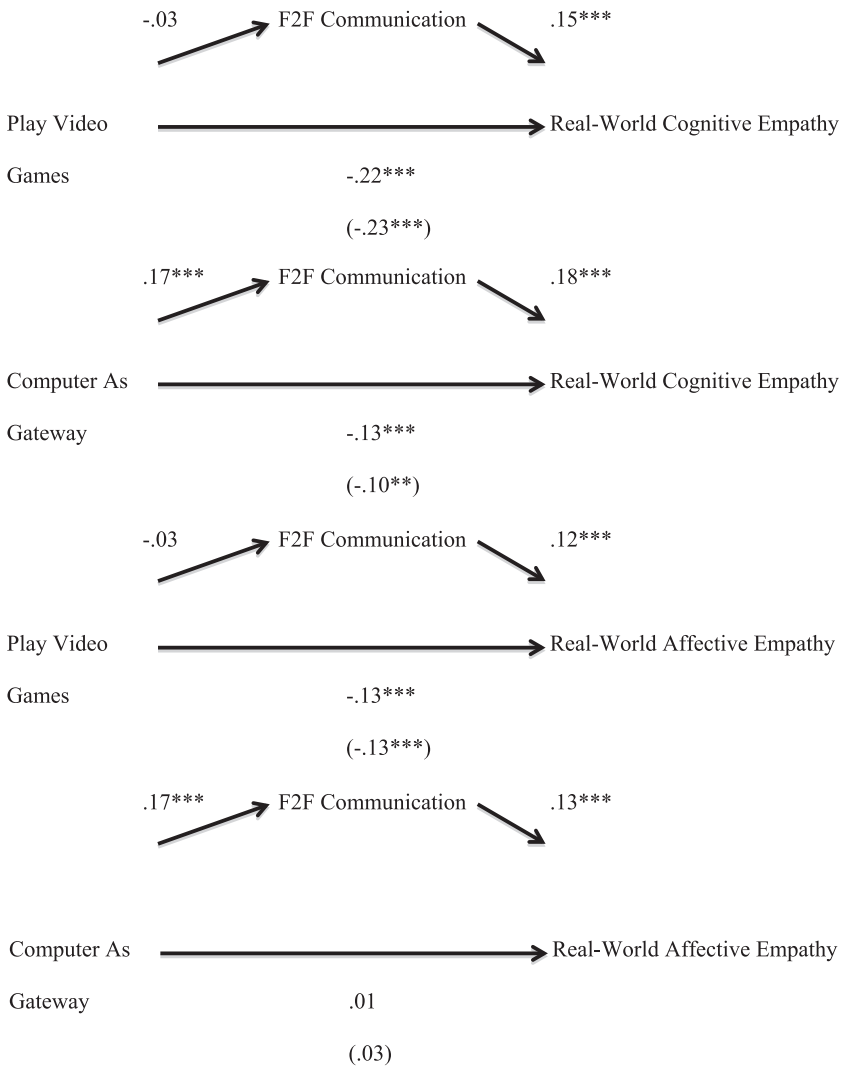

Fig. 3. Mediator analyses of F2F communication and the relationship between types of online activity and empathy measures in females. The numbers in parentheses are the zero-order correlation between the online activity and the real-world empathy measures. * $p < .05$; ** $p < .01$; *** $p < .001$.

4. Discussion

The two purposes of this study were to examine the impact of going online upon empathy and to measure and compare real-world empathy to virtual empathy. An anonymous online survey was administered to more than 1000 young adult members of the Net Generation, aged 18–30 years. The survey measured real-world empathy using a well-established scale (the Basic Empathy Scale, BES) and employed a new measure of virtual empathy modeled after the BES. Additionally, the questionnaire measured technology usage and social support. With respect to the first purpose of the study, the analyses were designed to test the hypothesis that going online takes time away from meeting people face to face (F2F) that then has a negative effect upon one's empathy levels. The major findings related to these analyses were that:

- Going online, in general, had very small negative impacts upon cognitive and affective real-world empathy and only cognitive real-world empathy in females was significantly affected.
- Going online was associated with increased time spent in F2F communication for both females and males.
- Playing video games significantly reduced cognitive and affective real-world empathy in females and cognitive real-world empathy in males but did not impact F2F time.
- Using the computer as a gateway to activities such as e-mail and instant messaging improved real-world empathy if it lead to improved F2F communication
- Using the computer for activities that do not lead to F2F communication had no effect on real-world empathy for the most part.

These findings shed light on the relationship between Internet usage and empathy. As opposed to assertions by Small and Vorgan (2008), *F2F communication was not reduced at all by going online*. This might be possible if additional hours spent online are displacing activities other than meeting people face to face. Some candidates for displaced activities could be engaging in health-related activities, studying for school, doing housework or reading books and magazines. But, the displacement of health-related activities does not seem to be a viable explanation. A recent study of health-related activities, some not taking very much time to execute (e.g., taking nutritional supplements), found that heavy Internet use by Hong Kong adolescents still predicted a lack of engaging in these activities, suggesting that displacement was not the cause (Kim et al., 2010). And, in a study of adolescents done in the United States, the hours spent using contemporary technology predicted negative health outcomes even after factoring out the time spent in physical activities, suggesting that the displacement of physical activities was not a key factor (Rosen et al., 2014). Reading does not appear to be displaced by going online, either, at least in the present study. There was an item in the Daily Media Usage scale that asked how many hours are spent in a typical day "reading books or magazines for pleasure." The correlations between responses on this item and overall time spent behind a screen were computed for females and males with the expectation that time spent online would reduce time spent reading. However, the results showed otherwise, with significant positive correlations for females, $r(804) = .29$, $p < .001$, and for males, $r(582) = .40$, $p < .001$. There are some hints that studying could be a task that is displaced by going online. Rosen, Carrier, and Cheever (2013) observed middle school, high school, and college students in the U.S. while the students studied for school in their home bedrooms. The observations showed that negative predictors of staying on task for students included having distractors on at the start of studying (including TV and telephone), having Facebook open on their computer screen at least once during the study session, and having computer windows open on their computer screen. Hence, the time spent in the online activities could have been taking the place of time spent in studying.

There was not a general effect of going online upon real-world empathy. The negative impact of going online upon real-world empathy was mostly confined to video gaming and this impact was not mediated by a reduction in F2F communication. In adolescents, it is known that video gaming involving violent content can have negative short-term and long-term effects that include changes in arousal levels, modifications of stored scripts for conflict resolution and priming for violence-related activities (Anderson, 2004; Anderson & Bushman, 2001; Anderson et al., 2003; Huesmann, 2007). It is possible that such changes affect one's ability to identify or be responsive to other people's emotions (i.e., cognitive empathy) or one's ability to undergo empathic reactions (i.e., affective empathy).

In a few cases there appeared to be activities done on the computer that improved cognitive empathy via F2F communication. The exact activities are unknown, but one possibility is that computer-based activities that involve making connections with friends and family might also lead to face-to-face meetings with those persons. Simply put, communicating a lot with someone online that you already know offline might increase the chances that you will see that person offline. This could then lead to more offline meetings with people, thus increasing the chances for practicing one's empathy skills.

Females and males showed some important similarities and a few differences in the relationship between going online and real-world empathy. Although the relationships between hours spent generally "behind a screen" and real-world empathy were small, females' cognitive real-world empathy was significantly impacted by those hours. The impact upon cognitive real-world empathy for females occurred for both video gaming and using the computer as a gateway to other activities (those that do not lead to F2F communication) although the latter effect was markedly smaller than the former. The reason why cognitive real-world empathy in females was affected by activities while using the computer as gateway that do not lead to F2F communication is unclear. Males' real-world empathy also was negatively affected by video gaming, but in their case using the computer as a gateway to other activities that do not lead to F2F communication did not affect their real-world empathy levels.

The second major goal for conducting the present study was to compare standard empathy to virtual empathy. The major findings with respect to this goal were that

- Real-world and virtual empathy scores were significantly positively correlated.
- For both sexes, real-world empathy scores were higher than virtual empathy scores.
- For both sexes, cognitive empathy scores were higher than affective empathy scores, but cognitive empathy scores were lowered more in the online world than were affective empathy scores.
- Both virtual empathy subscales were significantly positively correlated with the measure of general social support, but at a weaker level than real-world empathy.

If going online decreases empathy, then it would be expected that virtual empathy scores would be lower than real-world empathy scores. This is exactly what was found. Speculatively, this partially could be due to the lack of nonverbal cues in most computer-mediated communication. However, it is not likely to be due to a lack of F2F time when one is online, as was shown earlier in the findings. The reduction in nonverbal cues in the online world also might explain the finding that cognitive real-world

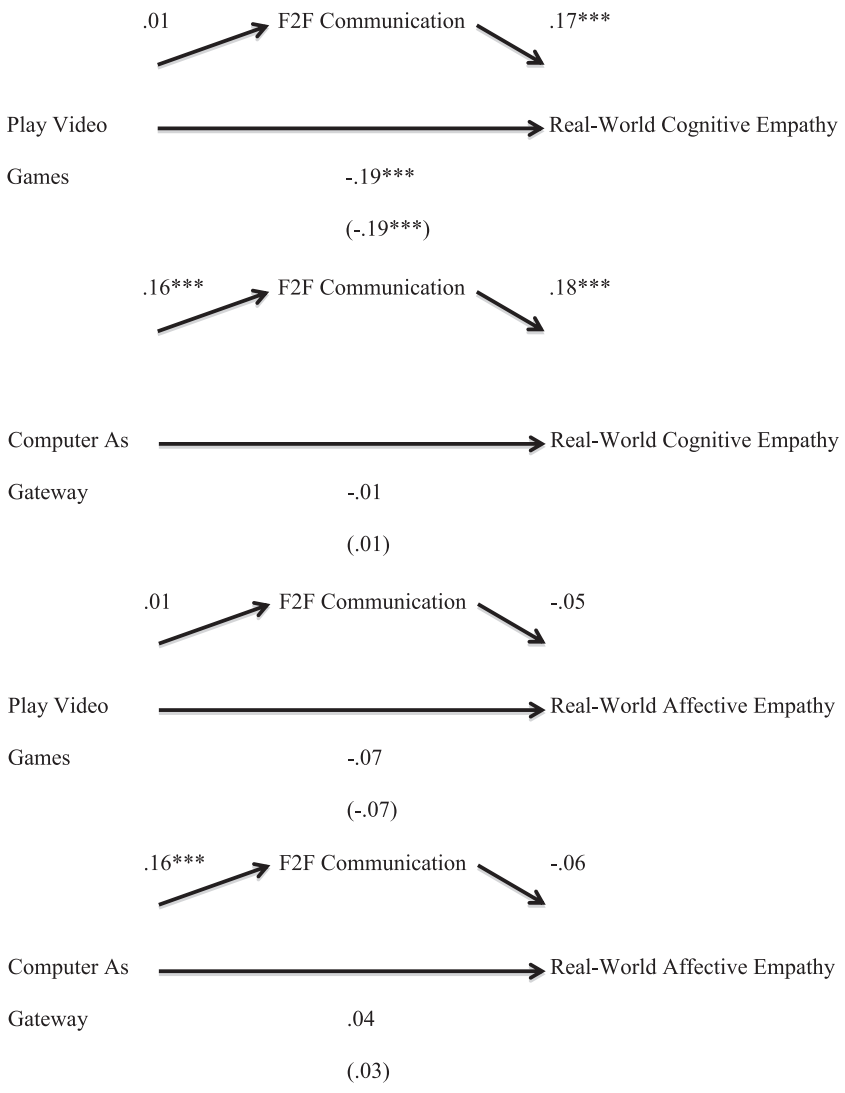

Fig. 4. Mediator analyses of F2F communication and the relationship between types of online activity and empathy measures in males. The numbers in parentheses are the zero-order correlations between the online activity and the real-world empathy measure. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4
Pearson's product moment correlations for real-world and virtual empathy subscales.

Measure	Mean	SD	1	2	3	4
1. Real-World-Cognitive	3.74	.65				
2. Real-World-Affective	3.33	.65	.43***			
3. Virtual-Cognitive	3.15	.55	.34***	.24***		
4. Virtual-Affective	2.92	.63	.18***	.60***	.50***	
5. Social Support	64.32	13.74	.37***	.24***	.15***	.10***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

empathy was impacted more than affective real-world empathy by being online. Cognitive empathy—the ability to identify the emotions of others—would be expected to rely on a bevy of cues for identification. Any reduction in the number of those cues would thus be expected to affect this form of empathy. In contrast, affective empathy—the ability to feel the same emotion as in others—might not be impacted as much by being online because this step does not rely as heavily on those cues.

One final comment about the impact of virtual empathy relates to the concept of social support. Although not formally examined, an interesting research question concerns the comparative impact of virtual empathy and real-world empathy on feelings of being socially supported. As virtual empathy often occurs in a social media environment, one might wonder if it engenders as strong a feeling of being social supported as it does when empathy is dispensed in the real world. Examining the relationship between empathy and social support, correlations were calculated for each and compared. As seen in Table 4, when considering the affective component of empathy, the correlation between real-world affective empathy and social support was .24 (r^2 = .06) while the same correlation for virtual affective empathy and social support was .10 (r^2 = .01) which implies—comparing the effect sizes—that real-world affective empathy is six times as related to feelings of social support as is virtual empathy. The same analysis correlating social support with cognitive empathy shows a similar pattern of real-world cognitive empathy (r = .37; r^2 = .14) when compared to virtual cognitive empathy (r = .15; r^2 = .03) with real-world cognitive empathy being nearly five times more important in feelings of being socially supported. Although only suggestive, these results imply that to gain the same feeling of social support that you get from, say, one hug or empathic conversation with someone in the real world you might need between five and six empathic comments online. Further research is necessary to examine the relative impacts of these two forms of empathy.

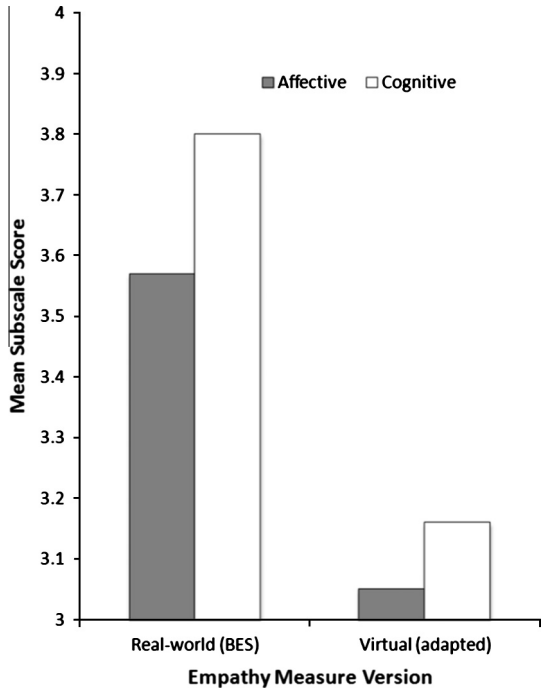

Fig. 5. The effect of empathy measure version and empathy subscale upon empathy scores in females.

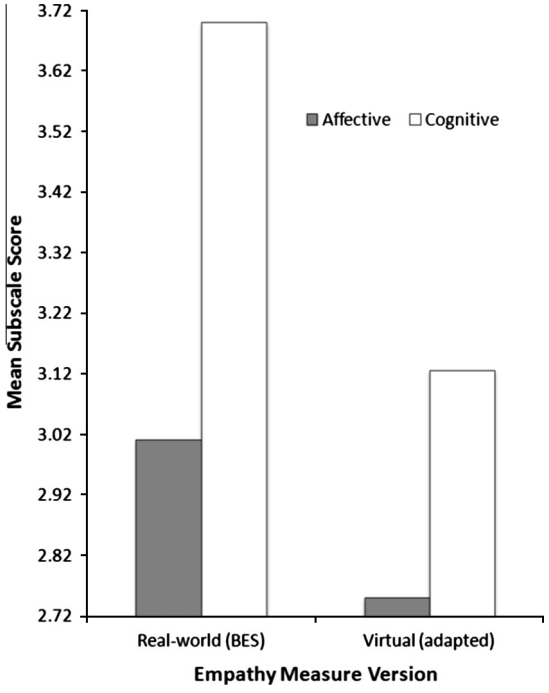

Fig. 6. The effect of empathy measure version and empathy subscale upon empathy scores in males.

5. Limitations

There are least three known limitations of the present study. First, the sample might not have been representative of the population of adult Internet users as it was collected as a convenience sample. Second, people's reports of hours spent engaged in various activities might not be objective, as they rely on self-report. However, similar self-report measures have been used in much of the research in the study of the psychology of technology with success. Third, the present study is correlational, so causation between time spent online or using various technologies and empathy cannot be established. For example, while the model tested purports to show that spending time online can increase the amount of time engaged in F2F communication with others, another possibility exists. A "third factor" such as extroversion could account for both the increased online activity (via social networking perhaps) and the increased F2F communication. Nonetheless, the present approach allows for the use of large participant samples that are not feasible with experimental manipulations involving activities done online.

6. Conclusion

Research into online health support communities has found that empathy does exist among the participants. So, just being "behind a screen" does not eliminate empathy among technology users. Further, the present results show that going online generally does not appear to reduce peoples' capacity for real-world empathy. Rather, spending time online that results in or increases the chances of F2F encounters actually contributes positively to real-world empathy. However, some online activities do appear to negatively affect real-world empathy, including video gaming and online activities that are not associated with increased F2F time. Finally, virtual empathy, as measured with the modified basic empathy scale in the present study, does appear to be related to feelings of social support but also appears to be weaker than real-world empathy.

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