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Sad Kids, Sad Media? Applying Mood Management Theory to Depressed Adolescents' Use of Media

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Abstract

Mood management studies typically have found that adults will select media that enhance positive moods and reduce negative moods. In this study, adolescents diagnosed with major depressive disorder and control adolescents without psychiatric disorders were called on customized cell phones up to 4 times a day and asked about their current mood state and media use for five extended weekends across an 8-week period. Mood effects on subsequent media use, mood during media consumption, and media effects on subsequent mood were examined. Results indicated that adolescents who consumed fun media tended to do so in a way that sustained, rather than enhanced their prior positive mood levels during and after consumption-if they turned to media. Adolescents in more negative moods did not often use media to improve their moods. When they did, boys were more likely than girls to use media that ultimately reduced negative mood levels. Findings are discussed in light of the literature on mood management, adolescence, and depression.

Mood management theory (Zillmann, 1988a, 1988b, 2000, 2003) predicts that individuals will select media content that promises to optimize their moods. In general, people are expected to choose media content that is more positive in hedonic value than their current mood state or media content that effectively distracts from a negative mood. With few exceptions (e.g., Larson, 1995), mood management has typically been examined with college-aged and older adults who are assumed to be mentally healthy and capable of effectively regulating their moods. It is not clear, however, how well the mood management hypothesis applies in other populations. Mood management has rarely been examined in more youthful audiences, for example, despite evidence that adolescents are among the most avid users of media (Roberts & Foehr, 2004). Even less attention has been paid to how media use is influenced by a consumer's mental health status. Mental health is especially important when considering

younger audiences because adolescence is a period of increased susceptibility to mood disorders that might hinder the ability to regulate mood with media. Therefore, in this analysis we expand on previous mood management studies to explore how mood and media use relate over short time spans for adolescents in natural settings with and without mood disorders.

Media and Mood Regulation

Arguably the most empirically supported observation in mood management research is that adults who are experiencing positive moods will seek positively valenced media to maintain their positive moods (e.g., Biswas, Riffe, & Zillmann, 1994; Knobloch, 2003; Knobloch & Zillmann, 2002; Knobloch-Westerwick, 2007; Knobloch-Westerwick & Alter, 2006; Mares & Cantor, 1992; Strizhakova & Krmar, 2007; Zillmann, 2000, 2003; Zillmann, Hezel, & Medoff, 1980). Many studies also have found that adults in negative moods tend to seek potentially uplifting media to improve their current mood state, while tending to avoid sad media content (e.g., Biswas, Riffe, & Zillmann, 1994; Knobloch, 2003; Knobloch & Zillmann, 2002; Meadowcroft & Zillmann, 1987; Zillmann, Hezel, & Medoff, 1980).

A few studies, however, have observed media choices that diverge from the hedonistic choices reported in much of the mood management research. Specifically, some studies note that happy people do not always seek happy media (e.g., Meadowcroft & Zillmann, 1987), and that people in negative moods sometimes select negatively valenced media rather than the uplifting content mood management theory would predict (e.g., Chen, Zhou, & Bryant, 2007; Mares & Cantor, 1992; Nabi, Finnerty, Domschke, & Hull, 2006; Oliver, 1993; Oliver, Weaver, & Sargent, 2000). For example, some researchers (e.g., Strizhakova & Krmar, 2007) have observed nervous individuals choosing horror films and sad individuals choosing dramas—choices that would seem to enhance, rather than repair, negative moods. Others, however, found anxious individuals choosing calming entertainment content and sad individuals choosing empowering or rewarding entertainment content (e.g., Raghunathan & Corfman, 2004; Raghunathan, Pham, & Corfman, 2006), which aligns more with the conventional mood management hypothesis.

Despite the divergent findings regarding counter-hedonistic media use, the vast majority of these studies find that consuming negatively valenced media leads to some level of gratification. Negatively valenced media, for example, might help the consumer cope with a negative experience or state of life (Mares & Cantor, 1992; Nabi et al., 2006). Or, the negatively valenced media might simply be enjoyed because the user is more able to evaluate negative emotions in a positive light (Meadowcroft & Zillmann, 1987). Individual differences such as feminine gender identity and empathic capability apparently contribute to an increased capacity for enjoying negative content (Oliver, 1993; Oliver, Weaver, & Sargent, 2000).

Although mood management has been studied extensively, gaps still exist, especially in terms of how mood management applies to populations other than mentally healthy adults. For instance, a small but significant percentage of the population suffers from mood disorders, such as major depressive disorder (MDD). These disorders typically have an impact on the capacity for mood regulation (Sheeber, Allen, Davis, & Sorensen, 2000; Silk, Steinberg, & Morris, 2003; Thompson, 2001). Depression, in particular, is problematic because it is often associated with behavior that induces or prolongs sad feelings, as well as a reduced inclination to take action that would prolong positive feelings (Forbes & Dahl, 2005).¹ Thus, individuals with clinical depression might not use media to repair or enhance mood states in the same way as those without mood disorders.

¹Though related, positive and negative affect have been shown to differ physiologically (Larsen, Norris, & Cacioppo, 2003), conceptually (Forbes, Williamson, Ryan, & Dahl, 2004), and empirically (Laurent et al., 1999). Thus, we treat these two valences separately in this study.

Another gap within the mood management literature is the understanding of different age groups, such as adolescents. Because adolescents are not yet fully cognitively and emotionally developed (see Beilin, 1992), these young consumers might exhibit media use patterns inconsistent with adult patterns. The adolescent period is also particularly ripe for mood disorders, especially depression. Because adolescents are avid media users and because we do not know how they use media to manage their moods, we focus our attention in this study on this population.

Adolescent Development, Media Use, and Depression

Adolescents between the ages of 8 and 18 spend almost 8 hours a day consuming some form of media (Roberts & Foehr, 2004). This rate translates to nearly 122 days' worth of media consumption per year. During that third of the year of consumption, almost 49 days are devoted to television viewing, 30 days to music listening, more than 7 days to video games, and 5 days to watching movies (Roberts & Foehr, 2004). Much of this media consumption takes place at home, where almost 70% of adolescents have televisions, 50% have video-game consoles, 46% have VCRs, 37% have DVD players, and 18% have Internet access in their bedrooms (Nickelodeon, 2005). When they are online, 84% of youth aged 12 to 17 regularly visit web sites about movies and television shows (Pew Internet and American Life Project, 2005).

During this period of intense media consumption, adolescents are developing ideas about who they are and how they should behave. Influenced by biological changes and social forces, youths are creating and reforming their self-identities and perceptions, their methods of self-expression and self-regulation, and their abstract thinking and judgment-making abilities (e.g., Beilin, 1992; Erikson, 1968). One key area in which media influence development is in the realm of social development, including gender roles, sexuality, rebellious activities, and adoption or rejection of ideals and socio-cultural norms (Erikson, 1968). Thus, adolescents' media selections can be used to adopt or portray their desired identity, from "teen rebel" (e.g., Arnett, 1992; Dillman Carpentier, Knobloch, & Zillmann, 2003) to ethnic/cultural affiliations (e.g., Dehyle, 1998; McLeod, 1999).

Adolescence is also a time of increased emotional variance (moodiness) and heightened emotional intensity (Larson, Moneta, Richards, & Wilson, 2002; Weinstein, Mermelstein, Hankin, Hedeker, & Flay, 2007), likely due to hormonal changes and continued cognitive development (e.g., Dahl, 2001; Dahl & Spear, 2004; Steinberg, Dahl, Keating, Kupfer, Masten, & Pine, 2006). This increase in emotional variance and intensity makes it challenging for adolescents to regulate their moods. Adding to this mix the documented tendency to seek rewards and take risks (Forbes & Dahl, 2005; Larson et al., 2002), adolescents might be more apt than adults to choose activities that intensify their current experience, whether the experience is positive or negative.

This potential to choose activities that intensify emotions becomes even more important when considering that adolescence is a critical period for the onset of mental health problems (Dahl, 2001; Stice, Presnell, & Bearman, 2001). Whereas depression in younger children is relatively rare (e.g., Fleming & Offord, 1990; Forbes & Dahl, 2005), depression in adolescence has prevalence rates as high as 25%, with point prevalence increasing two-fold from prepubescent rates (Angold, Costello, & Worthman, 1998; Jellinek & Snyder, 1998). This increase in depression is particularly dramatic for girls (Angold et al., 1998; Dahl, 2001). Yet despite these rates, there is no published research about how depression and gender might interact to affect how adolescents use media based on their moods.

Purpose of Study

Reviewing the extant literature, it is difficult to draw specific hypotheses about how adolescents, and adolescents with depression in particular, will use media. The difficulty is primarily because the mood management literature does not provide consistent predictions that account for hedonistic and counter-hedonistic media use even in mentally healthy adults. If the typical mood management hypothesis holds for an adolescent population, we would expect adolescents to use media that maintain positive moods or improve negative moods. In fact, because adolescents tend to intensify their emotions and seek rewards, we might expect adolescents' media use to be especially driven by hedonistic needs, choosing uplifting media irrespective of their prior mood and avoiding media that might be dispiriting. Adolescents with depression, however, might have different motivations for using media, or they might lack the motivation to use any media to regulate their moods.

It is also important to consider possible gender differences, both because girls are at higher risk for depressive disorders and because girls typically exhibit different media use patterns than boys (e.g., Brown & Pardun, 2004). Girls are also apparently more likely to find greater enjoyment in and fulfillment from sad content due to their feminine identity and capacity for empathy (Oliver, 1993; Oliver et al., 2000). On the other hand, girls might be more prone than boys to avoid media or choose mood-matching media because girls have an increased tendency to ruminate (Knobloch-Westerwick, 2007; Papadakis, Prince, Jones, & Strauman, 2006). Support for this rumination tendency is mixed, however, depending on whether a certain task is anticipated and what the affective requirements of completing the task are (Knobloch-Westerwick & Alter, 2006; Strizhakova & Krcmar, 2007).

The unknowns and disparate findings within the literature contribute to the challenges of predicting how adolescents will behave in a natural setting with naturally occurring moods (see Reeves, Newhagen, Maibach, Basil, & Kurz, 1991 about potential biases of lab settings in which many previous mood management studies have been conducted). We also do not know to what extent adolescents with or without mood disorders will think to use media to regulate mood. On the one hand, adolescents are surrounded by media and therefore might consistently turn to media based on their moods. On the other hand, adolescents might be so media-saturated that their use is more habitual than instrumental, and so their media patterns might not be affected by current moods.

In this study, we wanted to address the entire process of adolescents' choosing and using media in relation to mood. With data from a longitudinal field experiment with adolescents with and without depression, we were able to capture adolescents' decisions about media use based on their moods as well as see the results of those decisions within a short time span in their own environments. We addressed the following research questions about how mood and media relate to each other (a) prior to media use, (b) during media use, and (c) after media use:

- RQ1** How is the choice to use media, and the emotional quality of the media chosen, affected by prior mood for adolescents with and without depression?
- RQ2** How do concurrent mood states and emotional quality of media correspond during media consumption for adolescents with and without depression?
- RQ3** If adolescents with and without depression have chosen to use media, how are the adolescents' resulting mood states affected by the chosen media's emotional quality?
- RQ4** Does gender interact with mental health to affect media-mood relations?

METHOD

Overview

Adolescents diagnosed as having or not having clinical depression were asked questions about mood and behavior over the course of several weeks. Responses included self-reports of their current mood state, whether they were currently using media (and what the content was), and their perceptions of the media content they were consuming. Data from adolescents with depression were compared with those of adolescents without disorders to determine whether their gender, diagnosis and current mood state acted independently or interactively to influence the content selected. These data also addressed whether the adolescents' media choice acted independently or in interaction with gender or diagnosis to influence their later mood.

Participants

The data used in this study were part of a larger project affiliated with the Child and Adolescent Depression and Anxiety Study at the Western Psychiatric Institute and Clinic in Pittsburgh, PA. Participants were recruited from the University Center for Social Urban Research (UCSUR) and from radio and newspaper advertisements run in the surrounding areas. Most of the participants were White (85.2%), 10.2% were Black, 2.3% were Hispanic, and 2.3% were biracial. The sample (61.4% female, 38.6% male) ranged in age from 7 to 17 years ($M = 11.9$, $SD = 2.8$ years). Their mental health diagnosis was determined in a preliminary session using the Schedule for Affective Disorders and Schizophrenia—Present and Lifetime version (K-SADS-PL; Kaufman et al., 1997). Of the initial pool of 88 participants, 10 participants were diagnosed with MDD (Major Depressive Disorder), 18 had co-morbid MDD and anxiety disorders, and 23 participants (control group) had no mood or affective disorders. Thirty-seven participants had other disorders (e.g., bipolar). Because we were interested in adolescents with and without depression, these 37 participants were excluded from the analysis, leaving 51 participants in the study.

Previous reports using this sample found adolescents with depression had lower positive mood and higher negative mood levels than control adolescents (Forbes, Silk, Axelson, Bertocci, Ryan, & Dahl, 2006; Silk et al., 2007). Our own analysis replicated those observations. Therefore, adolescents with MDD and co-morbid MDD/anxiety disorders were combined into one MDD group ($n = 28$; 18 girls, 10 boys) to compare against the control group with no psychiatric disorders ($n = 23$; 17 girls, 6 boys).

Procedure

The host project's data collection included Ecological Momentary Assessment (EMA), as well as neuroendocrine, sleep, and clinical data collection. The portion of the data used in this paper was gathered from the EMA protocol. The EMA data were collected through the use of cellular telephone technology and a brief structured interview. Participants were given a modified, answer only, cellular telephone on which they received telephone calls from a trained staff member every other weekend for a total of five extended weekends, Friday through Monday. The equipment was dropped off at the participant's home on Thursday and picked up the following Tuesday.

Participants, in their home and social environments, received telephone calls from a trained research associate 12 times over the course of 4 days (Friday through Monday). On Fridays and Mondays throughout the study, participants received two calls between 4 p.m. and 10 p.m. in order not to interfere with school hours. On Saturdays and Sundays, participants received 4 calls between 11 a.m. and 10 p.m. Participants received telephone calls for a total of five extended weekends every other weekend for the 8-week duration of the study. Participants who did not initially answer their phone received a second call 10 minutes later. Participants

earned a bonus each weekend for completing all 12 calls; those who completed all 60 calls over the course of the study earned \$250. The mean number of incomplete calls per participant in this sample over the course of the study was 4.94 ($SE = 5.21$). The number of incomplete calls did not differ by diagnostic group ($t < 1$; $M = 5.50$, $SE = 5.84$ for MDD; $M = 4.26$, $SE = 4.22$ for control).

On each call, participants answered questions in six domains: (a) location/activity at the moment of call; (b) media use and perceived emotional quality; (c) social context (presence of other people); (d) mood; (e) anticipated future events; and (f) significant events during past 24 hours. Not all items were asked on each call to minimize the interruption to the participant's life.

Participants were asked at every call to identify any media they were using, and if using media, to rate its affective attributes. If participants were using more than one medium, they were asked about the medium they said was most important to them at that time. Also at every call, regardless of whether they were using media, participants were asked questions about their current mood and situational questions not pertinent to this study. The items used in these analyses were based on 4,313 completed calls out of a maximum potential of 5,280 calls (82%).

Participant media use—In 2,165 (50%) of the completed calls, the adolescent reported using some form of media, with 98% of the participants indicating use of some medium at least once over the course of the study. Television (59% of the 2,165 calls) was, by far, the most used medium, followed by radio/CDs (20% of the calls), Internet/computer (12%), video games (11%), books (3%), magazines (1%), and newspapers (<1%). These adolescents were multi-taskers in that many were using more than one medium in 1,528 (34%) of the calls. In 928 of the 1,528 calls (61%), television was listed as the most important medium being used at the time.

Measures

Mood state—On every call, participants were asked about their current mood using eight items from a modified version of the Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1999). In this measure, positive affect is conceived of as the activation of positive emotions. High positive affect suggests high energy or enthusiasm, and low positive affect suggests the absence of energy or enthusiasm. Negative affect is conceived of as the activation of negative emotions. High negative affect suggests high distress, and low negative affect suggests little or no distress.

Participants were asked, "How would you rate how (happy, sad, joyful, nervous, upset, energetic, angry, excited) you are right now?" on a 5-point scale that ranged from (1) *very slightly or not at all* to (5) *extremely*. Taking all completed calls indicating media use into account, a principal axis factor analysis with direct Oblimin rotation was performed on the eight PANAS items to evaluate the applicability of this scale with our sample. The analysis confirmed two distinct positive and negative affect factors, in accordance with the previous PANAS-C validations. Positive affect ($\alpha = .85$) was the strongest factor (eigen = 3.3, % variance = 41.0) and consisted of *joyful*, *excited*, *happy*, and *energetic* (loadings = .83, .82, .73, and .70, respectively). Negative affect ($\alpha = .70$) was the second factor (eigen = 1.7, % variance = 21.6) and consisted of *upset*, *angry*, *sad*, and *nervous* (loadings = .77, .68, .64, and .32, respectively). Because *nervous* had a low loading, this item was dropped, improving the internal consistency of the negative affect measure ($\alpha = .77$). Items for each factor were averaged into composite scores representing positive ($M = 3.1$, $SD = 1.1$) and negative ($M = 1.2$, $SD = .54$) mood states. These two composites were only moderately negatively correlated ($r = -.31$, $p < .01$) and were thus treated as independent factors in accordance with the literature (e.g., Crawford & Henry, 2004).

Media genre—Upon asking, “What types of media are you using?” interviewers probed for names or descriptions of the content (e.g., name of television program). If participants named more than one media activity, they were asked “Which is most important to you?” Although all kinds of media (radio, TV, magazine, computer, newspaper, video games, books) were mentioned, only television and movie responses were coded for genre because they were the most frequently mentioned (59% of all calls) and most feasible to code. Researchers recorded the genre category for each television program and movie named, of which there were 625 unique titles. Genre categories were obtained from the Internet Movie Database (IMDB.com). The TV.com database was used in the rare event that the title was not listed on IMDB.com.

The resulting genre listings were collapsed into eight categories. Adolescents watching television or movies when called were most frequently watching *comedies* (23.2%), followed by *action/adventure/sports* (20.2%) and *children/family* (18.2%) genres. *Drama* (6.9%), *reality/educational/ceremonial* (6.8%), *music* (3.9%), *news* (2.4%) and *horror* (1.7%) were least frequently mentioned. Finally, adolescents were engaged in undirected channel surfing in 13.7% of these calls. The genre categories were used to evaluate the face validity of the perceived emotional quality of the media, as genre should at least loosely correspond with their perceptions of the emotional quality of the media (e.g., a comedy ideally should not be perceived as sad).

Media emotional quality—Because we were interested in how the adolescents viewed the emotional quality of the media they were using, we asked participants to rate “how *fun*” and “how *sad*” the most important medium they were currently using was, using the familiar 5-point response scale. *Fun* ($M = 2.9$, $SD = 1.4$) and *sad* ($M = 1.2$, $SD = .65$) qualities were specifically selected because they are most in accord with the mood management and depression literature. These items were pilot-tested with 13 non-study participants (ages 7 to 15 years old) who readily rated media content for each emotional quality.

The subsample of calls indicating television consumption ($N = 1,286$) was used to evaluate the face validity of the media qualities measure. Mean scores for each quality were compared across media genre (see Table 1). As would be expected, children/family and comedy genres were most likely to be described as *fun*. Dramas were most likely to be described as *sad*.

These results indicated that the *fun* and *sad* items sufficiently represented the emotional quality of media choices and supported using the entire pool of completed calls as it was likely that content chosen in other media (e.g., radio, magazines, Internet) would be similarly evaluated.² Also, because so many different genres were being represented at each phone call, using the perceived emotional qualities of the media content allowed for more robust analyses, as using individual genres as dependent variables would severely limit the sample size for any analysis. Thus, for all completed calls, the extent to which participants attributed *fun* and *sad* emotional qualities to their chosen media were used in the analyses as single item variables.

RESULTS

Plan of Analysis

To address the research questions about mood effects on media use, mood during media use, and media effects on subsequent mood, we used repeated measures linear mixed effects models,³ which allowed us to account for time and for nesting of assessments within subjects. For all

²The grand mean for perceived fun quality for all media (television, music, books, magazines, Internet/computers, video games) was 2.94 ($SD = 1.42$). Video games received the highest fun ratings ($M = 3.74$, $SD = 1.20$); books received the lowest ($M = 2.29$, $SD = 1.32$). The grand mean for perceived sad quality for all media was 1.25 ($SD = .65$). Television had the highest sad ratings ($M = 1.29$, $SD = .70$); computer media the lowest ($M = 1.12$, $SD = .40$).

models, the participant was entered as a random effect. Consecutive phone call was entered as a repeated measure to control for inflated Type I error due to shared variance among calls from the same person. To additionally account for time, a study week variable was created by grouping together each of the five weekends' 12 calls (Weeks 0, 2, 4, 6, and 8). Study week was included as a fixed effect to evaluate weekly changes over the course of the study.

Each research question addressed (a) choice to use any media and (b) emotional quality of the media used. Thus, the analyses that addressed whether or not any media were chosen included all completed calls ($N = 4,313$), whereas the analyses addressing emotional quality of media used the subset of phone calls in which participants indicated some form of media use ($N = 1,528$). With regard to mood, we used both positive and negative mood measures in the analyses as the positive mood measure indicates adolescents' level of energy or enthusiasm and the negative mood measure indicates the adolescents' level of distress. Thus, low positive mood does not indicate the activation of negative emotion, but rather the absence of positive emotion.

In RQ1, we asked whether adolescents with and without MDD used media and what kind (emotional quality) of media they used based on their prior mood. In three analyses addressing this research question, we used a data file in which mood and media items were cross-lagged such that mood at one call was used to predict media use at the very next call. Cross-lags were created within each weekend, because it made little sense to predict media use from mood reported in a call occurring two weeks earlier. Diagnostic group (MDD, control), gender, study week, positive mood (low enthusiasm—high enthusiasm) and negative mood (low distress—high distress) were entered as independent variables. Main effects, two-way interactions, and three-way interactions of these variables were entered as fixed effects. A dummy-coded media use variable (0 = not using any media, 1 = using some form of media) was the dependent variable in the first analysis, which addressed whether adolescents turned to media based on mood. The media emotional qualities of fun and sad (as perceived by the user) were each entered as a dependent variable in the second and third analyses, respectively, which included only the subset of adolescents using media.

RQ2 dealt with how adolescents' moods corresponded with their media use during consumption. To address this research question, the same three analyses described above for RQ1 were performed. For these analyses, however, we used a cross-sectional data file matching mood at one call with media use during the same call.

In RQ3, we asked what the adolescents' resulting mood states would be after consuming media, especially when considering the media's emotional quality. Six analyses evaluated this research question, using a cross-lagged data file that matched media use at one call with mood at the next call. The first two analyses examined whether there was a global effect of media use on mood. Diagnosis, gender, study week and media use (no, yes) were entered as independent variables. Positive mood and negative mood were each used as a dependent variable. The next four analyses addressed emotional quality of media using the subset of adolescents using media during the previous phone call. Fun and sad media qualities were each entered as an independent variable in separate analyses that also included diagnosis, gender and study week. Positive mood and negative mood were each used as a dependent variable in the analysis of fun media quality as well as the analysis of sad media quality.

³Linear mixed models (LMM) can simultaneously analyze random effects, repeated measures and hierarchical effects. Whereas general linear models (GLM) use listwise deletion for missing cases, LMM draw from individual and pooled differences and can thus include incomplete cases in the analysis. Unfortunately, there are currently no universally accepted effect size estimates equivalent to η^2 that can be derived from LMM (e.g., see Jiang, 2007). The LMM in this study use a restricted maximum likelihood (REML) algorithm to compute coefficients for our predictors, as REML handles biases due to high correlations and outliers better than other algorithms (e.g., Diggle, 1988; Thompson, 1985). We used a scaled identity covariance type for our random effect and a diagonal covariance matrix for the fixed effect. For more information, see Jiang (2007) and Verbeke and Molenberghs (2000).

Table 2 provides a textual summary of the significant findings from these analyses.

Mood Effects on Subsequent Media Use

In evaluating RQ1 on how mood affected whether adolescents chose to consume media later, a marginal diagnosis effect emerged showing that MDD adolescents tended to use media somewhat more often than control adolescents, $F(1,1574.16) = 3.83, p = .051; M = .43, SE = .02$ for MDD; $M = .37, SE = .02$ for controls. A main effect for positive mood also emerged, and a post-hoc binary logistic regression evaluating the direction of this main effect showed that adolescents with lower positive mood levels at one call were more likely to be using media at the next call, $F(1,1845.71) = 3.93, p < .05; B = -.16, SE B = .03, Wald = 26.49, p < .01$. No main effects on choice were seen for gender, negative mood or study week.

Regarding interactions, a Diagnosis \times Gender interaction emerged, $F(1,1574.16) = 5.81, p < .05$, which was qualified by a Diagnosis \times Gender \times Negative Mood interaction, $F(1,484.30) = 6.56, p < .05$. Post-hoc mixed models examining Gender \times Negative Mood for each diagnostic group indicated that gender and negative mood level interacted more for the MDD group than for the control group, MDD: $F(1,821.06) = 7.52, p < .01$; control: $F(1,155.86) = 3.62, p = .059$. Additional post-hoc binary logistic regressions examined negative mood for boys and girls with and without MDD. Results showed that MDD boys with lower negative mood levels at one call were more likely to be using media at the next call, $B = -2.47, SE B = 1.06, Wald = 5.41, p < .05$. Control boys exhibited the same tendency to a lesser extent, $B = -.47, SE B = .27, Wald = 3.10, p = .08$. Neither MDD nor control girls showed differences due to negative mood level, $Walds < 1$.

In evaluating how mood might affect the *emotional quality* of media consumed later, media qualities of fun and sad (as perceived by the user) were each entered as a dependent variable in analyses using the subset of phone calls in which adolescents reported media use. With regard to fun media quality, a gender main effect emerged, $F(1,398.01) = 4.55, p < .05$. Boys who were using media rated their media as more fun compared to girls who were using media, boys: $M = 2.85, SE = .10$; girls: $M = 2.59, SE = .06$. A positive mood effect also emerged, $F(1,424.17) = 114.86, p < .01$. A posthoc linear regression exploring this effect revealed that feeling more positive at one phone call led to higher ratings of fun media quality at the next call, $B = .65, SE B = .04, t(1212) = 18.76, p < .01$. A negative mood effect explored with a post-hoc regression showed that feeling more negative at one call also led to higher ratings of fun media quality at the next call, $F(1,185.49) = 6.49, p < .05; B = .24, SE B = .08, t(1212) = 2.92, p < .01$. No main effects emerged for diagnosis or study week.

Only one interaction emerged in this analysis of fun media use—a positive Mood \times Gender interaction, $F(1,424.17) = 6.34, p < .05$. This interaction was explored with post-hoc mixed models and linear regressions, which indicated that higher positive mood level led to higher ratings of fun quality for both genders, though this was more true for boys than for girls, boys: $F(1,69.47) = 149.84, p < .01; B = .96, SE B = .05, t(428) = 18.34, p < .01$; girls: $F(1,330.93) = 128.17, p < .01; B = .49, SE B = .04, t(781) = 11.25, p < .01$.

No effects were revealed when using sad media quality as the dependent variable.

Summary of RQ1 findings—It appears that adolescents with and without depression turned to media after feeling less positive, but not necessarily after experiencing higher positive mood levels. Negative mood level did not influence girls' decisions to use media, but boys' media use tended to occur only when they had *not* been experiencing stronger negative moods. For those adolescents who did use media, the higher the previous positive or negative mood, the greater the fun quality of the media subsequently chosen. This was irrespective of the

adolescents' diagnosis. Adolescents did not appear to use sad-quality media based on their prior mood states.

Mood and Media Use During Consumption

In addressing RQ2 as to how mood and the use of any media relate in the moment of media consumption, a gender main effect emerged that indicated boys were using media more often than girls were, $F(1,1883.91) = 6.67, p < .05; M = .43, SE = .02$ for boys; $M = .38, SE = .01$ for girls. In addition, a negative mood effect explored with a post-hoc regression indicated that adolescents were feeling less negative when they were using media, $F(1,652.26) = 10.16, p < .01; B = -.08, SE B = .01, t(4267) = -5.67, p < .01$. Finally, a positive mood effect emerged, $F(1,2197.77) = 9.62, p < .01$, which was qualified with a Positive Mood \times Gender interaction, $F(1,2197.77) = 3.89, p < .05$. Post-hoc mixed models exploring the interaction showed that girls' media use did not correspond with current positive mood, $F(1,1633.10) = 1.74, ns$. Boys using media, however, tended to be feeling less positive, according to a post-hoc regression on the boys' data, $F(1,632.92) = 8.64, p < .01; B = -.08, SE = .01, t(1682) = -7.41, p < .01$. No main effects were found for diagnosis or study week, and no other interactions emerged.

Next, we analyzed how mood related to how fun the emotional quality of the media being used was. A gender effect emerged showing that boys evaluated the media they were currently using as more fun, compared to girls' evaluations, $F(1,406.12) = 6.28, p < .05; M = 2.98, SE = .09$ for boys; $M = 2.69, SE = .05$ for girls. A positive mood effect also emerged, $F(1,430.44) = 194.94, p < .01$. The direction of this effect was examined via a post-hoc linear regression, which showed that the higher positive moods, the more fun the media being used at the moment apparently were, $B = .70, SE B = .03, t(1455) = 23.98, p < .01$. No main effects were found for diagnosis, negative mood, or study week. However, one significant interaction emerged between negative mood and gender, $F(1,85.94) = 10.39, p < .01$. Post-hoc tests showed that for boys, feeling more negative corresponded to higher ratings of fun quality, $F(1,15.90) = 14.34, p < .01; B = .57, SE = .04, t(931) = 14.66, p < .01$. Girls' negative mood levels were not associated with their ratings of how fun the media were, $F(1,72.71) = 3.22, ns$.

No main effects or interactions emerged with regard to how mood relates during media use to the sad emotional quality of the media being used.

Summary of RQ2 findings—In exploring how mood and media use relate during media consumption, the analyses suggested that adolescents who were using any form of media were in lower negative moods than adolescents who weren't using media. Boys were also in lower positive moods when they were using media, as compared to boys who were not using media. These findings, that boys were using media when in low positive (absence of enthusiasm) and low negative (absence of distress) moods, suggest that media use was mostly occurring when the boys were in rather "neutral" mood states.

With regard to the type of media adolescents were using, those who *were* using media appeared to be consuming fun-quality media that matched hedonically with their positive moods. Boys who were in higher negative moods were also consuming fun media, however, as opposed to using media that matched their mood. Extent of negative mood did not influence girls' media choices, and as before, mood state did not correspond with consumption of sad-quality media.

Media Effects on Subsequent Mood

In examining RQ3 as to whether the mere act of using media affects subsequent mood, no main effects emerged for diagnosis, gender, study week, media use, positive mood or negative mood level. However, a Diagnosis \times Gender \times Media Use interaction emerged, $F(1,2064.43) = 5.97, p < .05$, which was explored via post-hoc mixed models. Gender and media use interacted for

the MDD group, but not for the control group, MDD: $F(1,1152.84) = 10.80, p < .01$; control: $F < 1$. Within the MDD group, MDD boys who used media at the preceding call felt less positive than MDD boys who did not use media at the preceding call, $F(1,382.54) = 13.33, p < .01$; used: $M = 2.64, SE = .09$; did not use: $M = 3.06, SE = .08$. MDD girls did not exhibit differences, $F(1,702.28) = 2.23, ns$; grand girls' $M = 2.57, SE = .05$.

Regarding whether subsequent positive mood level is affected by how fun the emotional quality is of the media previously used, a fun media quality effect emerged, $F(1,332.52) = 100.41, p < .01$. A post hoc regression indicated that the more fun the medium was at one call, the more positive the mood was at the very next call, $B = .35, SE B = .02, t(1203) = 17.24, p < .01$. No effects were found for diagnosis, gender or study week.

No effects emerged when examining how the sad emotional quality of media might affect subsequent positive mood level.

In examining fun media quality effects on later negative mood level, a marginal fun quality effect emerged, $F(1,120.43) = 3.67, p = .058$. A post hoc regression showed that adolescents who rated the media used at a preceding phone call as more fun tended to feel less negative at the subsequent call, $B = -.03, SE B = .01, t(1205) = -2.85, p < .01$. No effects emerged regarding diagnosis, gender or study week.

Using sad media quality to predict later negative mood levels, a sad quality effect emerged, $F(1,40.45) = 16.17, p < .01$. A post hoc linear regression revealed that higher ratings of sadness attributed to media used at one call resulted in higher negative mood levels at the next call, $B = .10, SE B = .02, t(1205) = 5.25, p < .01$. No other main effects were found, but a Gender \times Sad Quality interaction did emerge, $F(1,40.91) = 7.85, p < .01$. Post-hoc mixed models analyzing each gender group separately failed to converge, but post-hoc regressions suggested that for both genders, the sadder the media being consumed at one call, the more negative the mood at the next call, boys: $B = .22, SE B = .04, t(432) = 5.42, p < .01$; girls: $B = .06, SE B = .02, t(771) = 2.84, p < .01$.

Summary of RQ3 findings—With respect to media effects on later mood, the mere act of using media did not influence later moods for adolescents without depression. For adolescents with depression, media use generally led to lower positive mood levels for boys, but not for girls. With regard to the emotional quality of media, adolescents who had used fun media experienced an ultimate improvement in mood. Sad media use ultimately intensified negative moods.

DISCUSSION

Mood management studies have observed a tendency for adults to use media to maintain positive moods and improve negative moods. Exceptions to these tendencies are that dispiriting media are sometimes chosen at first, but the ultimate result of media use is an improvement in mood. We wanted to expand on the previous mood management findings to consider adolescents and depressive disorders. Thus, using data from an 8-week study with adolescents diagnosed with depression and adolescents without mood disorders, we analyzed in their natural settings how their moods might affect their subsequent media choices, how mood and media relate in-the-moment, and how media use might affect subsequent moods.

The findings suggest that adolescents are more likely to turn to media after feeling less positive. Among those adolescents who used media, the emotional quality of their media choice matched their prior positive mood level. In other words, the higher the adolescents' prior positive mood level, the more fun the emotional quality of the media they later used. Conversely, the lower

the adolescents' prior positive mood level, the less fun their media were. This tendency was apparent for both adolescents with and without depression, as well as for boys and girls. Thus, it appears that the adolescents were choosing media that matched, rather than enhanced, their current positive mood level, whether that level was high or low.

Girls' prior negative mood level did not appear to influence whether they used media later. Boys, on the other hand, seemed to use media only when their moods were not particularly negative. Boys also tended, in general, to use media more often and rate their media as more fun compared to girls.

With respect to the emotional quality of the media used, adolescents did exhibit a tendency to manage their negative moods in accordance with the conventional mood management hypothesis. The higher the prior negative mood level, the more fun the emotional quality of the media subsequently used. This pattern held regardless of gender or diagnosis.

The findings with regard to mood in the moment of media use told a similar story. For the most part, boys who were using media were experiencing fairly "neutral" (low positive and low negative) mood states, compared to boys who were not using media. Girls also tended to be feeling less negative during media use, though their positive mood levels did not relate to whether they were consuming media. In one of the only other studies to examine adolescents' media use and corresponding mood in a natural setting, Larson (1995) found that adolescents turn to media primarily when there is little else to do. Our findings here, therefore, corroborate Larson's findings that adolescent media use seems to be more about combating boredom than about mood regulation.

Granted, examining moods based solely on whether or not media are being consumed tells us little without taking the emotional quality of the chosen media into account. When emotional quality was considered, we found correspondence between the intensity of the adolescents' positive mood levels and how fun their media were. Thus, adolescents' media choices appeared to be sustaining positive mood levels.

The boys' choices to use fun media after feeling higher negative mood levels apparently did not translate into lower negative mood levels during consumption, however. In fact, the same relationship between negative mood level and use of fun media was found when examining mood prior to media use and mood during media use. This result suggests that boys who chose to use fun media upon feeling negative were still experiencing higher negative mood levels during consumption.

In contrast, girls exhibited no relationship between their negative mood levels and the type of media they used. Girls' use of any kind of media was associated with lower negative mood levels during consumption, however, which suggests that girls are variant in the media they might use to cope with or distract themselves from previous negative moods. Although this suggestion aligns with traditional mood management predictions, it does not support the competing idea that girls are ruminating by using media to sustain their negative moods.

In fact, we found no systematic tendency for boys or girls, with or without depression, to use sad media to prolong prior negative moods or reduce prior positive moods. We only found a tendency for boys with depression, who had mostly been in lower positive mood levels before and during media use, to be in lower positive mood levels after media use. This lack of differences due to diagnosis is surprising, considering that the depression literature suggests adolescents with depression, and girls with depression especially, might use sad media to sustain negative moods or lower positive moods (e.g., Forbes & Dahl, 2005). Instead, these adolescents' generally low use of sad quality media is more in line with evidence that

adolescents tend to seek rewards. Apparently, sad media does not seem very rewarding to adolescents.

We now turn to the last portion of the media use pattern—the effects of media on mood. Media use in and of itself did not result in a subsequent increase in positive mood or decrease in negative mood. Taking the emotional quality of media into account, however, we observed what can be considered predictable media effects. The more fun the quality of media consumed, the higher the subsequent positive mood and the lower the subsequent negative mood. Likewise, the sadder the quality of media consumed, the higher the subsequent negative mood. There was no indication, however, that prior negatively valenced media use ultimately led to an improvement in mood, as seen in studies with adult samples. Also, no differences according to gender or diagnosis were found, contrary to what mood management and depression studies might suggest.

Combining the three stages in media and mood that we examined, we conclude that adolescents who consume fun media tend to do so in a way that sustains, rather than intensifies their prior positive mood levels during and after media consumption—if they turn to media in the first place. In fact, regarding positive moods, adolescents in their natural environment did not appear to be using media to intensify their experiences, to seek rewards, or to enhance their mood. Similarly, adolescents in more negative moods did not often use media to improve those moods. When they did, girls experienced lower negative moods immediately, whereas boys did not. Boys tended to gravitate toward fun media when feeling particularly negative, however, and so these boys ultimately experienced a reduction in negative mood after consumption. In contrast, girls did not show a tendency toward any particular type of media content when feeling very negative.

Recalling the traditional mood management hypothesis, we would have predicted that both boys and girls would have exhibited a tendency to use fun media when in negative mood states. Thus, one might argue that because boys fit this prediction better than girls did, boys were more effective than girls in using media for mood management. However, without knowing the girls' motives for choosing media (e.g., temporary distraction?), it is hard to say whether the girls were less effective in reducing negative moods or simply had another goal in mind. Clearly, more research is needed to understand why men and women, and boys and girls, might choose different media based on prior mood and how well those choices satisfy their needs.

This study has several limitations. First, we are unable to rule out the possibility that adolescents' mood levels influenced their media perceptions, such that less positive moods led to perceptions that the media were less fun. Fortunately, we see some evidence contrary to this alternate explanation in our face validity assessments, which found correspondence between media perceptions and the actual genres being consumed. This evidence provides hope that the laborious and perhaps impossible task of developing objective measures of attributes for all available content might be unnecessary. Conceptually, the consumers' perception of the emotional qualities of their media might be the most appropriate measure in any case.

Second, though the longitudinal design and analysis strategy provided sufficient power, the sample is small and might not have included enough variance for the anticipated sad media findings to emerge. We had hints of differences as to how often adolescents with and without depression turned to media, but other media use patterns based on diagnosis did not markedly differ. Because the depressed adolescents' media use seemed to sustain previously low positive mood levels during consumption, we might surmise that these findings are evidence of reduced motivation to enhance positive moods. A larger sample would likely yield more of the differences we would expect. Thus, mental health status remains an interesting variable worthy of further study when examining media and mood regulation.

One key strength of our study is that these findings assess current mood and media use in the field, capturing changes in mood over short time spans. Our ability to do this is largely due to the Ecological Momentary Assessment (EMA) technology, which has rarely been employed by media researchers (Kubey & Csikszentmihalyi, 1990, and Larson, 1995, are exceptions). The EMA method proved useful in seeing media use in-the-moment and in a natural setting, which may be increasingly important as we enter a media-portable world under the control of young consumers. It is important to note, however, that because the EMA method relies on self-report, adolescents in this study might have become sensitized over the course of the study to the hypothesized connection between media use and mood. Such sensitivity was likely tempered, however, by the large battery of items (mood, current activities, caffeine use, sleep patterns, etc.) asked at each phone call, regardless of whether the adolescent reported using media. It is also unlikely that participants adjusted their media reports at one call based on their recollection of their mood reports on the preceding call. The use of cross-lagged evaluations of mood and media from one call to the next reduces the likelihood that sensitization would affect the results.

Despite these limitations, this study expands on the mood management literature to address adolescent media use in a longitudinal field setting, adding a level of ecological validity to mood management research. Specifically, this study highlights the applicability of the EMA method in exploring what kinds of media are chosen, or whether media are chosen at all, given an individual's prior, current, and subsequent mood states. We found clues not seen in previous studies as to *when* media choices based on prior mood might begin to influence positive or negative mood states. Therefore, it is important to continue studying media use longitudinally in a naturalistic setting to explore why some media choices might immediately improve mood upon use and why other choices might not.

Finally, this study calls into question the extent to which adolescents use media instrumentally to manage moods, which suggests the need to consider adolescence, and developmental stages in general, when conducting future mood management research. Our findings suggest that adolescents may be at a stage in which media are such a part of their everyday lives that using media to regulate mood is almost an afterthought. At this point, we do not know whether the age effect we think we are seeing is, in fact, a cohort effect that will explain these individuals' media use throughout their lives. It will be interesting to see if this 24–7 media generation maintains a different sense of the media's capacity to affect their moods throughout adulthood.

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TABLE 1

Mean Adolescent Perceptions of Emotional Qualities of Television/ Movie Genres Being Viewed

Television/Movie Genres	Perceptions of Emotional Quality of Media	
	Fun	Sad
Comedy	3.10(1.39) ^{cd}	1.21(.59) ^{bc}
Action/adventure/sports	2.83(1.42) ^b	1.28(.71) ^{bd}
Children/family	3.50(1.33) ^a	1.15(.52) ^b
Drama	2.88(1.37) ^{bd}	2.06(1.14) ^a
Reality/educational/documentary/awards	2.53(1.47) ^{bf}	1.08(.43) ^c
Music	2.43(1.38) ^{bf}	1.09(.37) ^{bc}
News	1.33(1.15) ^e	1.25(1.45) ^{bcd}
Horror	1.93(1.27) ^{ef}	1.57(.76) ^d
Undirected	2.26(1.24) ^f	1.31(.54) ^{bcd}
Total <i>M</i>	2.88(1.43)	1.28(.68)

Note. Values are mean adolescents' attributions of the emotional quality of the television or movie content being consumed, measured on a 5-point scale ranging from (1) *very slightly or not at all* to (5) *extremely* (standard deviations in parentheses). Values are taken from the subsample of adolescents watching television or movies when called ($N = 1,286$). Mean comparisons are made within columns only. Means with different superscripts differ significantly at $p < .05$.

TABLE 2

Summary of Significant Findings from Analyses of Research Questions

Research Questions	With Respect To ...	Regarding Use of ...		
		Any Media	Fun Media	Sad Media
RQ1: Effects of prior moods on subsequent media use	Mood	Feeling less positive led to media use	Feeling more positive led to fun media use	No significant findings
		Feeling less negative led to media use (boys only)	Feeling more negative led to fun media use	
	Diagnosis	MDD's media use marginally > control's media use	No significant findings	No significant findings
	Gender	See above	Boys' media more fun than girls' media	No significant findings
RQ2: Relation between moods and media use in-the-moment	Mood	In less positive moods when using media (boys only)	In more positive moods when using fun media	No significant findings
	In less negative moods when using media	In more negative moods when using fun media (boys only)		
	Diagnosis	No significant findings	No significant findings	No significant findings
	Gender	Boys' media use > girls' media use	Boys' media more fun than girls' media	No significant findings
		Also see above	Also see above	
RQ3: Effects of prior media use on subsequent mood	Mood	Media use led to less positive moods (MDD boys only)	Fun media use led to more positive and marginally less negative moods	Sad media use led to more negative moods
	Diagnosis	See above	No significant findings	No significant findings
	Gender	See above	No significant findings	No significant findings

Note. All analyses included diagnosis (MDD, control), gender and study week as independent variables. RQ1 and RQ2 also included positive and negative mood, whereas RQ3 added media usage (yes, no), extent of fun media quality, and extent of sad media quality in separate analyses. No significant findings emerged with respect to study week.