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## Beyond Social Media: A Cross-Sectional Survey of Other Internet and Mobile Phone Applications in a Community Psychiatry Population

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### Abstract

**Objective**—Popular media applications have been shown to benefit people with severe mental illness by facilitating communication and social support, helping patients cope with or manage symptoms, and providing a way to monitor or predict mental health states. While many studies of technology use by individuals with severe mental illness have focused primarily on use of social media, this study provides additional information about use of Internet applications such as blogs, wikis (websites that allow collaborative editing of content and structure by users), video games, and Skype by a community psychiatry population.

**Methods**—All English-speaking patients attending an outpatient program during a 4-week period in 2011 ( $N=274$ ) were surveyed about their technology use and demographic information; 189 patients provided demographic data and comprised the sample.

**Results**—Among Internet users ( $n=112$ ), rates of use of message boards, wikis, Skype, role-playing games, and blogs ranged from 26.8% to 34.8%. Among mobile phone users ( $n=167$ ), 41.4% used their phones to access the Internet and 25.3% used Twitter on their phones. In multivariate analysis, patients who had attended or completed college had much greater odds of accessing the Internet on mobile phones. Older patients were much less likely to access the Internet or use Twitter.

**Conclusions**—Our findings indicate that use of several popular forms of media is not uncommon in a community psychiatry population, but that rates of use differ on the basis of age

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and education. As the digital divide between people with severe mental illness and the general population is lessening, further research is needed to determine how to best leverage various types of media to support mental health recovery and complement clinical care.

### Keywords

Internet; cell phones; social media; community psychiatry; adult; adolescent

Digital technologies have the potential to change the way individuals with mental illness manage symptoms, access care, interact within communities, and participate in the kinds of positive activities that support recovery. People with serious mental illness (SMI) use technology in the same way as individuals in the general population, but they may also use it to seek treatment and emotional or social support.<sup>1</sup> Computer-mediated interactions can potentially reduce the negative consequences, including anxiety, paranoia, or confusion about social cues, experienced by some individuals during face-to-face communication.<sup>2</sup> Among these interactions, asynchronous methods of communication, such as social media platforms and message boards, afford the greatest ability for impression management, as users can carefully compose and edit responses before pressing “send.”<sup>3</sup> Despite concerns about stigma, many people share and support one another through social media and other forms of online social interaction, suggesting the potential benefits of these spaces for interventions that support or provide information about mental health.<sup>4</sup> In addition, the nature and pattern of online interactions (one’s “digital footprint”) can provide important information about an individual’s mental and behavioral health and possibly create opportunities for early intervention.<sup>5,6</sup>

### SOCIAL BENEFITS OF MEDIA USE BY PEOPLE WITH SMI

Interest in the use of social media by people with SMI is expanding rapidly, with several studies suggesting that individuals with SMI use social networking applications such as Facebook at rates equal to or greater than rates in the general population.<sup>1,7,8</sup> Studies of social media use by people with SMI indicate the benefits of seeking and providing support, developing new relationships and maintaining existing ones, and seeking information about illness through online social interactions on social media platforms, message boards, or chat applications.<sup>1,9,10</sup> The anxiety associated with social interactions that sometimes accompanies psychosis and makes face-to-face interactions difficult may be alleviated in online communications, which could facilitate formation of friendships.<sup>1</sup> The value placed on social networking by individuals with SMI is high. In a recent review of the acceptability of mobile phone and online interventions by people with SMI, individuals in several studies indicated a desire for social networking or peer support as part of the intervention.<sup>11</sup> In a 2014 survey of individuals with schizophrenia and schizoaffective disorder, 37% of respondents indicated that they would be interested in an online chat-based support group.<sup>12</sup> Although information about use of video chat services such as Skype by people with SMI is lacking, people with other disabilities find such services a useful way to maintain social relationships in the face of communication challenges.<sup>13</sup> Overall, this suggests that Internet-facilitated communication may be useful in accessing information and support as well as addressing the negative symptoms and social challenges faced by individuals with SMI.<sup>10,12</sup>

## MINING AND MONITORING THE DIGITAL FOOTPRINT

The nature and pattern of media use behaviors (ie, a person's digital footprint) may also be a rich source of information for monitoring illness status. For example, mining of social media data, such as Twitter and web forum postings, can predict states of illness, including depression, schizophrenia, bipolar disorder, and psychosis.<sup>6,14,15</sup> Remote monitoring or data mining of video game play may provide information about cognitive status, negative symptoms, or physical activity. Features such as key presses, reaction time, success in game, or even time played can provide valuable clues concerning patient status.<sup>16</sup> Combining data from wearable sensors and Internet use with information concerning playing of location-based games such as Pokémon GO or movement or exergames (eg, those played with a Kinect controller) has demonstrated the utility of this digital footprint for monitoring physical activity.<sup>17</sup> Overall, this suggests that mining media behaviors could be useful as a real-time measure of symptoms, side effects, or health behaviors in people with SMI.<sup>16,18</sup>

## GAPS IN RESEARCH INTO MEDIA USE IN PEOPLE WITH SEVERE MENTAL ILLNESS

Although use of social media by individuals with SMI has received a fair amount of study,<sup>6,10</sup> few studies have addressed this population's use of other Internet-based applications such as blogs, wikis, and video games, which can also provide significant opportunities for social interaction, collaboration, and other benefits to social participation and mental health. Blogs provide an outlet for creativity as well as an additional opportunity for social interactions. Like those without mental illness, people with SMI may use blogs as a form of self-expression or to find others who share their experiences, including experiences of extreme mental states.<sup>19,20</sup> Bloggers with mental illness may find blogging cathartic,<sup>21</sup> but may also express negative affect or suicidal ideation.<sup>20</sup> In addition, patient blogs may provide a way for psychiatrists to monitor patient well-being.<sup>22</sup> In contrast, wikis are collaborative knowledge bases designed to provide information and foster collaboration.<sup>23</sup> Higher quality-information can be expected if contributions are accepted only from "experts" such as mental health professionals or patient or caregiver advocates.<sup>24</sup>

Commercial video game play is another type of media use by people with SMI that has received less research attention. Video games are engaging and immersive environments that can provide players with the opportunity to escape, socialize, work on teams, and achieve clear goals.<sup>25</sup> Role-playing games allow players to be "blissfully productive," teaming up to accomplish high-level goals that require complex strategies.<sup>26</sup> The process of leveling up a character in these games results in a cycle of productivity; as one researcher explains, "There is no unemployment in World of Warcraft."<sup>27</sup> Thus, participating in role-playing games may allow patients to achieve in a computer-based environment the work-like productivity that may sometimes be elusive in real life.

Commercial video games have also been shown to have specific benefits for social connection and mental and physical health. Game play has been shown to relieve depressive symptoms and provide a novel way for older adults with SMI to get regular physical activity.<sup>28,29</sup> In addition, the social aspects of some games may promote a sense of belonging,

allowing players to make new friends and foster connections with existing friends and family.<sup>30</sup> This reinforcement of social participation also contributes to a sense of mastery and self-efficacy, which subsequently improves psychosocial wellbeing and directly predicts mental health recovery.<sup>31,32</sup> In a representative online survey of individuals with schizophrenia-related disorders, 26% of respondents said online gaming was the “most helpful” of their digital activities for improving or managing their condition.<sup>9</sup>

However, a tension exists between using games and social media to satisfy social and self-esteem needs and problems resulting from excessive use. In fact, in 2013, the American Psychiatric Association proposed Internet gaming disorder as a potential new diagnosis worthy of additional research.<sup>33</sup> Although there is considerable debate over the utility of this diagnosis and the related Gaming disorder proposed for ICD-11,<sup>34,35</sup> a recent review of epidemiological research suggests that individuals who have problems with loneliness and impulsivity or who have low levels of social competence or self-esteem may be more at risk for problematic use of video games.<sup>36</sup> This study also identified psychiatric disorders such as depression and social anxiety/phobia as possible consequences of problematic gaming. A second study suggested that, although demographic factors were the primary contributors to problematic technology use, symptoms of obsessive-compulsive disorder, attention-deficit/hyperactivity disorder, depression, and anxiety were risk factors for addictive social networking in females, while the same symptoms in males were predictive of addictive video gaming.<sup>37</sup> The results of this cross-sectional study suggested that, although symptoms of mental disorders may predispose individuals with SMI to develop problematic behaviors, these influences may not be as strong as other individual factors. Regardless, as with any rewarding behavior, ensuring a balance between benefits and risks to mental and behavioral health is important and may be an area in which people with SMI would benefit from additional support.

Despite the possible risks, technology use among those with SMI has many potential benefits. Whether through social interactions and connection or the productive and creative work of leveling video game characters or creating content on blogs and wikis, digital technology use may allow people with SMI to communicate and connect, provide and receive support, and see clear evidence of success in a way that they may not in face-to-face interactions. Previous studies of technology use in people with SMI have provided significant amounts of data on mobile phone and Internet use for health information and social networking. However, few studies have reported on use of message boards and blogs, and no studies that we are aware of have reported on the use of role-playing video games, wikis, or video chat in this population. In an earlier article published in 2014,<sup>38</sup> we published the results of a survey study designed to assess use of selected forms of digital technology in patients in a community psychiatry program compared with a general population sample. In this article, we present additional data on the use of several other types of applications by patients in the same sample from that community psychiatry clinic; this information may be useful to inform clinicians’ understanding of technology use and may aid in the development of interventions based on these applications.

## METHODS

A survey was carried out at an urban community psychiatry clinic where approximately 60% of the patients are diagnosed with an affective disorder and 30% are diagnosed with a psychotic disorder. We invited all English-speaking patients who attended the clinic during a 4-week period in 2011 to complete a short anonymous survey; written informed consent was waived by approval of our institutional review board. Of the 274 patients invited, 214 (78%) agreed and 189 (69%) provided complete information on all basic demographic characteristics and on at least 1 type of Internet use and were included in our analysis. Of those who did not participate, 2 reported that they did not use technology, 10 said they did not have time to complete the survey, and 1 reported not being able to read or write. The others who did not participate did not volunteer a reason. We asked yes/no questions about the use of various forms of information and communication technology, types and locations of use (reported elsewhere)<sup>38</sup> as well as categorical questions about age, gender, and education. We explored frequency distributions of types of Internet or mobile phone use among those who used these technologies and for whom data on age, gender and education were available. We modeled univariate and multivariate logistic regression to determine associations between various applications and demographic variables.

## RESULTS

As reported previously,<sup>38</sup> our sample included 214 patients who filled out surveys during a 4-week recruitment period in 2011. Among the 189 participants who supplied information concerning age, gender, and education, over half were 40 years of age or older ( $n=116$ , 61.4%), most were female ( $n=121$ , 64.0%), and just over a third had attended or graduated from college ( $n=66$ , 34.9%). The prevalence of use of specific Internet applications and regression results are shown in Table 1. Among Internet users in our sample ( $n=112$ , 59.3%), use of message boards ( $n=39$ , 34.8%), role-playing games ( $n=39$ , 34.8%), and Skype ( $n=37$ , 33%) were more prevalent than use of blogs ( $n=30$ , 26.8%) or wikis ( $n=30$ , 26.8%). In univariate regression of Internet use types among Internet users, odds of message board use was over three times greater among 25 to 40 year olds as compared to 16 to 24 year olds. This association was no longer significant when age, gender, and education were considered together in multivariate regression. No other associations between demographic variables and Internet use types were significant in univariate or multivariate regression.

Among the 162 (85.7%) mobile phone users in our sample (Table 2), more patients accessed the Internet ( $n=67$ , 41.4%) than Twitter ( $n=41$ , 25.3%). In univariate regression, patients who had attended or completed college had much higher odds of accessing the Internet compared with those who had not completed high school, and being 40 years of age or older was associated with less use of Twitter compared to being 16 to 24 years old. In multivariate regression, the odds of accessing the Internet and using Twitter were 79% to 86% lower for patients 40 years of age or older than for the youngest group. Odds of accessing the Internet were 4 to 15 times higher for patients who had at least some college education compared to those who had not completed high school. Although some associations between demographic variables and both Internet and mobile phone use were strong, no other associations were statistically significant.

## DISCUSSION

Our cross-sectional survey of use of various Internet applications by patients in a community psychiatry clinic shows that some patients who use the Internet and mobile phones take advantage of several applications that are known to promote social and mental health advantages. Although overall rates of use were somewhat low and differed at times on the basis of age and education, the technologies we assessed foster social connection, information-seeking and provision, creativity, and recreation and allow users to access resources that may be harder for this population to find in real-world settings. These data are consistent with other research showing the acceptance of social media by people with SMI<sup>10</sup> and provide support for the potential utility of message boards, blogs, wikis, and video games as a way to foster recovery-related resources for a subset of the community psychiatry population.

Among mobile phone users in our sample, over 40% used their phones to access the Internet, which is a lower rate than found in more recent studies, which have shown rates of 59% to 63%.<sup>39,40</sup> As smartphone use has increased in the general population over time,<sup>41</sup> it is likely that our lower rate reflects cohort effects from our 2011 snapshot. However, use of cell phones for Twitter, while overall low, is higher than the 5% to 6% found in samples from 2012 to 2014 in mixed inpatient and outpatient populations.<sup>12,42</sup> This may reflect differences in sample composition. We also found that older patients were less likely to use mobile phones to access the Internet and use Twitter. As studies that use data mining of Twitter to detect mental health states are proliferating,<sup>6</sup> it will be important to keep in mind that the overall use of Twitter by people with SMI may be low and not representative of older patients with SMI. We also found that patients who had attended or completed college were more likely to access the Internet on mobile phones than those who had not completed high school. Age and education remain barriers to digital participation for individuals with SMI, suggesting that older patients or those with less education may be less likely to benefit from Internet-based interventions delivered on mobile phones without additional support or training.<sup>43</sup> For individuals with SMI, accessing the Internet and a mobile phone is not the same as being able to use the Internet effectively.<sup>44</sup> Because digitally excluded patients are also likely to want to use the Internet, providing these individuals with skills training on basic Internet use on computers would be an important first step toward digital inclusion.<sup>43</sup>

Of those using the Internet in our sample, patients reported more use of message boards, Skype and role-playing games than wikis and blogs, and adjusted analyses showed no differences on the basis of age, gender, or education. These results support previous findings of the acceptability and value of online social interaction for people with SMI and provide preliminary information on the popularity of role-playing video games.<sup>1,4,8,9</sup> Although posting and commenting on others' posts on message boards allow individuals with SMI to seek and provide information and access naturalistic peer support,<sup>5,8,45</sup> the higher level intellectual effort required for creating content in wikis and blogs<sup>46</sup> may be more difficult for people struggling with severely impairing mental health symptoms. Moderated message boards may thus be a useful and more accessible part of web-based interventions for SMI. These applications could also provide data to researchers about patient populations as a whole, such as unmet needs for treatment and psychosocial support.<sup>5,45</sup> Results of a recent



study of a novel online intervention for individuals with psychosis (HORYZONS) that includes a substantial peer networking component and psychoeducation suggested that such interventions show promise for increasing connectedness and decreasing depressive symptoms.<sup>47</sup> The moderated social networking approach may be particularly useful in encouraging users to contribute to group support and knowledge building about strengths-based coping mechanisms in formats that are similar to wikis or blogs. Further information about the utility of wikis, blogs, and similar forms of knowledge building for this population is needed.

One third of the Internet users in our sample reported using Skype. Skype and other video chat programs can provide a crucial source of socialization for people with SMI who live independently. As they are a virtual replication of face-to-face interactions, such programs may provide a moderate level of mediation that facilitates communication for individuals who have trouble managing social cues.<sup>13</sup> In addition to their use for communication, such programs may one day play a crucial role in facilitating access to psychiatric care.<sup>48</sup> Further research is needed to determine best practices for using these technologies to support mental health recovery in people with SMI.

More than a third of our sample reported use of role-playing video games. A study of veterans with SMI conducted during this same time period found that 24% used the Internet to get information about or play video games.<sup>49</sup> As role-playing games are a subset of video games, these results likely reflect differences in sampling. Because video games provide a variety of experiences and cognitive states that may benefit people with SMI, including productive “work,” social connections, distraction from anxiety, and relief of depressive symptoms,<sup>26,28,50,51</sup> further investigation of usage patterns and potential benefits of video game play in this population is warranted.

A major concern with the use of media for mental health recovery, however, is the potential for developing problems related to excessive use (eg, Internet Gaming Disorder, a provisional diagnosis included in DSM-5 as a condition for further study or social networking addiction). Because individuals with SMI may be more likely to have both psychological risk factors for behavioral addictions, such as loneliness, depressive symptoms, or lower life satisfaction,<sup>52–54</sup> and demographic risk factors, such as unemployment, low educational level, and single relationship status,<sup>37</sup> they may be more vulnerable to excessive media use. However, the potential benefits of media use, such as continued cognitive stimulation, meaningful “work,” and participation in a community during times of greater impairment, may offset these risks.<sup>18</sup> Should gaming or Internet use be incorporated into therapeutic interventions, consequences of that use should be monitored carefully to ensure they do not outweigh potential benefits, as is done when psychotropic medications such as antipsychotics or benzodiazepines are prescribed. One drawback of current longitudinal studies of problematic gaming is that aspects of emotional well-being (eg, symptoms of depression or anxiety) are often only measured as outcomes rather than as predictors, making it difficult to understand temporal relationships between emotional problems and problematic gaming and how these interact with demographic and other predictors.<sup>55</sup> To best capture the potential range of utility and risks associated with social media use and video game play, further studies should examine the motivations, benefits,

and problems associated with play, as well as any variables associated with mental health and well-being, in a consistent way across studies.

Although our study provides important information about the breadth and popularity of several Internet-based applications in this sample, it had a number of limitations. The sample consisted of 189 individuals who were being treated in an outpatient community psychiatry clinic. Although this number is lower than in other studies with more representative samples, such studies may use web-based data collection or purposefully sample from a variety of treatment sites, introducing other forms of bias. In fact, our sample of 189 was higher than the average sample of 175 in 8 studies that employed a similar sampling mechanism.

<sup>12,39,40,42,43,56-58</sup> Because this study was conducted in 2011 and there has been a widespread increase in the availability and overall use of technology since that time, our results should therefore, be considered in that context. However, similar to our findings, more recent studies of media use in this population have also reported low levels of use.<sup>12,39</sup> Individuals in our sample who did use the Internet may represent early adopters of new technology and thus may not be fully representative of the population of individuals with SMI. Because technology and new media change rapidly, integrating questions about technology use into ongoing cohort and registry studies may be a better way to monitor temporal trends in technology use and relevant factors. Also, although we did consider effects of age, education, and gender, we did not assess diagnosis or functioning. Finally, as no standard questions about technology use have yet been developed for studies such as these, results may be difficult to compare across studies.

Efforts are now ongoing to create social media-based support for people with schizophrenia, and some online video game communities have begun to provide grassroots peer support for those with mental health problems.<sup>47,59,60</sup> The results presented here provide additional support for the use of a variety of Internet applications by individuals with SMI. Although individuals with SMI who had access to and used Internet applications during the time of our data collection may be “early adopters,” thus representing a subset of the population of individuals with SMI, this nonetheless indicates that some individuals with SMI may find a variety of applications useful in their recovery. These applications could be considered another tool to help those with SMI who are interested in using technology to aid their recovery. With time and careful attention to user-centered design, Internet-based interventions may be well positioned to provide individuals with SMI with new ways to connect and to receive support and treatment when access to care, socialization, or other life domains are impaired. Providers may find it useful to ask about individuals’ technology use and offer training and support to enable access to Internet-based interventions or peer support. Indeed, as technology is now often an integral part of daily life from at an early age, it is possible that children who later develop psychiatric illnesses will be in a better position to avail themselves of technology-based interventions. However, any intervention based on naturalistic Internet-based interactions is not without risks. Clinicians must learn about the Internet and be prepared to discuss potential problems related to trustworthiness of content, potentially harmful or troubling interactions, and overuse to help patients maximize benefits and minimize potential harms.<sup>8</sup> As the digital divide between people with SMI and the general population decreases, it will be vital to understand how existing commercial



applications can be used to understand the mental well-being of people with SMI and foster recovery.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1**

Odds ratios for use of Internet activities among Internet users (n=112)

|                                    |  | Message Board (n=39, 34.8%) |      | Wiki (n=30, 26.8%) |      | Skype (n=37, 33%) |      | RPGs (n=39, 34.8%) |      | Blog (n=30, 26.8%) |      |
|------------------------------------|--|-----------------------------|------|--------------------|------|-------------------|------|--------------------|------|--------------------|------|
|                                    |  | OR                          | aOR  | OR                 | aOR  | OR                | aOR  | OR                 | aOR  | OR                 | aOR  |
| <b>Age Group (yr)</b>              |  |                             |      |                    |      |                   |      |                    |      |                    |      |
| 16–24 (Ref)                        |  | 1                           | 1    | 1                  | 1    | 1                 | 1    | 1                  | 1    | 1                  | 1    |
| 25–40                              |  | 3.82 *                      | 3.28 | 0.81               | 0.81 | 1.43              | 1.41 | 1.33               | 1.20 | 2.43               | 2.24 |
| 40–55                              |  | 2.44                        | 1.97 | 1.22               | 1.19 | 0.60              | 0.58 | 1.38               | 1.22 | 2.76               | 2.46 |
| 55+                                |  | 1.16                        | 0.96 | 0.34               | 0.37 | 0.38              | 0.36 | 0.85               | 0.81 | 2.15               | 1.94 |
| <b>Gender</b>                      |  |                             |      |                    |      |                   |      |                    |      |                    |      |
| Male (Ref)                         |  | 1                           | 1    | 1                  | 1    | 1                 | 1    | 1                  | 1    | 1                  | 1    |
| Female                             |  | 1.01                        | 1.03 | 1.04               | 1.08 | 1.76              | 1.81 | 1.77               | 1.88 | 0.66               | 0.68 |
| <b>Education Level</b>             |  |                             |      |                    |      |                   |      |                    |      |                    |      |
| Did not complete high school (Ref) |  | 1                           | 1    | 1                  | 1    | 1                 | 1    | 1                  | 1    | 1                  | 1    |
| Completed high school              |  | 1.32                        | 1.42 | 0.51               | 0.59 | 0.91              | 1.03 | 0.58               | 0.59 | 1.36               | 1.29 |
| Attended college                   |  | 2.43                        | 2.27 | 0.87               | 0.91 | 1.19              | 1.31 | 1.65               | 1.61 | 1.67               | 1.43 |
| Completed college                  |  | 2.43                        | 2.38 | 0.93               | 0.96 | 0.67              | 0.72 | 0.38               | 0.36 | 1.13               | 1.02 |

Numbers and analyses reflect cases for whom complete data on age, gender, and education were available.

aOR indicates adjusted odds ratio; OR, odds ratio; RPGs, role-playing games

\* p&lt;0.05,

\*\* p&lt;0.01

**Table 2**

Odds ratios for use of mobile phone activities among mobile phone users (n=162)

|                                    | Access Internet (n=67, 41.4%) |          | Twitter (n=41, 25.3%) |         |
|------------------------------------|-------------------------------|----------|-----------------------|---------|
|                                    | OR                            | aOR      | OR                    | aOR     |
| <b>Age Group (yr)</b>              |                               |          |                       |         |
| 16–24 (Ref)                        | 1                             | 1        | 1                     | 1       |
| 25–40                              | 0.55                          | 0.35     | 0.54                  | 0.44    |
| 40–55                              | 0.36                          | 0.21 **  | 0.27 *                | 0.22 ** |
| 55+                                | 0.33                          | 0.21 *   | 0.17 **               | 0.14 ** |
| <b>Gender</b>                      |                               |          |                       |         |
| Male (Ref)                         | 1                             | 1        | 1                     | 1       |
| Female                             | 1.72                          | 1.81     | 1.07                  | 1.11    |
| <b>Education</b>                   |                               |          |                       |         |
| Did not complete high school (Ref) | 1                             | 1        | 1                     | 1       |
| Completed high school              | 1.15                          | 1.23     | 1.15                  | 1.31    |
| Attended college                   | 3.57 **                       | 4.53 **  | 1.85                  | 2.49    |
| Completed college                  | 13.00 **                      | 15.85 ** | 2.13                  | 2.44    |

Numbers and analyses reflect cases for whom complete data on age, gender, and education were available.

aOR indicates adjusted odds ratio; OR, odds ratio

\*  
p<0.05,\*\*  
p<0.01