The Relationship between Social Media and Empathy

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ABSTRACT

The Relationship between Social Media and Empathy

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Graduate School of Arts and Sciences
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Recently, there is an increasing concern of social media use. In particular, social media use may be related to empathy decline and mental health issues, even may be linked to some social problems (Konrath, 2010). The present study aims to investigate whether and how social media use would be associated with empathy. We collected totally 150 participants (6 – 78 years) through online survey. The results showed that time spending on social media has no significant relationship with empathy. However, preference for social media interaction was found to be positively related to online cognitive empathy. In addition, age has significant negative relationship with both online and offline empathy.
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Introduction

In present days, social media is already a part of the majority of users’ daily lives. Thousands of people are connected with each other and exchange information via the online network. As of 2018, 2.16 billion people worldwide have an account on Facebook, 2.5 billion on YouTube, 980 million on WeChat and 330 million on Twitter (Statista, 2018). Although the internet started out merely in order to allow users to exchange data and code with each other (Rheingold, 1993), it has pulled us together because of the faster and more convenient means of information exchange. People now are increasingly using the Internet, and more and more people are turning away from traditional media like TV, radio, newspapers and magazines (Mangold and Faulds, 2009).

Meanwhile, there is an increasing worry about the Internet and social media use today, especially in exacerbating mental health issues in adolescents and young adults. For instance, social media exists to connect people, but many people are concerned that it can lead to social isolation. Since online environment is free and comfortable, it can make communicating in person difficult when it comes to the real life. Interactive behaviors may become more familiar on screen-based media for most people, like social media. This makes many people concerned that social media may lead to the far distance between people, and people will slowly lose the ability of sharing their emotions and experiences when in face-to-face interactions. At this point, social media is concerning, as it affects user’s ability to communicate with others in daily life, makes them feel communicating in person difficult or even contributes to anxiety and depression. Furthermore, it may affect people’s relationship with others, because users keep interacting with others and it may cause them no longer to react genuinely to others’ real-life
issues, which means they may lose empathy and causes negative impacts to individual people and societies.

Over the past decade, as social media has been popularized, empathy has declined and social apathy became a great problem in today’s society (Konrath, 2011), which leads more and more researchers to consider “social media” an essential reason for those issues just as the public have concerned. For example, as the Neil Postman’s book “Amusing Ourselves to Death” (2006) expresses the notion, our society will grow like the world which was predicted by Aldous Huxley’s Brave New World, that is, because of information overload through media, people are controlled by inflicting pleasure. Postman wrote in his book: “Our politics, religion, news, athletics, education and commerce have been transformed into congenial adjuncts of show business, largely without protest or even much popular notice. The result is that we are a people on the verge of amusing ourselves to death.” (p.35) He clearly points out the harm of network and social media to our lives in his book, people keep seeking amusement instead of reading and learning, let alone, caring about others’ suffering and misfortune. In addition, Konrath (2011) found that there is a big drop in empathy in recent years among college students. It is almost 40% percent lower compared to their counterparts from 20 or 30 years ago, and he thinks the rising prominence of personal technology and social media use in everyday life is likely one of the important factors to explain this phenomenon.

Results for prior studies related to “social media” seem to support this phenomenon. Growing concerns over the relationship between social media use and psychosocial well-being (e.g. depression, loneliness, low self-esteem) has spawned a surge of research (Tromholt, 2016; Bandura, 2009; Festinger, 1954; De Choudhury, Gamon, Counts & Horvitz, 2013; Lin et al, 2016). There is some evidence that social media use is correlated to many psychological
disorders, like depression (Lin et al, 2016), social anxiety (Caplan, 2007), and affects our well-being negatively (Tromholt, 2016). However, people can also benefit from the use of social media in multiple facets, which is hard to dispute. A recent systematic narrative review study which was done by Best, Manktelow and Talyor (2014) identified both the beneficial and harmful effects of social media usage. This research based on forty-three original research paper, and the results show the benefits of social media use including increased self-esteem, perceived social support, increased social capital, safe identity experimentation and increased opportunity for self-disclosure. Harmful effects were reported as increased exposure to harm, social isolation, depression and cyber-bullying. In short, the relationship between social media and mental health are still under discussion.

In order to have deep understandings on this topic, “empathy” plays an important role in modern psychology research, due to its fundamental component of maintaining interpersonal relationship and mental health (Zaki & Cikara, 2015). The lack of the ability to empathize is a central predictor to many mental illnesses and social problems, and can be manipulated and measured by many psychological assessments (Farrow & Woodruff, 2007). Several studies indicate that there is a correlation between empathy and violent video games (Funk et al, 2003; Carnagey et al., 2007). Empathy is typically operationalized as an important role in shaping positive social relationships (Eisenberg et al, 1993), and reducing negative behaviors like prejudice (Galinsky, Ku & Wang, 2005; Vescio, Sechrist & Paolucci, 2010). Empathy bolsters relationships, improves individuals’ well-being, and promotes prosocial behaviors (Zaki & Cikara, 2015). Likewise, empathy and antisocial behavior are considered to have an inverse relation as well (Miller & Eisenberg, 1988), if people have high levels of empathy, they are less likely to engage in violent behaviors, such as aggression (Björkqvist, Österman & Kaukiainen,
Research has provided support for the assumption that empathy encourages prosocial or altruistic behavior (Hoffman, 2008). In contrast, low empathy has been identified as a risk factor for violent behavior among adolescents (Kingery, Bafora, & Zimmerman, 1996). In a meta-analysis, Jolliffe and Farrington (2004) found that low cognitive empathy was strongly related to offending.

Thus, it is not surprising that “empathy” becomes a new way of thinking about the relationship between social media and mental health. Some researchers focus on proving the existence of online empathy and how empathy spread through online and face-to-face empathy differently, so that to explain the effects of social media on mental health (Rosen, 2012; Caplan & Turner, 2007; Preece & Ghozati, 2001). Others focus on distinguishing differences between social media-based interaction and face-to-face interaction, whether one is more empathic than another, and how those differences are going to affect user’s daily lives (Sproull and Kiesler, 1986; Cornwell & Lundgren, 2001).

Despite these rationales for why social media might related to empathy drop, direct empirical evidence for a relation between social media use and empathy is largely missing. One study suggested that exposure to online violence was associated with lower empathy (Funk et al., 2003). Also, Konrath (2013) have found a direct link between social media use and social disconnection, with simultaneous declines in empathy among young Americans. However, some other researchers found a positive relationship between social media use and empathic concern was found (Alloway et al, 2014; Vossen & Valkenburg, 2016). Alloway et al (2014) found Facebook usage was linked to high level of empathy, which suggests that social media helps adolescents to stay connected with others. Vossen & Valkenburg (2016) also supported adolescents’ social media use improved both cognitive and affective empathy. However, most of
these studies that investigate the relation between social media use and empathy are among young adults (Carrier, Spradlin, Bunce & Rosen, 2015; Vossen & Valkenburg, 2016; Konrath, O’Brien & Hsing, 2011). The inconsistent finding may be due to some researches focus more on specific online behaviors, included activities like violent video games, and whether those different online activities may have different effects on empathy, while other researches examine mainly using social media, like email and texting, to maintain relationships with their friends (Bryant, Sanders-Jackson & Smallwood, 2006; Peter & Valkenburg, 2007; Alloway et al, 2014).

Given the scarcity in research investigating the relationship between social media and empathy, the first purpose of this study is to explore whether there is relationship between social media usage and empathy. Empathy is a multidimensional construct consisting of cognitive and affective components, that also may have online and offline differences. Social media usage is also a broad concept. Prior research more focus more on time spent on specific social media platform or messaging, but it is still unknown whether merely use social media is related to all components of empathy or to some particular components, and whether there is difference between online and offline. They will be tested separately in this study.

The relationship between social media use and empathy is very important to know. Research already found out empathy attributes to mental health and maintain positive interpersonal relationship (Zaki & Cikara, 2015). Therefore, to assess the correlation between social media use and empathy can provide us an idea of how social media can affect us psychological states and interpersonal relationship with others. Further to say, it can help explain some mental illnesses and social problems that the public has concerned among modern societies.
Social Media

The term “social media” is ambiguous. What exactly should be included in this category is unsure. Back to 20 years ago, the term “weblog” was first used, which leading to the creation of social networking sites, such as Facebook and YouTube. The growing use of social networking sites, resulted in the term of “social media” (Kaplan & Haenlein, 2010). Then, in 2004, Web 2.0 was first used to describe a new concept for social media which focuses on the way Web pages are designed and used instead of technical updates (O’reilly, 2005). In short, that is all users can be continuously modified in a social media dialogue as creators, interact and collaborate with each other, instead of only passively viewing content. Web 1.0 projects, like personal web pages, are replaced by collaborative projects in Web 2.0. So that Web 2.0 is considered as the evolution of social media (Kaplan & Haenlein, 2010). Web 2.0 can summarize almost any form of content that users make use of social media, which is also called User Generated Content (UGC) (Berthon et al, 2015). UGC gives an idea about what was included in “social media” currently. The most striking characteristics of UGC are: 1) publication requirement, it needs to be published on a publicly accessible website or on a social networking site. 2) Creative effort, it needs to show a creating of the work or adapting existing works. 3) It is created without professional routines and practices (Wunsch-Vincent & Vickery, 2007). Clearly, those three characteristics exclude email, two-way instant messages and the like.

Consequently, social media is an evolving group of Internet-based applications through which users create and exchange content (Kaplan & Haenlein, 2010). It builds on the concepts and foundations of Web 2.0 and emphasize the UGC characteristics.

Empathy
Empathy refers to the ability and tendency to share and understand others’ internal states (Zaki & Ochsner, 2012). As humans, our empathic abilities help us to infer the thoughts and feelings of others (Decety & Ickes, 2009) and to generate the appropriate affective and behavioral response (Hoffman, 1993). Our ability to feel and infer others’ emotions is considered crucial for healthy functioning in interpersonal relationships (Blair, 2005; Eisenberg & Miller, 1987).

Empathy is a multidimensional concept as discussed earlier in this paper, the cognitive component of empathy refers to accurately recognizing another person’s thoughts and feelings (Davis, 1983; Hoffman, 1977) and is mainly focused on the underlying cognitive processes such as perspective taking or accurately recognizing another’s emotions. Later, Reniers (2010) defined empathy into two parts: the general consensus requires empathy to encompass a comprehension of other people’s experience (cognitive empathy) as well as the ability to vicariously experience the emotional experience of others (affective empathy). According to Reniers (2010), both cognitive and affective empathy are necessary and distinguish to empathic response. In detail, cognitive empathy focuses more on understanding the emotional states of others, and affective empathy refers to the ability to be sensitive to and vicariously experience the feeling of others.

Social Media and Empathy

Prior studies already show that empathy plays an extremely important role in maintaining interpersonal relationship. Given that social interaction takes place online, an important question to ask is whether empathy can be experienced through online communication just as face-to-face communication, and whether they are different.
Peiris et al. (2000) found that a computer interview could be made more effective by simulating the human interviewer technique of empathizing with interviewees, suggesting that empathy could be delivered in online environment. Caplan & Turner (2007) argued that empathy through computer-mediated communication, such as social media, could be facilitated through easier and frequent access to other people, so that online comforting behavior actually can support empathy or even increase it. However, Rice & Katz (2000) found that many online communities contained empathic communication and more than half of the messages in one community were hostile, which are a cause of concern because they may discourage positive forms of empathy.

The possible negative concern of social media on empathy has been attributed to the notion that computer-mediated communication (CMC), which is distinct from face-to-face (FtF) communication. In particular, CMC was considered as more impersonal because of the lack of nonverbal cues, and computer systems are more likely to constrain user’s selection and interpretation of information (Walther, 1996), this is so-called cues-filtered-out theory (Culnan and Markus, 1987). It was claimed that CMC reduces “social context cues”, which are the aspects of physical environment and nonverbal hierarchical status cues, so that CMC impedes interpersonal impressions (Sproull and Kiesler, 1986). Also, Lea and Spears’ social identity-deindividuation (SIDE) theory predicts that CMC participants engage in an “overattribution” process. That is, they built stereotypical impressions based on the light of information they had, and overreliance on minimal cues including misspelling, typing errors, punctuation etc. This cognizance led to their attribution and judgement of others (Lea & Spears, 1992). From these points of views, CMC would be expected to be less socially-oriented and more impersonal than FtF communication. The online environment is anonymous, which makes CMC communication
more exaggerated and idealized, and reduces personal influences than possible in FtF communication (Cornwell & Lundgren, 2001). However, Walther (1996) introduced a new theory called hyperpersonal communication theory, to explain people’s uses of the media where the interpersonal communication exceeds FtF interpersonal communication. In contrast to the cues-filtered-out theory, Walther asserts that the reduction of cues during interaction cannot be assessed independently. According to this theory, CMC can provide opportunities for users to present themselves in more ideal ways and may select communication partners that are satisfy oneself. So, CMC can become “hyperpersonal”, which means giving a kind of interaction that is more desirable than we can often manage during FtF interaction.

Although there is fewer data about whether CMC is more or less empathic than FtF, many scholars point out the importance of empathy in CMC as well as in FtF. Empathy through CMC was also called “virtual empathy” by Rosen (2012). In his book *iDisorder: Understanding our obsession with technology and overcoming its hold on us*, Rosen mentioned that results from lab research about 1400 young adults shows that virtual empathy is not only a real concept, but it is linked to social support. Also, real-world empathy is more strongly related to positive feelings (Rosen, 2012). The most interesting thing is that result showed people who spent more time on social networks and who instant messaged more often are the best at dispensing virtual empathy. Essentially, those who are better able to express virtual empathy were also better able to express real-world empathy. Practicing virtual empathy helped people better express empathy face-to-face (Rosen, 2012).

Based on the CMC theory and prior research, there seems to be more reason to expect that social media can help users to practice social skills and enhance their empathy.
In addition, CMC may allow individuals to create a perfect or more positive one’s self online as they expect (Caplan, 2003). They are able to develop and edit self-presentation, which means Internet for them is a place where they have full control of themselves and others’ impression of them (Caplan, 2003). Also, research found that media users tend to seek out messages that distract them from sources of a negative mood (Knobloch-Westerwick & Alter, 2006; Zillmann, 1988; Bowman & Tamborni, 2012). In this case, media is considered as a tool for mood regulation. Thus, a preference for online social interaction may be due to the individuals’ perceptions about CMC. According to the Caplan (2003), preference for online social interaction refers to “a cognitive individual-difference construct characterized by beliefs that one is safer, more efficacious, more confident, and more comfortable with online interpersonal interaction and relationships than with traditional FtF social activities” (p.629). However, some research shows loneliness and depression maybe related to a preference for online social interaction (Caplan, 2003; McKenna, Green & Gleason, 2002). Davis (2001) argues that online communication to people who are lonely and depressed is more attractive. There is some evidence that preference for social media use is correlated to psychological disorders, like depression (Gamon, De Choudhury, Counts & Horvitz, 2013; Lin et al, 2016) and social anxiety (Caplan, 2007). This study going to investigate the preference of social media interaction and empathy.

Given that (1) Personality is one of the psychological operating cores that is most related to Internet use (Alonso & Romero, 2017), and (2) It is well-known that gender differences and age differences exist in empathy (Lennon & Eisenberg, 1987), “personality”, “gender”, and “age” will be used as control variables in this study while the relationship between social media use and empathy is examined.
Hypotheses:

1) Individuals with higher preference on face-to-face interaction compared to online interaction would have a high level of empathy, measured by the empathic concern subscale in the IRI (Davis, 1980). The preference is measured by the revision of subscales of GPIUS2 (Caplan, 2010).

2) Time spending on social media will be related to the level of empathy, specifically, time on social media will be (a) positively related to empathy measured by the empathic concern subscale in the IRI, (b) negatively related to offline empathy measured by revision of QCAE, and (c) positively related to online empathy measured by revision of QCAE.

3) Time spending on social media will be positively related to both cognitive empathy and affective empathy, but will be more strongly related to cognitive empathy than affective empathy.

All the above hypothesized relationships will be tested with the set of covariates in each model: gender, age and extraversion (measured through the Big Five personality traits).

Method

**Study design and population**

This study was performed using online questionnaires. Participants were recruited through the Sona system and Qualtrics (https://www.qualtrics.com). The Sona System is a cloud-based participant pool management Software. All participants should be familiar with one social media platform to complete the survey. Participants from Qualtrics were compensated the amount their agreed upon with Qualtrics before their entered into the survey. Participants from school Sona system were received research credit for psychology research studies and/or experiments.
The final data consisted of 150 participants (70% female; M\_age=34.85) who had completed the survey. In total, 57 participants from Sona system (N\_female=32, N\_male=25, M\_age=19.18, SD=1.61) and 93 participants from Qualtrics (N\_female=73, N\_male=19, N\_other=1, M\_age=44.45, SD=16.34). Missing data was random, which means not associated with specific variable. There are totally 3 missing values, and the missing was replaced by its corresponding sample mean. One observation was removed from the data due to invalid values.

**Materials**

This study materials include an informed consent form (see Appendix A), a questionnaire of five sections, with each section measuring one concept.

Time and demographic questions (see Appendix B): These items ask about participants’ age, ethnicity, relationship status and weather they are a member of social media. In addition, questions about time spending on social media are included, such as “How long have you been using social media?”, “On average, how much time do you spend daily on social media on weekdays/weekends?” and “How much time during the past week did you use social media?”. For the purpose of this study, these items are open-ended questions, with instructions on answering the question (e.g., in years or in hours).

Empathy (see Appendix C, E, F): The interpersonal reactivity index (IRI) (Davis, 1980) is an original 28 items scale used to measure empathy, which includes four subscales: (a) perspective taking; (b) empathic concern; (c) fantasy scale; and (d) personal distress. The IRI is used in research with established reliability at \( \alpha=0.70 \) to \( 0.78 \). For Test-retest reliability (60 to 75 days), males’ correlations between .61 and .79, females’ between .63 and .81. (Davis, 1980). All four subscales are used in the study. Scores of the scale are obtained by summing up the
individual item scores. This scale is a Five-point Likert-type scale, ranging from 0 (does not describe me well) to 4 (describe me very well). In addition, the QCAE: A Questionnaire of Cognitive and Affective Empathy is used (Reniers et al, 2010) to measure cognitive (19 items) and affective empathy (12 items). The reliability of QCAE is .878. (Reniers et al, 2010). It is a 31-items four-point Likert-type scales, ranging from 1 (strongly disagree) to 4 (strongly agree). In this survey, the QCAE is revised into two versions, includes social media interaction version and FtF interaction version, in order to fit the study. Scores of each subscale are obtained by summing up the corresponding individual item scores. Summing up the scores of cognitive empathy and affective empathy provides a total score for Empathy.

Preference of social media interaction (see Appendix D): The Generalized Problematic Internet Use scale 2 (GPIUS2) is a 15-items self-report scale used to measure the prevalence of cognitive and behavioral symptoms of Problematic Internet Use (PIU) (Caplan, 2010). The reliability score is α = .86. The scale is an eight-point Likert-type response scale, ranging from 0 (strongly disagree) to 8 (strongly agree). Only the Preference for online social interaction subscale is used in this study. The summation of the item score is used as the scale score. In this survey, the term ‘Internet use’ in the original GPIUS2 was replaced with “social media use”.

Personality (see Appendix G): Extraversion subscale from The Big Five Personality Test (Goldberg, 1992) is used as measure of personality (extraversion in this study). This is a five-point Likert-type scale, ranging from scale 1 (disagree) to 5 (agree). The reliability score is α = 0.84 (Goldberg, 1992).

Procedure
Participants signed up for the study via an online site called the SONA research system or through the Qualtrics. They went to the website to read the online informed consent form and, after providing consent, was connected to the surveys in the study. Participants then completed the survey via the Qualtrics online research survey program. Demographic information was collected before participants completed the survey.

**Analytic approach**

First, variables were examined for normality. The time spending on social media measure is based on 7 open-ended questions. Responses not clearly presented with one numerical value were re-coded in numbers. For example, answer like “almost 1 to 2 years” were recoded as 1.5 years. Answers for “How long have you been using social media?” were recorded in variable “Time1”. Answers for the other four questions were added to create a measure of average time spending on social media per week and were recorded in variable “Time0”.

Bivariate correlations were calculated between all numeric variables, the relationship between time spending on social media and the level of empathy was explored. The two key predictors are 1) the preference for online social interaction, which is measured by GPIUS2, recorded as “preference0”. Since the distribution of “Preference0” is closer to uniform distribution instead of normal distribution, it was categorized. “Preference” scores 0 to 7 indicated “FtF preference”, scores 8 to 14 indicated “neutral” and scores 15 to 21 indicated “social media preference”; 2) “Time0” and “Time 1”. Given the skewed distribution of ‘Time0’, a log transformation was used, and was recorded as “Time”.

The outcome variables are: “General empathy”, which measured by IRI and was recorded as “IRI”; online and offline empathy, which measured by QCAE. All empathy variables (except
“IRI”) are dimensions of the QCAE, record as “OnGenEmp” (online general empathy),
“OnCogEmp” (online cognitive empathy), “OnAffEmp” (online affective empathy),
Empathy is the sum of offline cognitive empathy and online cognitive empathy, recorded as
“OverallCog”. Same as overall affective empathy, and it was recorded as “OverallAff”. Control
variables include gender, extraversion, and age.

Finally, because we collected the data from two different ways (Sona system and
Qualtrics), we tested and compared two samples among all variables to see whether there are any
differences.

Regression model was used to test the relationship between empathy and social media. To
test hypothesis 1, the main model is: IRI ~ Preference + Age + extraversion + gender. For
hypothesis 2, the main model is: (a) IRI ~ Time + Time1 + Age + extraversion + gender; (b)
OffGenEmp ~ Time + Time1 + Age + extraversion + gender; (c) OnGenEmp ~ Time + Time1 +
Age + extraversion + gender. For hypothesis 3, the main model is OverallCog ~ Time + Time1 +
Age + extraversion + gender; and OverallAff ~ Time + Time1 + Age + extraversion + gender.

Given the positive correlation between the two Time variables, models were also tested
with only one time variable.

Results

Preliminary analyses

According to the results, there are no significant differences between samples that from the
Sona system and Qualtrics among all variables, except age and offline empathy. The mean age
for Sona system is 19, but for Qualtrics is 44. The offline empathy variables for Sona system are all significantly higher than Qualtrics.

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Note: Values in the same row and subtable not sharing the same subscript are significantly different at $p < .05$ in the two-sided test of equality for column means. Cells with no subscript are not included in the test. Tests assume equal variances.

There is no concern of non-normality for all the outcome variables in the model. All empathy variables are significantly positively correlated with each other. Time and Time1 was significantly positively correlated ($r = .294$, $n=149$, $p = .000$). Preference was significantly positively related to online empathy ($r = .221$, $n=149$, $p = .007$) but not offline empathy ($r = .044$, $n = 149$, $p = .593$). Mean scores for the “social media interaction preference” category is slightly higher than “neural” and “face to face preference” among all empathy variables (e.g. For IRI,
M_{social media preference} = 67.11, M_{face-to-face preference} = 57.92, M_{neutral} = 59.84.). Furthermore, age was significantly negatively related to IRI (r = -.244, n = 149, p=.003) and offline empathy (r = -.233, n =149, p=.004), and online empathy (r = -.181 n = 149, p=.027). It also related to cognitive (r = -.217, n = 149, p=.008) and affective empathy (r = -.236, n = 149, p=.004). Age is also significantly negatively related to Time (r = -.267, n =149, p=.001) and Time 1 (r = .195, n = 149, p=.017).

As expected, the two “Time” variables were positively related to all empathy variables (the correlation coefficients range from 0.012 to 0.220), except that Time 1 is negatively related to OverallAff (r = -.036 n = 149, p=.661). However, those correlations are not very strong and most of them are not significant. Only online empathy (r = .220 n =149, p=.007) and overall cognitive empathy (r = .166, n=149, p=.043) are significantly positively related to Time. Both Time1 and Time were significantly positively related to Preference (Time: r = .288, n=149, p=.000; Time1: r = .265, n=149, p=.001).

Regression model on social media use and empathy

First, to test hypothesis 1, which is the relationship between IRI and preference, the main model is significant, with F (5, 143) =4.097, p=0.002, adjusted R square 0.095. As for the relationship between preference and empathy (measured by IRI), comparing to those with neutral

| Correlation | Time | Time1 | Preference | age  | gender | IRI       | OfFemEn     | OfFemEn     | OverallCog | OverallAFF | Extraverion | OfCogEn     | OfAffEn     | OfAffEn     | OfAffEn     |
|-------------|------|-------|------------|------|--------|-----------|-------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|<sup>##</sup> |
| Time        |      |       |            |      |        |           |             |             |             |            |             |             |             |             |             |             |             |
| Preference  | .250 | .265  |            |      |        |           |             |             |             |            |             |             |             |             |             |             |
| age         | -.267 | .195  | .006       |      |        |           |             |             |             |            |             |             |             |             |             |             |
| gender      | -.031 | .003  | .171       | .185 |         |           |             |             |             |            |             |             |             |             |             |             |
| IRI         | .137  | .122  | -.213      | .011 |         |           |             |             |             |            |             |             |             |             |             |             |
| OfFemEn     | .041  | .033  | -.233      | .021 | .021   | .521      | .828        | .861        | .714        | .079       | .054        | -.146       | -.060       | .035        | .008        |             |
| OfFemEn     | .166  | .124  | -.217      | -.044 | .356   | .828      | .861        | .714        | .079       | .054        | -.146       | -.060       | .035        | .008        |             |             |
| OverallCog  | .071  | .036  | .110       | .258 | .037   | .289      | .750        | .760        | .714        | .079       | .054        | -.146       | -.060       | .035        | .008        |             |
| OverallAFF  | .098  | .074  | .167       | -.034 | .289   | .514      | .978        | .808        | .645        | .098       | .074        | .167        | -.034       | .289        | .514        | .978        |
| OfCogEn     | .054  | .003  | .040       | -.228 | -.036  | .252      | .978        | .808        | .645        | .098       | .074        | .167        | -.034       | .289        | .514        | .978        |
| OverallAff  | .003  | -.076 | .044       | -.218 | .072   | .228      | .455        | .863        | .627        | .831       | .044        | .374        | .718        | .627        | .831        | .044        |

<sup>##</sup> Correlation is significant at the 0.01 level (2-tailed).
<sup>*</sup> Correlation is significant at the 0.05 level (2-tailed).
preference, those preferring social media interaction on average have a higher empathy level ($t(143) = 2.500, p=.014$). Similarly, those preferring FtF interaction on average have a higher empathy level, but this difference is statistically non-significant ($t(143) = -.620, p=.536$). The results indicate that compared to those participants who have no any preference of FtF interaction or social media interaction, the social media preference participants have significant higher IRI scores.

To test whether there is a relationship between time spending on social media and empathy, three models, each with a different outcome variable, were analyzed. For IRI, the main model is not significant, with $F(5, 143) = 2.194, p=.058$, the adjusted R square for the model is 0.039, The coefficient for Time (average hours spending on social media per week) is 2.425, with $t(143) = .728, p=.468$. Time 1 (years using social media) coefficient is .135, with $t(143) = .442, p=.659$. Thus, it seems that our study does not reveal that time spending on social media is related to empathy measured by IRI. For offline empathy, the model is significant, with $F(5, 143) = 2.408, p=.039$, and the adjusted R square for model is 0.045, the coefficient for Time is -1.832, with $t(143) = -.693, p=.489$. Time 1 coefficient is .251, with $t(143) = 1.040, p=.300$, which also indicates no relation. Finally, the model for online empathy is also significant, with $F(5, 143) = 2.417, p=.039$, adjusted R square 0.046. The coefficient for Time is 3.941, with $t(143) = 1.648, p=.102$. Time 1 coefficient is .213 with $t(143) = .975, p=.331$. The results for all three models showed neither “Time” nor “Time 1” had relation with IRI, offline empathy, and online empathy. We also tested each model with only one Time variable, but the results do not change in a meaningful way.

To test the relationship between time spending on social media and overall cognitive empathy or overall affective empathy, two more models were run. For cognitive empathy, the
main model is significant, with $F(5, 143) = 2.566$, $p=.030$, adjusted R square 0.050. The coefficient for Time is 2.044, with $t(143) = .652$, $p.515$. Time 1 coefficient is .471 with $t(143) = 1.647$, $p=.102$. For affective empathy, the model is not significant, with $F(5, 143) = 2.197$, $p=.058$, adjusted R square 0.039. The coefficient for Time is .065, with $t(143) = .042$, $p=.967$. Time 1 coefficient is -.007 with $t(143) = -.049$, $p=.961$. The results show there is no relation between the two Time variables and each of the two components of empathy.

Additionally, as supplementary analyses, we tested whether time was related to online cognitive empathy, and whether preference was related to online cognitive empathy. These additional analyses were driven by the significant correlation coefficients of the variables. Age, gender, and extraversion were also included in the models as covariates.

These two additional models were all significant. For the relation between time spending on social media and online cognitive empathy, the model showed $F(5, 143) = 2.740$, $p=.021$, adjusted R square 0.056. The coefficient for Time is 3.282 with $t(143) = 1.946$, $p=.054$, which was not significant. Time 1 coefficient is .195 with $t(143) = 1.270$, $p=.206$. The results indicated the years of using social media and time spent on social media per week still have no relation with online cognitive empathy.

Moreover, the model to test the relationship between preference and online cognitive empathy is significant as well, with $F(5, 143) = 3.274$, $p=.008$, adjusted R square 0.071. The coefficient for social media preference is 3.921, with $t(143) = 2.315$, $p=.022$, meaning that comparing to those with neutral preference, participants who prefer interaction through online social media, on average, have higher level of online cognitive empathy. The difference between those with neutral preference and those preferring FtF interaction is statistically non-significant.
In prior research, public concerns about the negative influences of social media use on empathy have been expressed. On account of the missing empirical evidence in the existing literature, the primary purpose of this study was to investigate the relationship between social media use and empathy of all age groups, particularly preference for social media interaction and time spending on social media. Additionally, because empathy is a multidimensional concept, differences in effects were investigated between cognitive empathy, affective empathy, online empathy and offline empathy. Overall, this study suggests that time spending on social media was not a primary predictor for any subcategory of empathy. Preference for social media interaction can predict online cognitive empathy and general empathy. These relations were all positive. Also, this study does not provide evidence to support the hypothesis that social media use may be related to offline empathy.
Based on the cues-filtered-out theory of CMC and the findings provided by Konrath (2013), we hypothesized that higher preference for face-to-face interaction would have a high level of empathy (H1). The findings of the present study support the opposite view of this hypothesis. Participants who have high level of social media preference have significantly higher empathy. However, the main predictors for this model are age and gender instead of preference on social media interaction versus face-to-face interaction. This seems to support that age and gender differences exist in empathy. A large amount of research has reported a gender difference in empathy (Lennon & Eisenberg, 1987). Schulte-Rüther et al. (2008) even provided the neuroscience bases to explain the gender difference in empathy. The current study supports these previous results between gender and empathy and suggests that females might be more empathic than males, or at least have perceptions of themselves as empathic. However, it is also problematic because my research finds there is only a correlation to general empathy, which measured by IRI. For age difference in empathy, Lennon & Eisenberg (1987) found that empathy as measured by questionnaires increases in the early school years and no specific change for a person older than approximately age 11. However, the present study shows that age is not only a primary predictor for empathy but also negative related to all subcategories of empathy. This might be due to the healthy aging, for instance, a reduction of neural activities might be associated with loss of empathic abilities (Decety, J., 2010; Kanske et al, 2016).

In addition, as empathy is a multidimensional concept, we investigated whether time spending on social media can predict empathy. Specifically, time would positively relate to general empathy and online empathy, but negatively relate to offline empathy (H2). Given that social media use might be a way to practice social skills (Vossen & Valkenburg, 2016), we hypothesized that individuals who spend more time on social media may have higher general and
online empathy levels, but might exercise less offline empathy. Our findings only support the
idea that time spending on social media have a positive relation to general empathy, but do not
support the relationship between time and online/offline empathy. The primary predictor is still
age instead of time. This might suggest that time spending on social media is less critical
comparing to the impact of age on empathy.

Furthermore, our study did not show a significant relationship between time spending on
social media and either cognitive empathy or affective empathy (H3). This suggests that the
length of time of social media use is not related to any component of empathy.

The present study suggests that the preference of social media interaction is distinguished
from time spending on social media, and these two variables weigh differently when predicting
empathy. It may be that preference of social interaction was more important in predicting
empathy, compared to time spending on social media. This result is similar to the results that
were found by Carrier et al. (2015). That is, the adverse effects of being online upon empathy are
not due to online time, while not measuring preference for social media interaction.

Implications and suggestions for future research

The present study is the first to provide information on the relationship between social
media use and empathy. In general, these results indicate that social media may not be as
detrimental as public concerns. Importantly, this study excludes some online activities like email
and messages, which have already been widely supported to have positive relation with empathy
(Rosen, 2012). This means the relationship between social media and empathy, whether negative
or positive, maybe depend more on specific online activities or personal choice in other words.
At least, merely spending more time on social media may not necessarily have negative effect on
empathy. Although the preference for social media interaction does affect some aspects of empathy, especially online empathy, those effects are positive. In this study, it is age and gender, respectively, that appears significantly related to empathy. These findings seem promising considering they may help explain why older adults are more at risk for many psychological disorders due to their decreasing ability to understand others’ internal states (Grühn, D et al., 2008). Also, the present study finds there is a significant negative correlation between time spending on social media and age, time and preference for social media interaction, but no significant relationship between age and social media interaction preference. This means those who spend more time on social media may prefer social media interaction rather than face to face interaction, and this has nothing to do with age. However, in present days the youth usually spend more time on social media. This may be due to the rapid development of modern technology. Social media has turned into a crucial part of the youth’s daily life and work, and helps them to develop empathy or social skills. It is also giving a new way to think about the generation gap between the youth and the elderly. In addition, it is possible that the negative impacts of social media use on empathy are more significant to the elderly.

In the current study we only measure the amount of time spending on social media and preference for social media interaction. Research measuring other aspects of social media use and other control variables is necessary for the future understanding of empathy, such as frequency or specific online activities. Related to this, we need more information on why social media use has positive or negative influences on empathy. For example, it has been shown that adolescents use social media in an emotional way. They express their emotions and receive comments from others, or comment on others (Errasti, Amigo & Villadangos, 2017). In the same respect, social media has been suggested to have a positive relation with empathy. Additionally,
Carrier et al. (2015) found that communications related interactions with others online might facilitate empathy while video or online gaming might negatively affect empathy. Future research should investigate more possible predictors of the effect of social media on empathy.
Reference


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Hi – My name is Huai Qian. I am a graduate student at Brandeis University. This is an online survey for the empathy and social interactions of individuals online. We are asking you to take part in this research because you are 18 years old or above and used at least one social media platform (e.g. Facebook, YouTube…). The purpose of this research is to improve our knowledge of how time spend on social media is related to our empathy, and social interaction preference.

This form explains the current study as well as your rights as a participant. This study is entirely web-based, as is expected to take no more than 40 minutes of your time. Before taking this study, please read the consent form below and click on the “I agree” option at the bottom of the page. Choose the “I agree” option if you understand the statements and willing to participate in the study. You do NOT have to participate in this study. Even if you do decide to participate, you can still refuse to answer any question you do not care to answer. There is no penalty for deciding not to participate in. You may decide at any time that you do not want to participate further and may withdraw without penalty or retribution.

Participation in this research will include completion of the following: reading this informed consent statement as well as completing five questionnaires. One of the questionnaires will ask you general information about yourself and time spend on social media, while other four will ask questions about your interactions with people both online and offline. This research is not expected to have any risk to participants, maybe some items in the survey can initiate some emotional responses and psychological stress.

By clicking on the “I Agree” button at the bottom of this webpage, you are accepting and understanding the potential risk. There is also some benefit to participating in the study, which may be useful and interested to you in your course or in understanding social interaction and social media.

The information that you complete will be used for this study. Your answers will be entirely anonymous. Neither your name nor any other identifying information will be attached to your responses. Participation in this study results in you having the right to ask questions and have those question answered. If you have questions about this study, please contact the researcher or the researcher’s advisor, whose information is located at the end of the informed consent.

Last, if you are from Qualtrics online sample, you will receive 2 dollars for your participation. If you are an undergraduate student in psychology at Brandeis University, you may be eligible to receive research credit for psychology research studies and/or experiments. To receive credit for participating, you have to register for the SONA system.

If you have any questions about this study or rights, you may contact the Huai Qian at qianh@brandeis.edu or the researcher’s advisor Xiaodong Liu at xliu0806@brandeis.edu. If you have questions about your rights as a research subject, please contact the Brandeis Institutional Review Board at irb@brandeis.edu or 781-736-8133.
If you are 18 years of age or older, familiar with at least one social media platform (e.g. Facebook, YouTube...), understand the statements above and freely consent to participate in the study, choose the “I Agree” button to begin the experiment. The “I Agree” option is your affirmation of consent confirmation to continue with the study. If you decline to participate in this study, please close this window or navigate to a different website.

[I Agree]
Appendix B
Background information survey

1. What is your gender?
   1) Male
   2) Female
   3) Other

2. Age (in years) ___________

3. Which of the following best represents your racial or ethnic heritage?
   1) Caucasian
   2) Latino/Hispanic
   3) Middle Eastern
   4) African
   5) Caribbean
   6) South Asian
   7) East Asian
   8) Multiracial
   9) Other

4. Relationship status
   1) Single
   2) Relationship
   3) Married

   Social Media Usage Experience

5. Think about your use of social media such as Facebook, YouTube, Twitter, Weblog and other social networking sites (exclude email, two-way instant messages and the like).

   Are you a member of social media?
   1) Yes
   2) No

6. How long have you been using social media? (in years) _____

7. On average, how much time do you spend daily on social media? (in hours) ______

8. How much time during the past week did you use social media? (in hours) ______

9. On average, how much time do you spend daily on social media in weekdays? (in hours) ______
10. On average, how much time do you spend daily on social media on weekends? (in hours) ______

11. (Optional) If you use iPhone and have downloaded the recent iOS version iOS
12.0, go to the Settings – Screen Time, please write down the time for your Social Networking Category for Last 7 Days. ________
Appendix C

Interpersonal Reactivity Index (Davis, 1980)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D, or E. When you have decided on your answer, fill in the letter next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE: A B C D E

DOES NOT DESCRIBES
DESCRIBE ME VERY
ME WELL WELL

1. I daydream and fantasize, with some regularity, about things that might happen to me.
2. I often have tender, concerned feelings for people less fortunate than me.
3. I sometimes find it difficult to see things from the "other guy's" point of view.
4. Sometimes I don't feel very sorry for other people when they are having problems.
5. I really get involved with the feelings of the characters in a novel.
6. In emergency situations, I feel apprehensive and ill-at-ease.
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.
8. I try to look at everybody's side of a disagreement before I make a decision.
9. When I see someone being taken advantage of, I feel kind of protective towards them.
10. I sometimes feel helpless when I am in the middle of a very emotional situation.
11. I sometimes try to understand my friends better by imagining how things look from their perspective.
12. Becoming extremely involved in a good book or movie is somewhat rare for me.
13. When I see someone get hurt, I tend to remain calm.
14. Other people's misfortunes do not usually disturb me a great deal.
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.
16. After seeing a play or movie, I have felt as though I were one of the characters.
17. Being in a tense emotional situation scares me.
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
19. I am usually pretty effective in dealing with emergencies.
20. I am often quite touched by things that I see happen.
21. I believe that there are two sides to every question and try to look at them both.
22. I would describe myself as a pretty soft-hearted person.
23. When I watch a good movie, I can very easily put myself in the place of a leading
24. I tend to lose control during emergencies.
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.
27. When I see someone who badly needs help in an emergency, I go to pieces.
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.
Appendix D
Revised from GPIUS2 (Caplan, 2010)
Rate the extent to which you agree or disagree with each statement about your use of online social media. Social media are platform or website where you can create a profile and connect with others. Examples of social media are Facebook, YouTube, weblog etc. (but exclude email, two-way instant messages and the like).
ANSWER SCALE: 1 2 3 4 5 6 7 8
DEDINITELY DEFINITELY
DISAGREE AGREE

1) I prefer online social interaction through social media over face-to-face communication.
2) Online social interaction through social media is more comfortable for me than face-to-face interaction.
3) I prefer communicating with people through social media rather than face-to-face.
4) I have used the social media to talk with others when I was feeling isolated.
5) I have used the social media to make myself feel better when I was down.
6) I have used the social media to make myself feel better when I’ve felt upset.
7) When I haven’t been online for some time, I become preoccupied with the thought of going online.
8) I would feel lost if I was unable to go online.
9) I think obsessively about going online when I am offline.
10) I have difficulty controlling the amount of time I spend online.
11) I find it difficult to control my Internet use.
12) When offline, I have a hard time trying to resist the urge to go online.
13) My internet use has made it difficult for me to manage my life.
14) I have missed social engagements or activities because of my Internet use.
15) My internet use has created problems for me in my life.
Appendix E

Revised from QCAE (Reniers et al, 2011)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D. When you have decided on your answer, fill in the letter next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE: A B C D

1) DOES NOT DESCRIBES
2) DESCRIBES ME VERY
3) WELL
4) WELL

All items are considered situation through SOCIAL MEDIA, all interactions or events experience here is purely through social media.

1) I can easily work out what another person might want to talk about with.
2) I can tell if someone is masking their true.
3) I can sense if I am intruding, even if the other person does not tell me.
4) I am good at predicting how someone will feel when surfing on social media.
5) I am good at predicting what someone will do when surfing on social media.
6) I am quick to spot when someone in a group is feeling awkward or uncomfortable.
7) I can pick up quickly if someone says one thing but means another.
8) I can easily tell if someone else is interested or bored with what I am saying when talk with them.
9) I can easily tell if someone else wants to enter a conversation.
10) Other people tell me I am good at understanding how they are feeling and what they are thinking.
11) I am happy when I am with a cheerful group and sad when the others are glum.
12) It worries me when others are worrying and panicky.
13) People I am communicating with through social media have a strong influence on my mood.
14) I am inclined to get nervous when others talk to me through social media seem to be nervous.
15) I try to look at everybody’s side of a disagreement before I make decisions when I am surfing on social media.
16) Before criticizing somebody, I try to imagine how I would feel if I was in their place when I am surfing on social media.
17) When I am upset at someone, I usually try to “put myself in his shoes” for a while.
18) I always try to consider the other fellow’s feelings before I do something.
19) I sometimes try to understand my friends better by imagining how things look from their perspective
20) I can usually appreciate the other person’s viewpoint, even if I do not agree with it.
21) I sometimes find it difficult to see things from the “other guy’s” point of view.
22) Before I do something I try to consider how my friends will react to it.
23) I find it easy to put myself in somebody else’s shoes.
24) I usually stay emotionally detached when watching stories or contents post on social media by my friends.
25) I am usually objective when I watch a stories or contents online, and I don’t often get completely caught up in it.
26) I often get deeply involved with the feelings of contents post on social media.
27) It is hard for me to see why some things post on social media upset people so much.
28) I often get emotionally involved with my friends’ problems.
29) Friends talk to me about their problems as they say that I am very understanding.
30) It affects me very much when one of my friends seems upset when talk with me through social media.
31) I get very upset when I see someone post sad context through social media.
Appendix F

Revised from QCAE (Reniers et al, 2011)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D. When you have decided on your answer, fill in the letter next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE: A B C D

DOES NOT DESCRIBES

DESCRIBE ME VERY

ME WELL WELL

All items are considered situation through FACE-TO-FACE situation, all interactions or events experience here is purely through face to face communication.

1) I can easily work out what another person might want to talk about.
2) I can tell if someone is masking their true emotion.
3) I can sense if I am intruding, even if the other person does not tell me.
4) I am good at predicting how someone will feel.
5) I am good at predicting what someone will do.
6) I am quick to spot when someone in a group is feeling awkward or uncomfortable.
7) I can pick up quickly if someone says one thing but means another.
8) I can easily tell if someone else is interested or bored with what I am saying.
9) I can easily tell if someone else wants to enter a conversation.
10) Other people tell me I am good at understanding how they are feeling and what they are thinking.
11) I am happy when I am with a cheerful group and sad when the others are glum.
12) It worries me when others are worrying and panicky.
13) People I am with have a strong influence on my mood.
14) I am inclined to get nervous when others around me seem to be nervous.
15) I try to look at everybody’s side of a disagreement before I make a decision.
16) Before criticizing somebody, I try to imagine how I would feel if I was in their place.
17) When I am upset at someone, I usually try to “put myself in his shoes” for a while.
18) I always try to consider the other fellow’s feelings before I do something.
19) I sometimes try to understand my friends better by imagining how things look from their perspective.
20) I can usually appreciate the other person’s viewpoint, even if I do not agree with it.
21) I sometimes find it difficult to see things from the “other guy’s” point of view.
22) Before I do something I try to consider how my friends will react to it.
23) I find it easy to put myself in somebody else’s shoes.
24) I usually stay emotionally when talk with my friends.
25) I am usually objective when I talk with others, and I don’t often get completely caught up in it.
26) I often get deeply involved with the feelings of other people.
27) It is hard for me to see why some things upset people so much.
28) I often get emotionally involved with my friends’ problems.
29) Friends talk to me about their problems as they say that I am very understanding.
30) It affects me very much when one of my friends seems upset.
31) I get very upset when I see someone cry.
Appendix G

The Big Five Personality Test

This is a personality test, it will help you understand why you act the way that you do and how your personality is structured.

1) I am the life of the party.
2) I feel little concern for others.
3) I am always prepared.
4) I get stressed out easily.
5) I have a rich vocabulary.
6) I don't talk a lot.
7) I am interested in people.
8) I leave my belongings around.
9) I am relaxed most of the time.
10) I have difficulty understanding abstract ideas.
11) I feel comfortable around people.
12) I insult people.
13) I pay attention to details.
14) I worry about things.
15) I have a vivid imagination.
16) I keep in the background.
17) I sympathize with others' feelings.
18) I make a mess of things.
19) I seldom feel blue.
20) I am not interested in abstract ideas.
21) I start conversations.
22) I am not interested in other people's problems.
23) I get chores done right away.
24) I am easily disturbed.
25) I have excellent ideas.
26) I have little to say.
27) I have a soft heart.
28) I often forget to put things back in their proper place.
29) I get upset easily.
30) I do not have a good imagination.
31) I talk to a lot of different people at parties.
32) I am not really interested in others.
33) I like order.
34) I change my mood a lot.
35) I am quick to understand things.
36) I don't like to draw attention to myself.
37) I take time out for others.
38) I shirk my duties.
39) I have frequent mood swings.
40) I use difficult words.
41) I don't mind being the center of attention.
42) I feel others' emotions.
43) I follow a schedule.
44) I get irritated easily.
45) I spend time reflecting on things.
46) I am quiet around strangers.
47) I make people feel at ease.
48) I am exacting in my work.
49) I often feel blue.
50) I am full of ideas.