A Pilot Investigation of Media Multitasking and Trauma Symptoms Among Adolescents

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Effective prevention and intervention for trauma symptoms are still needed, particularly for adolescents, in whom high-risk behavior is common. This pilot study examines how media multitasking may be related to trauma symptoms in a sample of adolescent college students (N = 55). Results indicate that higher media multitasking is uniquely and independently associated with higher trauma symptoms. These results hold even after controlling for alcohol intoxication, which is commonly associated with trauma symptoms. Adolescents may be more forthcoming in revealing information about media multitasking than other behaviors commonly associated with trauma symptoms, such as alcohol and drug use. The present study provides the first evidence that media multitasking could be an additional tool for clinicians treating adolescents with trauma symptoms.

Keywords: Trauma symptoms, media multitasking, alcohol, adolescence

MEDIA MULTITASKING

Because of the growth and continued integration of new media and technology in daily life, the use of multiple forms of media continues to rise, particularly among adolescents (Rideout, Foehr, & Roberts, 2010). Media multitasking is broadly operationalized as the practice of concurrently interacting with multiple forms of media (Ophir, Nass, & Wagner, 2009). For example, it is common for adolescents to talk to friends while simultaneously texting on a smartphone, watching a video online, and browsing the web; this is media multitasking. A recent study discovered that media multitasking in American youth has increased by over 119% in the past decade (Rideout et al., 2010). In fact, when accounting for media multitasking, adolescent youth interact with electronic digital media for an average of 8 hours and 33 minutes per day (Rideout et al., 2010). Research examining this increasingly popular behavior is still in the early stages. However, studies are finding evidence that this trend displays significant negative implications for both cognitive functioning and mental health.

Research has linked higher rates of media multitasking with poorer academic outcomes in adolescents, attention problems, anxiety, depression, aggression, behavior problems, and high-risk behaviors, including substance use and accelerated sexual behavior (Becker, Alzahabi, & Hopwood, 2013; Mathers et al., 2009; Ophir et al., 2009; Primack, Kraemer, et al., 2009; Primack, Swanier, et al.,...
The Ophir et al. (2009) study, which introduced the media multitasking measure used in the present study, found deficits in cognitive control associated with higher media multitasking. Subsequent research has revealed that higher media use among college age women is associated with poorer academic functioning (Walsh et al., 2013). Multiple studies have found associations between higher rates of media multitasking and increased symptoms of depression, anxiety, and substance use disorders (Becker et al., 2013; Mathers et al., 2009; Primack, Kraemer, et al., 2009; Primack, Swanier, et al., 2009). Additionally, elevated media use has been linked to more aggressive behavior, increased violence, greater high-risk behaviors such as alcohol use, tobacco use, and earlier onset of sexual activity (Villani, 2001). Increased maladaptive behavior and decreased overall health status have also been associated with increased media use (Mathers et al., 2009). However, not all research has found a significant relationship between media multitasking and negative outcomes. A study conducted by Shui-I Shih (2013) found a nonsignificant relationship between media multitasking and both cognitive and emotional measures of well-being. Given that media multitasking rates are rapidly increasing in late adolescence, and that many negative outcomes have been associated with this increased media use, it is a topic worthy of further exploration.

TRAUMA SYMPTOMS

An area that has not received much attention in relation to media multitasking is trauma symptoms. Trauma symptoms are common experiences that occur following a difficult incident, such as feeling afraid, difficulty sleeping, or being easily startled (Copeland, Keeler, Angold, & Costello, 2007). These types of trauma symptoms occur in all people and are different from trauma itself. These symptoms exist on a spectrum and are grouped by the DSM-5 into four classifications of symptoms: intrusion symptoms (e.g., distressing memories, nightmares, dissociative reaction, and frightening thoughts), avoidance symptoms (e.g., avoiding places, events, or objects), negative alterations in cognitions and mood, and marked alteration in arousal and reactivity (e.g., feeling tense, difficulty sleeping, angry outbursts, and being easily startled) (American Psychiatric Association, 2013). Trauma symptoms, separate from trauma itself, have been associated with deficits in cognitive functioning in youth (Nooner et al., 2013; Nooner & Leaberry, 2013), as well as increased rates of alcohol intoxication (Anda et al., 2014; Read et al., 2012; Stewart, 1996).

The other primary construct in our article, media multitasking, has been associated with many of the same deficits as trauma symptoms, including cognitive deficits (Ophir et al., 2009) and increased alcohol intoxication (Primack, Kraemer, et al., 2009; Villani, 2001). Despite these areas of apparent overlap, media multitasking has yet to be explored in association with trauma symptoms. Multiple mechanisms exist by which media multitasking can be associated with trauma symptoms. This relationship may be bidirectional in that media multitasking may be a risk factor for trauma symptoms, or the converse could be true. To clarify, we are not exploring if trauma itself is related to media multitasking. We are evaluating if the symptoms that commonly occur following a difficult incident, termed trauma symptoms, are related to media multitasking. Exploration is warranted given the common cognitive deficits associated with trauma symptoms and media multitasking and the prevalence of both of these disorders in adolescents (Nooner et al., 2013; Nooner & Leaberry, 2013; Ophir et al., 2009; Read et al., 2011; Read et al., 2012; Rideout et al., 2010; Scarpa et al., 2002).

ALCOHOL USE

High-risk alcohol use is seen in both individuals experiencing trauma symptoms and those with increased media use (Anda et al., 2014; Primack, Kraemer, et al., 2009; Read et al., 2012;
Stewart et al., 1996; Villani, 2001). A form of high-risk alcohol use that is associated with trauma symptoms is alcohol intoxication (Anthenelli, 2010; Centers for Disease Control and Prevention, 2014; National Institute on Alcohol Abuse and Alcoholism, 2014). For the purposes of this study, alcohol intoxication is defined according to Achenbach’s Adult Self-Report, which asks the number of days someone has been “drunk” in the past 6 months (Achenbach, 2009). Alcohol intoxication is common among late adolescents according to the Centers for Disease Control and Prevention (CDC, 2014). Research has shown that the average age at which youth, ages 12 to 20, begin to drink is 16.1 years old (Substance Abuse and Mental Health Services Administration, 2011). National survey data indicate that there are high rates of alcohol use among this age group, as well as high rates of dangerous drinking practices such as alcohol intoxication and binge drinking (Windle, 2003). In fact, a national survey revealed that 28.6% of twelfth graders and 40.1% of college students engaged in binge drinking, defined by consuming five or more drinks in a row, during the 2 weeks preceding the survey (Johnston et al., 2004; Johnston et al., 2010). Further, at least one instance of alcohol intoxication is reported by 94% of all 15- to 17-year-olds and 96% of 18- to 20-year-olds (Pacific Institute for Research and Evaluation, 2005). These high rates of alcohol intoxication commonly co-occur with additional health compromising behaviors such as drug use and risky sexual behavior (Windle, 2003). In a nationwide study of college students, 27.4% of the participants in the study reported driving a vehicle after consuming alcohol (Windle, 2003). Media multitasking has been linked to both alcohol and substance use in adolescents (Primack, Kraemer, et al., 2009; Villani, 2001).

**THE PRESENT STUDY**

Our pilot study builds upon past research by evaluating the unexplored relationship of media multitasking and trauma symptoms. We also aim to replicate past work by studying the relationship between trauma symptoms and alcohol intoxication in adolescence. We are interested in examining trauma and alcohol intoxication because they often co-occur in adolescent samples. Therefore, the variable of alcohol intoxication is useful for demonstrating that our sample has typical adolescent characteristics, which, in turn, will help to more strongly suggest that any findings related to trauma and media multitasking are also typical of adolescents in general. We are particularly interested in the dimension of media multitasking that has to do with using media while engaged in face-to-face conversation with other people. We are focused on this dimension because it is becoming more common, particularly among adolescents, to be continually engaged in various media while spending direct time with peers. Given that increased social interaction with peers is a core adolescent developmental milestone (Nooner et al., 2013), we want to see if differences in adolescents’ media use, while engaging face to face with others, is related to trauma symptom scores.

We theorize that media multitasking while talking to others may be related to increased trauma symptoms. Given that this is a pilot investigation we are not hypothesizing a specific direction of the relationship between media multitasking and trauma symptoms, just that they will be positively associated (i.e., higher scores on one will be related to higher scores on the other). This hypothesis is based on the common deficits associated with trauma symptoms and media multitasking (Becker et al., 2013; Ophir et al., 2009; Nooner et al., 2013; Primack, Kraemer, et al., 2009; Primack, Swanier, et al., 2009; Walsh et al., 2013), which lead us to theorize a similar direction in the relationship of these variables. We are taking a step forward in this pilot study by looking specifically at the impact of media multitasking on trauma symptoms, during face-to-face social interactions. To examine this theory, we make the following specific hypotheses:
1. **Hypothesis 1 (H1):** We hypothesize that higher media multitasking scores, when talking face to face with others, will be related to higher trauma symptom scores.

2. **H2:** Second, we hypothesize that more days intoxicated by alcohol (i.e., drunk) will also be associated with higher trauma symptom scores.

3. **H3:** Third, we hypothesize that higher media multitasking scores will be associated with more days drunk.

4. **H4:** Fourth, we hypothesize that media multitasking will have a significant independent association with trauma symptoms, separate from the variance accounted for by days drunk.

**METHOD**

**Participants**

The participants in this pilot study included 55 college students (ages 18 to 20), who were recruited through the university subject pool over the course of one semester; see Table 1. These participants were recruited for an Institutional Review Board (IRB)–approved (H1213-074) study assessing trauma symptoms, alcohol use, and media multitasking in college students. Demographic characteristics of the participants are summarized in Table 1.

**Procedure**

This pilot study consisted of three surveys. Prior to the assessments, each participant signed an IRB informed consent. All of the assessments were completed at the same time, over the course of approximately 1 hour. None of the participants withdrew from the study, and no adverse events occurred. Principal investigator K.N., licensed psychologist, was present to monitor clinical safety. To ensure confidentiality, identifiers were removed, including participant names, date of birth, and date of assessment. Further, data were secured through the use of an encrypted, firewalled, password-protected computerized data collection and management system, the Collaborative Informatics and Neuroimaging Suite (COINS) (Scott et al., 2011). This system was developed by the Mind Research Network to allow for both secure and efficient direct computer-based participation and data management. Because of the data security provided by this system, COINS is in compliance with Health Insurance Portability and Accountability Act standards and implementation rules.

**Trauma Symptom Checklist**

To assess trauma symptoms, participants completed the Trauma Symptom Checklist (TSC-40) (Briere and Runtz, 1989). This is a 40-item self-report measure of symptomatic distress in adults associated with either childhood or adult traumatic experiences. This measure uses a four-point

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>Variable</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>18.0 (0.66)</td>
<td>Gender (male/female)</td>
<td>(25%/75%)</td>
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<tr>
<td>MMI F2F</td>
<td>6.87 (3.78)</td>
<td>Ethnicity (white/nonwhite)</td>
<td>(81%/19%)</td>
</tr>
<tr>
<td>ASR DD</td>
<td>17.09 (20.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSC</td>
<td>20.85 (12.01)</td>
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*Note: MMI F2F = Media Multitasking Index: number of media used when talking face to face. ASR DD = Adult Self-Report item: number of days drunk in past 6 months. TSC = Trauma Symptom Checklist total score.*
Likert response scale ranging from 0 (Never) through 3 (Often). The TSC-40 requires approximately 10–15 minutes for participants to complete. This measure has been shown to have high internal consistency ranging from .89 to .91 (Briere, 1996a). In the present study we used the TSC-40 total score, which is a summary score of all of the items, as our measure of trauma symptoms.

The Trauma Symptom Checklist assesses trauma symptoms, which occur on a spectrum and are experienced by nearly all individuals. This tool is used routinely in healthy individuals who have subclinical trauma symptoms. In fact, in a validation study of 667 maltreated children and adolescents conducted by the author of this checklist, less than 4% of the sample fell within the clinical range (Briere, 1996b). Hence, this is a measure to assess symptoms related to trauma in healthy populations and is sensitive to differences in scores that occur in a nonclinical range.

Media Multitasking Index
Our measure of media multitasking was developed and first used by Ophir et al. in their 2009 study. This is a 10-item questionnaire-based index, which identifies participants’ media multitasking in various settings (e.g., while talking to others, while watching television, browsing the web, or listening to music). In this study, we calculated the total number of media used (e.g., text, e-mail, talking on a cell phone, social media, online blogging, listening to music, video games, watching television, and other work on a computer) at any time while talking face to face with another person in a “typical day”; this comprised the variable “MMI F2F.”

Achenbach Adult Self-Report
Our measure of alcohol use was the Achenbach Adult Self-Report (ASR) (Achenbach, 2009). For this measure adults, ages 18–59, report on their adaptive functioning and personal substance use. The scoring process for the ASR provides normed scales for adaptive functioning, personal strengths, empirically based syndromes, and substance use. For the substance abuse measure of the ASR, the mean r was significant at .96 with p < .01 (Achenbach & Rescorla, 2003). For the purposes of this study, we examined the question that asks the number of days in the past 6 months that the participant has been “drunk” (i.e., intoxicated by alcohol).

Analytic Strategy
We are using a multiple regression model to examine the associations between trauma symptoms, media multitasking while talking face to face with others, and days intoxicated by alcohol (i.e., drunk) in the past 6 months. For this analysis, the criterion variable is participant trauma symptoms. The predictor variables are participant media multitasking and days drunk. We used the IBM for SPSS 19.0 to evaluate the associations between trauma symptoms, media multitasking, and days drunk.

RESULTS
Descriptive statistics are presented in Table 1. Analyses included the entire sample (N = 55). The age, gender, and ethnicity of the participants were the same as the overall population of UNCW undergraduates taking introductory psychology. No age, gender, or ethnic differences were found (p > .05); therefore, they were not included as covariates in the analyses. Adolescents reported using an average of 6.87 (SD = 3.78) different media (see method for types of media used) at some point during their time talking face to face with others on a “typical day.” They also reported 17.09 (SD = 20.9) days intoxicated by alcohol (i.e., drunk) in the past 6 months. The average total trauma
Symptom scores were 20.85 (SD = 12.01), which was below the clinical range and what is expected for a typically developing adolescent sample (Briere, 1996a). Standardized values (z scores) were used for the analyses and for the reported beta values. Visual inspection of the scatterplots for the relations among media multitasking, days drunk, and trauma symptoms indicated that all relations were linear. Zero-order correlations were examined to verify and statistically examine these linear relations.

The correlation between media multitasking and trauma symptoms was moderate and statistically significant, $r(55) = .39$, $p = .004$. Adolescents who engaged in more media multitasking had more trauma symptoms; adolescents who engaged in less media multitasking had less trauma symptoms. The correlation between days drunk in the past 6 months and trauma symptoms was moderate and statistically significant, $r(55) = .36$, $p = .008$. Adolescents who had more days drunk had more trauma symptoms; adolescents who had fewer days drunk had fewer trauma symptoms. The correlation between media multitasking and days drunk was not statistically significant, $r(55) = .202$, $p = .14$.

Subsequently a multiple regression analysis was conducted to evaluate how well media multitasking and days drunk were associated with trauma symptoms. Media multitasking and days drunk accounted for a significant amount of variance in anxiety: $F(2,54) = 7.67$, $p = .001$, $R^2 = .23$, 95% CI ranged from .05 to .41. The partial regression coefficient relating media multitasking to trauma symptoms was moderate and statistically significant, $\beta = .33$, $p = .01$, 95% CI = .08 to .58; see Figure 1. Adolescents who had higher media multitasking scores had more trauma symptoms; adolescents who had lower media multitasking scores had fewer trauma symptoms. The partial regression coefficient for days drunk in the past 6 months to trauma symptoms was small to moderate and statistically significant, $\beta = .29$, $p = .03$, 95% CI = .04 to .54; see Figure 2.

![Figure 1](Z:\NTIG\Documents\MS1.png)

**Figure 1** Scatterplot with least-squares regression line and 95% CI. Criterion variable is TSC, and predictor is MMI-F2F.

**Note.** TSC = Trauma Symptom Checklist total score. MMI F2F = Media Multitasking Index: number of media used when talking face to face.
Adolescents who had more days drunk had more trauma symptoms; adolescents who had fewer days drunk had fewer trauma symptoms.

DISCUSSION

Late adolescence is a developmental period when alcohol intoxication, media use, and exposure to traumatic events often peak, particularly when adolescents leave home for the first time to attend college (Copeland et al., 2007; Read et al., 2012). The ubiquity of media use may be an advantage in relation to trauma symptoms by providing easier access to safety information and means to communicate with others (O’Keeffe, Clarke-Pearson, & Council on Communications and Media, 2011). Yet concerns related to the association of media use and trauma symptoms remain, including incidents of suicide and self-harm following unwanted revelation of sexual assault via social media (Borzekowski, 2006; O’Keeffe, Clarke-Pearson, & Council on Communications and Media, 2011). It is important to note that these incidents were reported in relation to trauma symptoms and not trauma per se. Therefore, it is important to understand the role of trauma symptoms in the emergence of the ubiquitous media use that is common in late adolescence.

Overall we found support for three of our four hypotheses pertaining to media multitasking and trauma symptoms in adolescents. In support of our first hypothesis, this pilot investigation found
that media multitasking was significantly related to trauma symptoms in late adolescent college
students. Supporting our second hypothesis, the number of days students reported being drunk also
accounted for a significant proportion of the variance in trauma symptoms. We did not find support
for our third hypothesis; media multitasking was not significantly associated with days drunk.
However, we did find support for our fourth hypothesis; media multitasking was significantly and
independently related to trauma symptoms, even after accounting for the number of days drunk. In
particular, this study found preliminary evidence that that media use may be worthy of future
exploration as an independent mechanism pertaining to trauma symptoms.

Our pilot study provided initial evidence that media multitasking while taking face to face with
others was uniquely associated with trauma symptoms. Specifically, students who used more media
while talking directly to others reported higher trauma symptoms than those who used fewer media.
Although trauma symptoms are not a mental health problem per se, they are a potent risk factor. In
fact, trauma symptoms are a risk factor for many of the disorders that have also been linked to
elevated media multitasking (De Bellis, 2001; Nooner et al., 2013). These disorders and problems
include anxiety, depression, attention problems, substance use disorders, suicide, excessive vio-
lence, sexual behavior problems, and eating disorders (Becker et al., 2013; Borzekowski, 2006;
Harrison & Cantor, 1997; Mathers et al., 2009; Ophi et al., 2009; Primack, Swanier, et al., 2009;
Strasburger et al., 2010; Villani, 2001; Walsh et al., 2013).

Our pilot results suggest that higher media multitasking may be part of a risk profile associated
with elevated trauma symptoms. Screening for trauma symptoms often involves asking adolescents
about high-risk, illegal behaviors such as underage drinking and illegal drug use. As such, it can
lead adolescents to provide socially desirable responses as a way to avoid negative repercussions.
Media multitasking represents a way to screen for elevations in trauma symptoms in a manner that
may be more compatible with behaviors that adolescents are comfortable revealing to health care
professionals.

Some of the limitations to the current pilot study include that it is a cross-sectional study in
which media multitasking, alcohol intoxication, and trauma symptoms were assessed at the same
time. Therefore, we cannot examine causality. In addition, we assessed trauma symptoms and not
trauma per se. It is possible that the relationship between our study variables would differ
depending on the type of trauma experienced. While our sample size was representative of the
gender and racial background of students at our school, it was a relatively small sample from the
undergraduate subject pool. However, given that the behaviors assessed are commonly seen in
college age students, it is likely that the results would apply to others in late adolescence. Addition-
ally, this study was not sufficiently powered to examine interaction effects, which
would be useful for future studies to evaluate. It would be ideal to follow up this pilot investigation
with a larger study that followed participants over time and used a multivariate statistical approach
such as structural equation modeling. The results of the present investigation are valuable in that
they illustrate that a more extensive study could be worthwhile.

These preliminary findings of a relation between media multitasking and trauma symptoms in
adolescents hold potential for efforts aimed at improving the mental health of adolescents. These
results can inform efforts at identification of those who are experiencing trauma symptoms but may
not feel comfortable responding to questions about high-risk or illegal behavior. In sum, media
multitasking has the possibility of being a new tool for clinicians working with adolescents who are
experiencing trauma symptoms.

**FUNDING**

There is no outside funding source. This research was supported by startup funds from the
Department of Psychology, University of North Carolina Wilmington, Wilmington, NC.
REFERENCES


