Running Head: USER DEMAND AND SELECTIVE EXPOSURE

How much do our video games ask of us?

The effect of user attentional demand on selective exposure to video games

[authors redacted]

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Abstract

Previous studies show that user demand (attention required to use a medium) increases intervention potential and resulting mood management capability in video games. We reasoned that user demand influences selective exposure. A 2x3 experiment varied participant mood (boredom, stress) and video game user demand (low, moderate, high). As predicted, participants preferred moderate user demand, and this preference was stronger for stressed participants. Findings suggest that user demand provides video games with unique intervention potential.

Keywords: selective exposure, user demand, intervention potential, video games, learned expectations

How much do our video games ask of us?

The effect of user attentional demand on selective exposure to video games

Zillmann and Bryant's (1985) affective-dependent theory of stimulus arrangement, often referred to more simply as selective exposure theory, holds that mood state is a robust predictor of media choice. Companion logic from mood management theory (Zillmann, 2000) provides scholars examining mood's effect on media selection with a theoretical framework to explain these choice behaviors. Arguing that media selections are motivated by an innate desire for individuals to dissipate noxious mood states, researchers have found evidence to explain the influence of mood on media selection and consumption patterns regarding television and film (Bryant & Zillmann, 1984), music (Knobloch & Zillmann, 2002), and Internet browsing behavior (Mastro, Eastin, & Tamborini, 2003). However – perhaps with the exception of Internet browsing behavior (to the extent that one does or does not consider the Internet to be an interactive medium) – these prior investigations have not examined the influence of interactivity and user demand on selective exposure or mood management processes. The importance of interactivity and user demand cannot be overstated, as they are integral components of an increasingly popular form of entertainment media: the video game. Recent work ([authors redacted], 2010; Chen & Raney, 2009) has begun to examine the importance of interactivity (the term used by Chen & Raney) and user demand (the term used by [authors redacted]) in video games by examining how varying levels of interactivity/user demand might influence the mood repair process; that is, a shift in mood state away from noxious (negative valence) to optimal (positive valence). In both studies, results generally indicate that an increase in interactivity/user demand resulted in greater mood repair, although data from [authors redacted] (2010) suggested a curvilinear pattern in which extreme user demand could have a detrimental effect on mood

repair. Although data from both of these studies provides evidence of mood repair stemming from experimentally-induced interactivity/user demand states, neither study attempted to examine actual selective exposure behavior. Thus, the current study extends this line of research to investigate the effect of experimentally-induced noxious mood states on subsequent selective exposure to video games known to differ in user demand.

Intervention potential, user demand, and video games.

Entertainment scholars assert that the experience of video game play is unique among other media forms, and that features of technology responsible for this uniqueness afford video games great mood management potential. Both Grodal (2000) and Bryant and Davies (2006) suggest that video games differ significantly from 'passive' media such as film and television viewing, in part because of the increased attention and physical engagement required for the ongoing experience of video game play to continue. This viewpoint has been adopted by others (Klimmt & Hartmann, 2006; [authors redacted], 2010; Tamborini et al., 2004; Vorderer, 2000) who argue that the cognitive and tactile engagement required for video game play increases their intervention potential over other forms of media, such as television and film. In short, it can be argued that whereas consumption of film and television require *some* of an individual's attentional resources, video game play requires a user's *more focused* attention in order for the video game to progress. This concept of variance in the level of attentional resources required for media exposure to progress is referred to by Bowman and Tamborini (2010) as *user demand*; in the language of selective exposure and mood management theory, user demand is closely related to the concept of *intervention potential*, or the medium's ability to capture an aroused individual's attentional resources and distract the individual's focus on others thoughts (Bryant & Davies, 2006).

Generally, it is argued that media with higher intervention potential are more likely to distract an individual from the root cause of a noxious mood state, thus hastening the mood repair process.[1] Although most research on mood management theory operationally defines intervention potential based on attributes of message content, we suggest that intervention potential can differ also based on attributes of the media form itself. As such, attributes of media form might be thought to affect both selective exposure and mood repair processes. For example, while previous research shows selective exposure to newspaper (Zillmann, Knobloch, & Yu, 2001 and Internet magazine articles (Knobloch, Hastall, Zillmann, & Callison, 2003) attributable to the different photographs and images accompanying the articles (attributes of message content), both Chen and Raney (2009) and [authors redacted] (2010) found significant differences in mood repair resulting from attributes of video game control mechanisms (attributes of media form). Thus, to the extent that video games have a greater intervention potential than other forms of media as is suggested in recent work on the subject ([authors redacted], 2010; Chen & Raney, 2009), we should expect individuals experiencing noxious mood states to prefer video gaming over other forms of media entertainment, given that the media forms have similar content. [2]

Prior research on video games and mood management/selective exposure

Most published work examining selective exposure to video games as a function of mood states has largely focused on theory rather than empirical evidence, but there are a few notable exceptions. Chen and Raney (2009) examined the post-play mood of individuals who played a boxing video game at three different levels of interactivity – viewing boxing on DVD, playing a Flash-based game with only keyboard controls, or playing a Nintendo *Wii* boxing game with motion-sensor controls. Their findings showed that individuals who played the highly

interactive video game (the Nintendo *Wii* version) experienced significantly greater positive mood than individuals in the other two experimental conditions. Although this study provided some insight into the effect of video game technology on mood repair, subjects in the three interactivity conditions played different games. As such, the interactivity manipulation was confounded with other differences among the three games that might also affect mood repair, including differences in media content not related to differences in interactivity. To address these concerns, [authors redacted] (2010) manipulated the control schemes of the same video game in order to create different levels of user demand without introducing media content confounds. Their study varied three levels of user demand (low, moderate or high) in a flight simulator game controlled through a naturally-mapped flight stick and throttle mechanism. Participants were randomly assigned to play the flight simulator game with all controls set on auto-pilot (akin to television viewing, or the DVD condition in Chen & Raney, 2009), with only the flight stick and throttle activated, or with all controls activated. Results for this study corroborated in part the findings from Chen and Raney (2009) by showing and increase in mood repair from low to moderate user demand conditions; however, a significant curvilinear pattern in their data showed that repair declined at the highest level of user demand (see Figure 1). In tandem, these studies suggest not only that attributes of video games may provide this technology with greater mood repair potential than film or television, but also that these technology attributes can allow users to determine the intervention potential of a given game by choosing to play a game at high or lower levels of user demand. Left unanswered, however, is how these differences in user demand might affect selective exposure patterns.

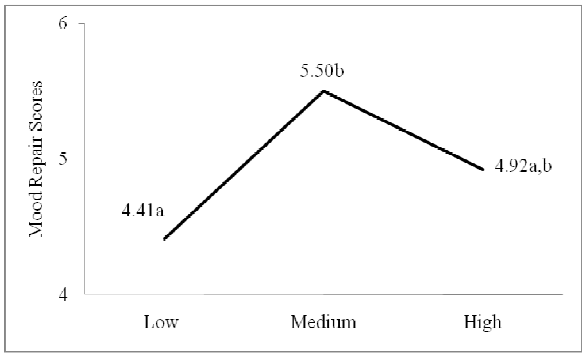

Figure 1. Post-game play affect scores as a function of user demand ([authors redacted], 2010). *Note: Means with different subscripts differ at p < .05 level or greater.*

Current study

The present investigation begins by asserting that the unique demand on a user's attentional resources thought to occur during video game play is in part responsible for the mood management potential of video games, as suggested in prior research ([authors redacted], 2010; Chen & Raney, 2009). Importantly, while the previous research was designed to demonstrate only mood repair process, the current study is engineered to examine not only mood repair, but also selective exposure processes. We do this by providing users with a choice among game conditions that they know to vary in the relative amount of user demand (low, moderate, high) required to play the video game. The user demand conditions we use are identical to those of [authors redacted] (2010).

From theory, and based on data from Chen and Raney (2009), we would expect that, in general, users experiencing noxious mood states will choose game conditions known to have a higher amount of user demand than those not in a noxious mood. Yet as just stated, [authors redacted]'s (2010) data on mood repair suggest curvilinear pattern in which high levels of user demand (compared to moderate levels) have a detrimental effect on repair. Their study found mood repair was highest at moderate levels of user demand, decreased slightly at the highest

level of user demand, and was significantly lower at the lowest amount of user demand.[3] As such, if selection is driven by anticipated mood repair, we cannot assume that a noxious mood will results in an unlimited desire for added user demand. Since our study replicates the user demand conditions used in [authors redacted] (2010), our game-choice hypotheses are modeled after the pattern of mood repair they observed. Thus, given conditions in which players are familiar with the user demand levels available in a video game, we offer our first hypothesis:

> H1: If given the choice to play a video game with varying conditions of user demand, a curvilinear choice pattern will be observed in which individuals in a noxious mood state will prefer a game with low user demand *less* than one with moderate user demand, and will prefer a game with moderate user demand *more* than one with high user demand.

Related to this, we are also concerned with how this pattern of user demand choices might differ as a function of the type of noxious mood state an individual is experiencing; in this case, boredom or stress. Logic from [authors redacted] (2010) proposed that bored individuals might benefit more from user demand than stressed individuals. Bored individuals should benefit not only from the intervention brought on by increased user demand, but may also benefit from game play's ability to heighten arousal. This would differ for stressed individuals. Although stressed individuals too should benefit from the intervention brought by increased user demand, game play's ability to heighten arousal would not be expected to provide the same added mood-repair benefit it might provide to bored individuals, particularly if user demand is at a high level. Notably, these differences in the amount of repair expected for bored and stressed individuals are consistent with significant differences in the patterns of repair observed by [authors redacted] (2010), see Figure 2.

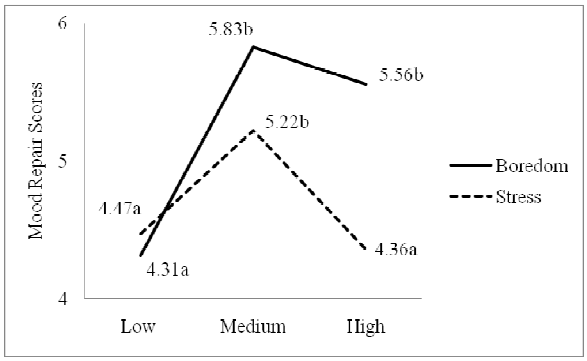

Figure 2. Post-game play affect as a function of user demand & mood ([authors redacted], 2010). *Note: Means with different subscripts within mood manipulation differ at p < .05 level or greater*

For stressed individuals, they found that the moderate user demand game led to greater mood repair than either the low or high user demand game, and that little mood repair from the high user demand game was apparent. By contrast, the mood repair primacy of the moderate user demand condition was not apparent for bored individuals. For these respondents, the moderate user demand game again led to greater mood repair than the low demand game, but the repair benefits for the moderate demand condition did not differ significantly from those in the high demand condition.

Our second hypothesis is based on two previously identified considerations: First, given that the logic for our game-choice hypotheses is based on the understanding that selection is driven by anticipated mood repair, we would expect differences in the game-choice behaviors of bored and stressed individuals to mirror differences between bored and stressed individuals in the amount of mood repair expected from games at different levels of user demand. Second, since our study replicates the user demand conditions used in [authors redacted] (2010), our game-choice hypotheses are modeled after the pattern of mood repair they observed. As such, based on a belief stressed individuals will anticipate greater mood repair in the moderate user demand condition than the low or high demand conditions, and that bored individuals will not

mirror this pattern, we predict that stressed individuals will show a greater bias toward moderate user demand as compared to bored individuals.

> H2: Selective exposure patterns will differ significantly between stressed and bored individuals such that stressed participants will show a greater preference for moderate levels of user demand over both low and high user demand, whereas bored participants will not show the same preference for moderate levels of user demand over both low and high user demand.

METHOD

Participants

Participants were recruited from a large, Midwestern university and offered course credit and the chance for a $100 cash prize for participating in the study. Using an effect size measure of $f = .31$ calculated from prior research on video games and mood management (Chen & Raney, 2009), we set an expected effect size of $\omega = .40$ (considered a medium-to-large effect in a chi-square analysis; Cohen, 1988) for this study. Power analyses using $\omega = .40$ was performed for a chi-square contingency table with three possible choices, $\alpha < .05$, two-tailed, and a statistical power of $\beta = .80$; this analysis provided us with a optimal $N = 61$; after all data was collected, a final sample size of $N = 64$ was achieved for this study. This sample contained 39 males and 25 females with an average age of 22 years, five months, and 73 percent of participants self-reported majoring in communication or a related field. As with prior research ([authors redacted], 2010; Chen & Raney, 2009), data collection was restricted here to a convenience sample of college students.

Design and Procedure

Upon entering the lab, participants first reviewed and signed the informed consent form. Once consent was obtained, participants were asked to complete a questionnaire measuring perceived video game skills and demographic characteristics. After completing the questionnaire, participants were given five minutes to learn the controls of the flight simulator game before playing each version of the video game (each of the three user demand conditions) for five minutes. The games were played in the following order of user demand: high, low, and moderate; after reach game play session, participants were asked to complete a perceived user demand measure. Playing all three games prior to the mood manipulation was important, as selective exposure processes are driven by learned expectations regarding the medium's capacity to repair mood that stem from an individual's prior experience with that medium (Atkin, 1985). After playing all three versions of the game, participants were subjected to either the boredom or stress manipulation, and then asked to choose one of the three user demand conditions to play for five minutes. User demand choice was recorded by the primary researcher, and participants played the game. Once game play was completed, participants were fully debriefed as to the purpose of the study and entered into the cash drawing; this was the conclusion of the study. The entire procedure lasted about one hour.

Stimuli/Materials

Mood inductions. Consistent with prior research (Bryant & Zillmann, 1984; Mastro et al., 2002, [authors redacted], 2010), participants were induced into either boredom or stressful affective states. Each induction required participants to perform a particular task for 20 minutes. For the boredom induction, participants were given a large box of metal washers, and asked to thread the washers onto a length of string. For the stress induction, participants were asked to

complete a booklet of difficult logic puzzles designed to exceed the talents of the participants. Furthermore, participants in the boredom induction were left to their own volition, whereas participants in the stress induction were under constant pressure from an experimenter to perform better.

Video game. The video game played in this study was *Lock-On: Modern Air Combat*, released by Ubisoft in November 2003 and promoted as "an ultra-realistic [combat flight] simulator with faithfully rendered physics, weather, and avionics" (Gametap, 2009). The game is played using the Saitek X36F flight stick and X35T throttle in tandem with a standard PC keyboard and mouse, based on how the game's controls are configured. *Lock-On* was particularly well-suited for this study for two reasons: the game has fully programmable flight controls (which allow the experimenter to turn on or off any number of game controls) and variable auto-pilot capability (which allow the experimenter and the user to give varying amounts of game control to the video game itself).

User demand induction. All participants began playing the flight simulator game with the aircraft configured for a final approach toward the landing strip. For the low user demand condition, participants played the game with full auto-pilot engaged and all user controls turned off; that is, the game did not require any input from the user in order to progress from flight to landing. For the moderate user demand condition, participants were able to manipulate the speed and direction of the plane using the joystick, throttle, and rudder, while the simulator automatically controlled all other flight controls, including landing gears (used to safely land the plane on a landing strip), landing flaps (used to help increase drag to bring the plane to a safe landing speed), airbrakes (used to help bring the plane to a safe ground speed by increasing drag), wheel brakes (used to help slow the speed of the plane once on the landing strip), and

drogue chute (a small parachute used to aid in slowing the plane on the ground). For the high user demand condition, participants were able to manipulate all flight controls and avionics with no assistance from the computer. Table 1 summarizes the controls made available to participants in each user demand condition; notably, these are the same user demand conditions used in [authors redacted] (2010).

Table 1. Controls available to the user in each user demand condition, at the start of game play.

Low user demand	Medium user demand	High user demand
Flight controls • [none]	Flight controls • Joystick • Throttle • Rudders	Flight controls • Joystick • Throttle • Rudders
Avionics • [none]	Avionics • [none]	Avionics • Airbrake • Landing flaps • Landing gear • Drogue chute • Wheel brakes

Measures

Mission feedback. Along with the behavioral measure of user demand, the NASA-Task Load Index (NASA-TLX) was used as a self-report measure of subjective workload assessment. This six-item, 20-point semantic differential scale is useful in measuring workload in human-machine interactions (NASA-TLX, n.d.), and has been used in prior research on flight simulations (c.f. Moroney, Reising, Biers, & Eggemeier, 1993; Rueb, Vidulich, & Hassoun, 1992; Schweingruber, 1999). Sample items from the scale were: “How much mental and perceptual activity was required?” and “How much physical activity was required?” One item from the scale designed to measure perceived performance negatively affected scale reliability and was dropped from subsequent analysis. Average reliability of this scale was $\alpha = .72$.

Mood repair. Mood repair was measured using a pre-test and post-test administration of an adapted version of the Affect Grid (Russell, Weiss, & Mendelsohn, 1989; adapted in [authors redacted], 2010), see Figure 3. The scale asks participants to visually map their current mood state in the semantic space between positive and negative affect (the x-axis) and high or low arousal (the y-axis) using a 9 x 9 grid, with the square the center of the grid representing a "neutral, average, everyday feeling" (Russell et al., 1989, pp. 501). The scale has been validated in prior research as a measure of mood and affect (Russell et al., 1989; Killgore, 1998; Swindells, MacLean, Booth, & Meitner, 2007), and the pre-test/post-test implementation of the scale has been established as a valid measure of mood change (Eich & McCaulay, 2000).

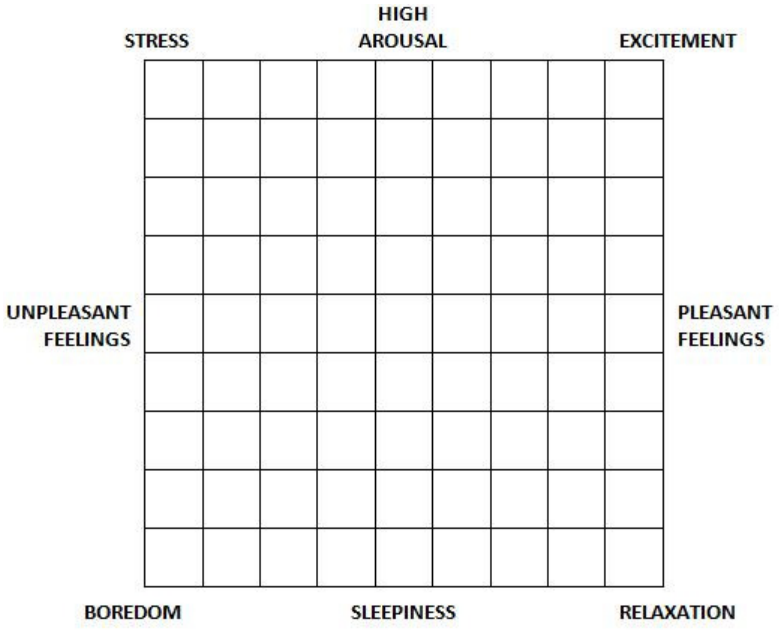

Figure 3. Russell et al. (1989) Affect Grid metric, adapted for use in the current study.

Selective exposure. To measure participant's preference for a particular user demand setting, the primary investigator recorded which version of the video game (low, moderate, or high user demand) participants chose to play.

Perceived game skill. To control for the potential effects of video game skill, participant's perceived video game skill was assessed using the 10-item, seven-point Likert-scaled Game Playing Skill scale (GaPS; Bracken & Skalski, 2006). Sample items from this scale were: "I am a good video game player" and "I often win when playing video games against other people." Notably, perceived game skill did not differ significantly between bored (M = 4.22, SD = 1.38) and stressed (M = 4.46, SD = 1.62) participants, $t(62) = -.639$, *ns*, and no significant correlation existed between game skill and video game user demand condition (r = -.041, ns); thus, controlling for the potential effects of perceived game skill on video game choice was not required in this study.

RESULTS

Induction check

Mood. The mood manipulations used in this study were found to significantly affect both arousal and affect levels of participants in the predicted direction. Notably, there was no significant difference in either pre-manipulation arousal, $t(62) = .395$, *ns*, or pre-manipulation affect, $t(62) = .625$, *ns*, between mood conditions. For the boredom manipulation, we found that post-manipulation affect was significantly lower than the pre-manipulation affect, $t(30) = 6.92$, $p < .001$, and post-manipulation arousal significantly lower than pre-manipulation arousal, $t(30) = 5.42$, $p < .001$. For the stress manipulation, we found that post-manipulation affect was significantly lower than the pre-manipulation affect, $t(32) = 10.1$, $p < .001$, although post-manipulation arousal did not differ significantly from the pre-manipulation arousal above, $t(32) = -1.80$, $p = .081$. However, post-manipulation affect in the stress condition was significantly lower than post-manipulation affect in the boredom condition, $t(62) = 3.19$, $p = .003$, indicating

that the stress mood manipulation induced a more noxious mood state than the boredom mood manipulation. Figure 4 contains a graphical depiction of the mood manipulation induction.

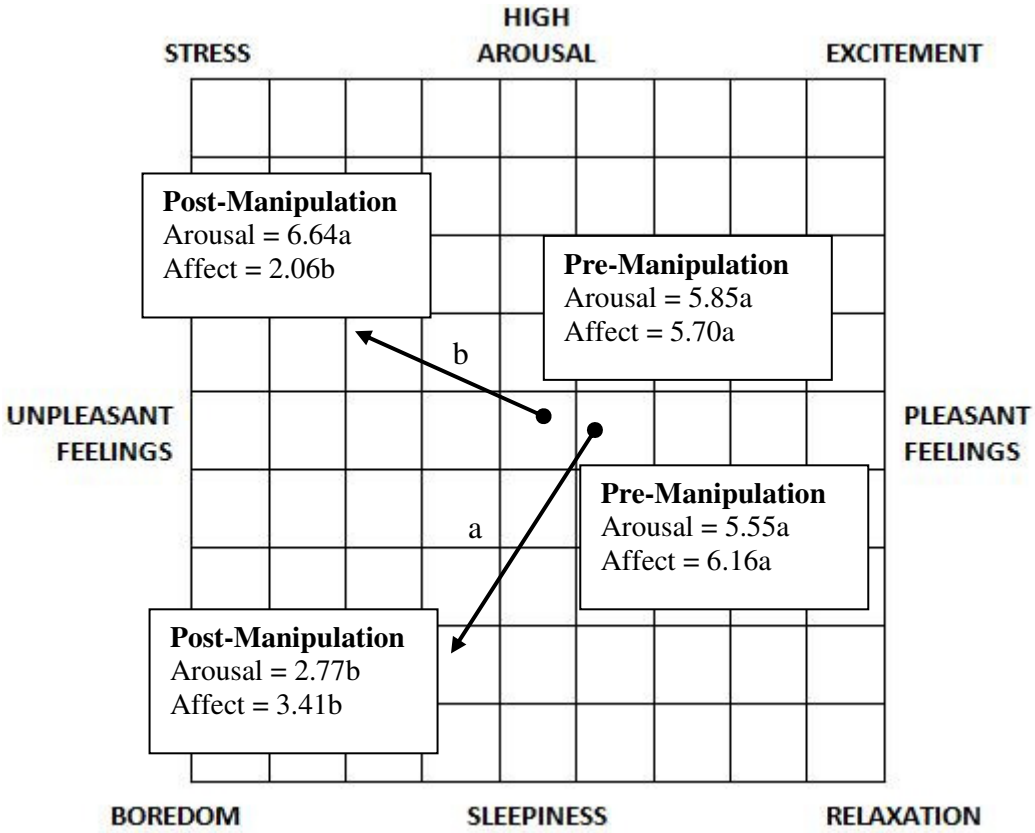

Figure 4. Induction check: Arousal and affect means for mood groups, pre and post induction. *Notes: a = boredom, b = stress, means with different subscripts across pre- and post-manipulation conditions differ significantly at p = .05 or greater.*

User demand. Although not an induction per se, participant's self-reported user demand was measured after each of the three practice sessions with the video game as indicated by their scores on the NASA-TLX. Note that the behavioral distractor task measured was not used during the practice sessions due to concerns that participants might simply learn to do the task better with multiple iterations. A repeated-measures ANOVA reports that indeed a significant difference in perceived user demand was found between the three video game conditions in the predicted direction, $F(2,126) = 265.1$, $p < .001$, $\eta^2 = .808$. Perceptions of user demand were lowest in the low user demand condition (M = 3.72, SD = .389), moderate in the moderate user

demand condition (M = 11.5, SD = .389), and highest in the high user demand condition (M = 12.6, SD = .350). Thus, we can conclude the participants did perceive the expected significant difference in user demand between user demand conditions.

Hypothesis testing/research question analysis

Selective exposure. Our first hypothesis predicted that, given the choice to play video games known to vary in user demand, a curvilinear choice pattern would be observed among individuals in noxious mood states such that individuals would prefer low amounts of user demand the least, moderate amounts of user demand the most, and high amounts of user demand less so than moderate but more so that low amounts. To examine this, we first we conducted a chi-square goodness of fit test to see if our observed pattern of game choice behaviors differed from chance. Then, we examined visually the observed pattern of game choices and compared this to the pattern of post-game play affect scores from [authors redacted] (2010). The chi-square goodness of fit showed that indeed our observed pattern of game choice behaviors differed significantly from chance, $\chi 2$ (2, n = 64) = 15.6, $p < .001$, see Table 1. Visual inspection reveals that the selection of game play with varying levels of user demand appears to follow the predicted curvilinear pattern. Participants chose the low user demand condition the least (7 observed choices), the moderate user demand condition the most (32 observed choices), and the high user demand in the middle (25 observed choices). As our chi-square analysis provides us evidence that the observed game choice behaviors differed significantly from chance, and simple observation of the pattern of game choices follows the expected curvilinear relationship reported in [authors redacted] (2010) we conclude that the findings are consistent with for H1. Figure 5 shows the post-game affect scores from [authors redacted] (2010) superimposed on the observed user demand selections from the current study.

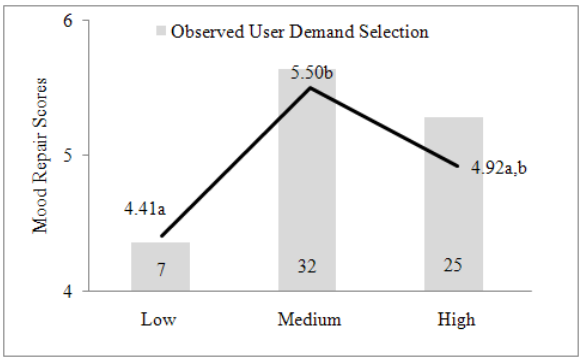

Figure 5. Observed post-game play affect scores from [authors redacted], 2010, superimposed on observed user demand selections from current study.

Our second hypothesis predicted a significant difference in selective exposure patterns between stressed and bored individuals; specifically, that stressed individuals would prefer moderate user demand over high user demand more so than bored individuals. To examine this, a chi-square goodness-of-fit test was conducted to comparing the observed pattern of selected user demand exhibited by bored participants with the observed selection pattern exhibited by stressed participants. This test required us to split the data file into separate groups of n = 31 (bored participants) and n = 33 (stressed participants), see Table 1. As we had at least one cell with a frequency of less than five, Yate's correction was applied to our final chi-square critical value (Yates, 1934).

Table 1. Observed frequency of user demand choices by mood manipulation

	Low	Moderate	High	Total *n*
Boredom	6	13	12	31
Stress	1	19	13	33

$\chi^2_{Yates}(1, n = 31) = 18.8, p < .001.$

The result of our test comparing user demand choices for bored and stressed participants revealed that the pattern of choices in each condition varied significantly, $\chi^2_{Yates}(1, n = 31) = 18.8, p < .001$. Although all participants showed aversion to the low user demand condition, stressed participants showed greater preference for moderate user demand than did bored

participants, and both stressed and bored participants showed equal preference for high user demand. Thus, we conclude that the findings are consistent with H2. Figure 6 shows a comparison between the observed user demand selection frequencies for bored participants in the current study and post-game play affect scores for bored participants in [authors redacted] (2010). Figure 7 shows the same comparison for stressed participants.

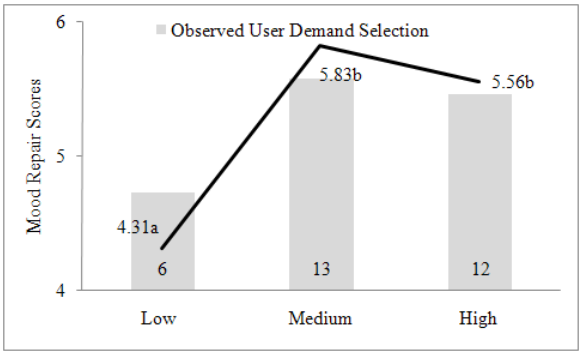

Figure 6. Observed post-game play affect scores for bored participants (authors redacted], 2010) superimposed on observed user demand selections for bored participants from current study.

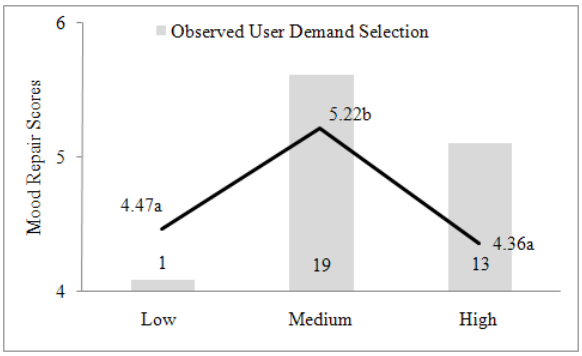

Figure 7. Observed post-game play affect scores for stressed participants ([authors redacted], 2010) superimposed on observed user demand selections for stressed participants from current study.

Discussion

The current study was designed to extend selective exposure and mood management theory by demonstrating how conceptualizing intervention in terms of user demand – that is, the demand placed on an individual's attentional resources during media consumption – might aid in

extending the scope of the theories to newer, interactive media forms. Previous studies using this conceptualization ([authors redacted], 2010; Chen & Raney, 2009) have shown that the *more focused* attention required to play a video game distinguishes the intervention potential of this technology from other entertainment media, and that the increased user demand associated video game play significantly can increase mood repair when compared to non-interactive media such as television (e.g., [authors redacted], 2010; Chen & Raney, 2009). However, whereas these previous studies showed that variance in user demand is related to variance in mood repair, neither study examined how differences in user demand affected actual selective exposure behaviors. The present study addresses this gap in research that examines the distinct selective exposure qualities of video game play. The ability to meet this need was greatly aided by the fact that our study used three versions of a video game for which precise differences in mood repair capacity had already been established ([authors redacted], 2010). We began by familiarizing participants with each of the three different game versions so that they could develop learned expectations about each version's different mood repair capacity. Then, combining mood management and selective exposure logic with our knowledge of each version's mood repair capacity from prior research, we developed precise hypotheses predicting game choice patterns for people in different noxious states. As predicted, participants in our study demonstrated a clear preference for moderate levels of user demand, and this preference was greater for stressed as compared to bored participants. These findings are discussed in further detail below, along with limitations and recommendations for future research aimed at broadening our understanding of the role of user demand (and, by extension, intervention potential) in selective exposure and mood management processes. Notably, we consider the fact that our findings were consistent with our uncommonly-precise hypotheses to be strong evidence of both the selective exposure

logic upon which they were based and the claim that the user demand in a video game distinguishes its intervention potential from other forms of entertainment media.

User demand and selective exposure

Our hypotheses were concerned with the influence of user demand on individual's selective exposure patterns. We predicted based on prior research ([authors redacted], 2010; Chen & Raney, 2009) that participants experiencing noxious mood states would prefer moderate levels of user demand as compared to extremely high or low levels, and that stressed participants would show a more distinct preference for moderate user demand levels than would bored participants. Indeed, both of these predictions were supported. After being given a set amount of time to develop learned expectations about a video game at three discrete levels of user demand, we found support for both of our predictions. Both stressed and bored participants showed the greatest preference for moderate user demand levels as compared to low or high levels of user demand, and stressed individuals showed a greater bias for moderate user demand than did bored individuals. This data is compelling for two reasons. First, it lends further empirical support to our assertions regarding selective exposure processes in newer forms of interactive media. In this case, the data give us a closer look at how we can understand the intervention potential in terms of the demand a medium places on its user, and how this user demand can be used as a predictor of video game choice related to two orthogonal and commonly-experienced mood states. Second, this research provides empirical evidence for selective exposure assumptions regarding learned expectations that have gone largely untested.

Selective exposure theory as applied to entertainment media is based partly on two propositions. The first of is that previous encounters with media leads to learned expectations related to a medium's ability to satisfy certain needs, and the second is that these learned

expectations drive media choice. Yet, we know of no research that has experimentally varied learned expectations to examine their influence on this part of the theoretical process. This may be largely due to the fact that most prior selective exposure research has examined forms of traditional entertainment media so ubiquitous that learned expectations are difficult to vary, or assumed to be universal. For example, when conducting selective exposure research on television and film, it makes sense to assume that individuals have well learned expectations about standard offerings well before they enter an experimental setting, making it difficult to manipulate and test learned expectations' influence. By demonstrating clearly the role of learned expectations in the selective exposure to video games, this investigation adds to our understanding of selective exposure processes.

Limitations and Future Research Directions

As with any research, there are elements of the current study that should be scrutinized, as they are potential threats to the internal and external validity of our conclusions. The limitations discussed here are related to the short amount of time participants spent playing video games, our focus on intervention potential over other theoretically-relevant variables (and, related to this, our use of only one video game and two mood states), our non-measurement of mood repair, our lack of a 'no-experience' control group, and our small, college-aged sample frame; each of these is discussed in detail (and in order) below.

For this study, participants were given five minutes to play each version of the video game (in the order of high, low, moderate) in order to establish a familiarly and, by extension, a learned expectation about the game's mood repair potential. Although this seemed to be enough time for participants to get a feel for the differential user demand in each of the three conditions (in fact, our manipulation check confirms this), we wonder whether or not there might be an

important relationship between game play time and user demand. For example, is it possible that as people spend more time with a video game and become increasingly familiar with the game's controls, the game becomes less demanding their attentional resources. In this case, user demand would be highest upon first exposure with a video game, and reduced with each subsequent exposure (or, demand may be reduced simply as a function of time spent playing during any one exposure). At the same time, our study does provide evidence that learned expectations may be formed rather quickly – in this case, after five minutes of game play – and that this (quick) learned expectation formation is enough to cause significant differences in selective exposure patterns. Future research should consider this relationship with more experimental rigor.

When conducting research on selective exposure and mood management, both Bryant and Davies (2006) and Zillmann and Bryant (1985) specify three other theoretically-relevant dimensions that one must consider along with intervention potential: arousal regulation (the ability for a medium to increase or decrease an individual's felt arousal), behavioral affinity (the similarity between message content and one's current affective state) and hedonic valence (the general pleasurable or unpleasurable tone of a message). Although our study statistically controlled for self-reported arousal and experimentally controlled for behavioral affinity and hedonic valence by keeping content constant across user demand conditions, future research should examine how these other elements might function differently with interactive media. Tangentially related to this point, our study focused on only type of game (a flight simulator game) and only two types of moods (boredom and stress); thus, future studies should expand to consider other types of video games and other types of mood states commonly associated with exposure to entertainment media.

Although our data provide evidence to suggest that varying levels of user demand can make the same media form more or less attractive to individuals wishing to dissipate noxious mood states, we did not examine subsequent mood repair resulting from these user demand decisions. The research on which video game use and mood management on which the current study is based ([authors redacted], 2010; Chen & Raney, 2009) focused on mood repair resulting experimentally-controlled user demand conditions, whereas the current study examined 'naturally-occurring' (to the extent that laboratory-based media selections can be considered 'naturally-occurring') selective exposure patterns to varying user demand conditions. Clearly (to us), the natural progression for this line of research would be to combine elements of each of these studies in order to examine observed mood repair stemming from 'naturally-occurring' selective exposure patterns.

It is important for us to note that our experimental design is unique form other selective exposure and mood management research in that participants are given an opportunity to practice and experience each of the three experimental video game conditions prior to post-mood manipulation selection. This was done to vary and test the influence of different learned expectations in the selective exposure process (Atkin, 1985). While our manipulations of these learned expectations were successful, our design did not include a no-practice control group. As such, we cannot compare the different levels of learned expectation against a no-expectation control. Future research might consider a Solomon four-group or other related design in replications of this study.

Finally, the current study relied on a small sampling of college-aged students. Although our *a priori* power analysis justified the use of a small sample in our study and our sampling frame represents a significant portion of video game players (Jones, 2003), other populations

may differ in their experience with video games, which in turn might affect their selective exposure behaviors.

Conclusion

This study extends a line of research examining the role user demand in video games on mood management and selective exposure processes. Results indicate that once learned expectations have been established regarding the relative benefit of different user demand conditions on mood repair, a moderate amount of user demand is most preferred by individuals experiencing noxious mood states, and that moderate user demand was preferred by stressed more so than bored individuals. While these data add to a growing body of research attempting to expand the theoretical scope of selective exposure and mood management theory to include interactive entertainment media, the study also highlights several areas in which future study is necessary. As the video game and interactive media industry continues to grow, so must our understanding the reciprocal processes that govern how mood states can affect game play choices, and how game play choices can in turn affect mood states.

Endnotes

[1] While a complete review of selective exposure and mood management theory is beyond the scope of the current study, we refer the reader to Zillmann & Bryant (1985) for a discussion of the basic tenets of the theories Bryant & Davies (2006) for a theoretical discussion of the theory's application to video gaming, and [authors redacted] (2010) for a discussion of how different aspects of the theory are expected to differ between media forms, such as film and video games.

[2] The issue of potential content differences is not a small one. While intervention potential is the most salient element of mood management and selective exposure processes with respect to user demand, other factors such as arousal regulation (the ability for a medium to increase or decrease an individual's felt arousal), behavioral affinity (the similarity between message content and one's current affective state) and hedonic valence (the general pleasurable or unpleasurable tone of a message) are also important factors when considering a medium's relative attraction to an individual experiencing a noxious mood state (Bryant & Davies, 2006; Zillmann & Bryant, 1985).

[3] This data is explored in greater detail in [authors redacted], 2010.

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