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COMMUNICATION

Journal of Communication ISSN 0021-9916

ORIGINAL ARTICLE

Characterizing Mood Management as Need Satisfaction: The Effects of Intrinsic Needs on Selective Exposure and Mood Repair

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This study attempted to (a) extend traditional mood management theory research by investigating the influence of the intrinsic needs for competence and autonomy on selective exposure to video games and (b) test the influence of satisfying these needs on resultant mood repair. An experiment varied satisfaction of competence and autonomy needs using false feedback. Subjects then selected media that varied in level of user demand. Measures of need satisfaction were taken before and after media selection. Results demonstrated that (a) thwarted intrinsic needs significantly predict the choice of video games with different levels of user demand and (b) the satisfaction of these needs predicts enjoyment. Findings indicate that mood management can result from mood repair through need satisfaction.

doi:10.1111/j.1460-2466.2012.01649.x

According to mood management theory (MMT), media use is often impulsive and driven by a desire to both terminate aversive states and maintain pleasurable states. Most MMT research explains media selection as driven by intervention processes that can terminate a negative mood state by distracting users from the negative affect or its source (Zillmann, 1988; Zillmann & Bryant, 1985). We propose that exposure to entertaining media is also driven by processes of mood repair that *directly address*, rather than simply *distract from*, the source of negative affect. On the basis of the belief that negative mood often results from the failure to satisfy needs, we reason that satisfying needs originally responsible for negative affect should repair negative mood. Though choice driven by repair may occur in different forms of media, this study examines it specifically in video games.

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Defining media appeal as the satisfaction of intrinsic needs

Tamborini, Bowman, Eden, Grizzard, and Organ (2010) and Tamborini et al. (2011) proposed and tested a model of media appeal as the satisfaction of intrinsic needs situated within self-determination theory (SDT; Deci, 1975; Deci & Ryan, 2000; Ryan & Deci, 2001). SDT is a theory of human motivation, which posits that psychological well-being is related to the satisfaction of three basic intrinsic needs: autonomy (feelings of volition or choice when engaging in a behavior), competence (a need for challenge and feelings of effectance), and relatedness (a need to feel close or connected to others). The theory has been applied to a variety of different contexts and has been used to address a number of outcome variables such as intrinsic motivation, self-regulation, and psychological well-being (Ryan & Deci, 2000).

A series of recent studies (Ryan, Rigby, & Przybylski, 2006; Tamborini et al., 2010, 2011) demonstrated a strong association between video game enjoyment and the satisfaction of intrinsic needs. These studies demonstrate that entertaining media fulfill intrinsic human needs other than the regulation of arousal and affect traditionally addressed by MMT. Of particular interest to this study are the satisfaction of competence and autonomy—two intrinsic needs from SDT found by Ryan et al. to be satisfied by video game play. Yet, the role of these needs in mood management and selective exposure processes has not yet been investigated.

Selective exposure processes and media appeal

MMT (Zillmann, 1988) assumes that individuals strive for (a) the minimization of exposure to negative stimuli and negative moods and (b) the maximization of exposure to pleasurable stimuli and positive moods. The theory proposes that individuals arrange stimuli in their environment in a way that maximizes their chances of reaching these goals, and the selection of entertaining media is one form of such stimulus arrangement. The theory puts emphasis on four characteristics of individuals and of media stimuli that are crucial for mood management via media exposure (Bryant & Davies, 2006): *excitatory homeostasis*, the tendency of individuals to select media stimuli to achieve optimal levels of arousal; *intervention potential*, the ability of a message to engage or absorb an aroused individual's attention; *hedonic valence*, the positive or negative nature of media stimuli; and *message-behavioral affinity*, typically thought of as the similarity of media content to behaviors responsible for real-life affect.

We propose that the four mechanisms of mood management might be thought of as representing two processes: (a) those that simply distract an individual from negative mood versus (b) those that address its cause through repair. Conceptually, hedonic valence, intervention potential, and message-behavioral affinity can be understood in terms of distraction processes. That is, negative mood may be reduced by simply distracting an individual from the mood itself without addressing its cause. Alternatively, excitatory homeostasis can be understood in terms of repair processes. That is, negative mood caused by low levels of arousal can be addressed by exposing oneself to highly arousing media. Vice versa, for negative moods caused by high levels of arousal, exposure to less arousing media may result in the repair of the negative mood.

The above distinction is integral to our arguments. On the basis of the results by Tamborini et al. (2010, 2011), we suggest that the traditional MMT perspective is restricted in two important ways. First, it addresses only the hedonic regulation of needs for arousal and affect via selective exposure to entertaining media. Research by Tamborini et al. (2010, 2011) demonstrates that the appeal of entertaining media goes beyond the regulation of arousal and affect, and that appeal is strongly associated with the intrinsic need for competence and autonomy. To date, MMT has not addressed the role of these intrinsic needs for mood repair and selective exposure to entertaining media. Second, with the exception of excitatory homeostasis, MMT's other mechanisms focus on the *distraction* from negative mood. In contrast, the potential of entertaining media to *repair* mood by directly addressing the source of negative affect has received considerably less attention.

Current research suggests that the use of entertaining media has a strong potential to repair thwarted intrinsic needs. Thwarted intrinsic needs are a significant cause of negative affect, whereas the satisfaction of the intrinsic needs is associated with positive affect (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Studies by Ryan et al. (2006) and by Tamborini et al. (2010, 2011) provide evidence that the use of video games leads to the satisfaction of the need for competence and autonomy and thus has the potential to repair negative mood caused by thwarted needs. Thus, we believe that the inclusion of a needs-based perspective can be a valuable extension of MMT, and may help us understand how media choice can go beyond mood management by simple distraction to result in mood repair. In this way, our article focuses on mood management through both traditional distraction mechanisms and repair mechanisms that satisfy thwarted competence and autonomy needs.

Our extension of MMT is not without precedent. In their discussion of challenges to MMT presented when studying video games, Bryant and Davies (2006) discuss the fact that video games offer unique characteristics relevant to repair processes. Specifically, Bryant and Davies emphasized the opportunity to experience mastery and control. They observed that video game technology offers an opportunity to repair damaged self-esteem through the mastery of challenges presented within the game, and the rewards associated with this mastery are central to a video game's appeal. Apart from this, Bryant and Davies further suggest that elements of control found in video games offer an opportunity to repair negative affect caused by a lack of autonomy. As suggested by Bryant and Davies and research by Tamborini et al. (2010, 2011), these characteristics demonstrate the potential of interactive entertaining media to repair thwarted needs.

This study

We begin by observing that mastery and control as discussed by Bryant and Davies (2006) are conceptually similar to the SDT needs of competence and autonomy, respectively. On the basis of this, we test a model examining the effects of SDT-based needs on media selection (Figure 1). The logic underlying the model suggests that the ability of video game technology to satisfy SDT-based needs can influence the

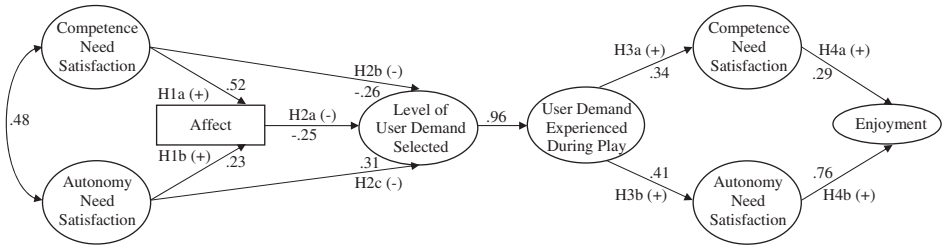

Figure 1 Observed structural equation model with hypotheses labeled. Scores in the figure represent standardized path coefficients. All path coefficients are significant at $p < .05$.

selection of game play conditions, the resultant satisfaction of these needs, and subsequent mood repair represented as enjoyment.

In the first step, we investigate the influence of affect and SDT-based needs on selective exposure to video games as represented in Figure 1. On the basis of the results demonstrating that the satisfaction of intrinsic needs is associated with positive affect (Reis et al., 2000), we expect a positive relationship between affect (defined within this study as an emotional state ranging between the poles of pleasure and displeasure) and the satisfaction of competence (H1a) and autonomy needs (H1b). Traditional MMT logic would argue that negative affect should predict selection of media stimuli with the type of high intervention potential produced by the absorbing nature of a game with high user demand and positive affect should predict selection of content with low intervention potential (H2a).

In addition to the *indirect* effect of need satisfaction on selective exposure through simple affective state, our model extends the traditional MMT logic by proposing that, in addition to and independent of the distracting function of entertaining media, the satisfaction of thwarted intrinsic needs has a *direct* influence on selective exposure to entertaining media. From a need satisfaction perspective, media users are likely to select media with attributes that have the ability to directly address and repair thwarted needs that cause negative affect. This logic can be combined with Bryant and Davies' (2006) discussion of video game technology's unique features and Tamborini et al.'s discussion of the association between video game attributes and the SDT needs of competence and autonomy (Tamborini et al., 2010, 2011) to make predictions about selective exposure and resultant mood repair. Tamborini et al. (2011) demonstrated a positive relationship between the level of interactivity (defined as the level of user demand in a game control scheme and the ability to influence the game environment) and the satisfaction of competence and autonomy needs. Additionally, and even more relevant to this study, Tamborini et al. (2010, 2011) found that beyond the influence of interactivity, there are strong positive relationships between the satisfaction of competence and autonomy needs and enjoyment. By combining these ideas, we reason that the thwarted satisfaction of competence and autonomy needs can be repaired by the selection of specific media and the resultant opportunities they afford to satisfy competence and autonomy

needs. For example, when considering competence in video games, the challenge presented by a game might affect feelings of mastery. Video games low in user demand (i.e., those with interactive game controls that are less complex and thus easier to use) provide less opportunity to experience mastery and to demonstrate competence. Therefore, the mastery of a less demanding computer game is unlikely to evoke feelings of competence and lead to repair. In contrast, successful mastery of a video game with higher user demand is more likely to be perceived as a meaningful accomplishment, and thus more likely to repair feelings of incompetence. From this, we expect a negative relationship between the satisfaction of competence needs and selective exposure to stimuli with higher user demand (H2b). Similarly, video games high in user demand (i.e., those with interactive game controls that are more complex and afford greater influence on the game environment) provide users with greater opportunities to experience feelings of volition. Similar to expectations regarding competence, we expect a negative relationship between the satisfaction of autonomy needs and selective exposure to stimuli with higher user demand (H2c).

Data from Tamborini et al. (2011) demonstrated that enjoyment of both interactive and noninteractive media stimuli is positively associated with the satisfaction of intrinsic needs. Furthermore, higher levels of interactivity, defined as user demand, were associated with greater satisfaction of competence and autonomy needs. Replicating the results reported by Tamborini et al. (2011), we expect that higher levels of user demand will be positively associated with the satisfaction of the need for competence (H3a) and autonomy (H3b).

Finally, as Tamborini et al. (2010, 2011) showed a strong association of enjoyment with the satisfaction of competence and autonomy needs in media conditions with both high and low user demand, we expected to find the same relationship between need satisfaction and media appeal in our model (H4).[1]

Method

We assessed selective exposure to entertaining media stimuli with different levels of user demand after a false-feedback manipulation. Participants were familiarized with three versions of a computer game that systematically differed in user demand (high, medium, and low). Next, they were randomly assigned to one of two false-feedback conditions (positive vs. negative feedback). Finally, participants were instructed to play the computer game again, choosing one of the three user demand conditions they had already played.

Participants

One hundred and twelve participants were recruited from a large university in the Midwestern United States and offered course credit for participation. One participant was removed due to missing data, leaving 111 participants (28 males) in the analyses ($M_{\text{age}} = 19.96$ years, $SD = 1.35$). Participants were randomly assigned to one of two false-feedback conditions ($n_{\text{positive}} = 57$, $n_{\text{negative}} = 54$).

Stimuli/materials

Video game

The video game played was Lock-On: Modern Air Combat, a flight simulator released by Ubisoft. The game was played using a flight stick and throttle in tandem with a standard keyboard and mouse. Lock-On was chosen because its fully programmable controls allowed us to vary conditions of low, medium, and high user demand. In each condition, participants were asked to land a military fighter jet on a landing strip. For the high-user-demand condition, participants used all flight controls. For medium demand, participants used only those controls used to adjust the speed and direction of the plane (the joystick, throttle, and rudder), while the computer automatically controlled all other avionics (landing gears, landing flaps, airbrakes, wheel brakes, and drogue chute). For low demand, participants played the game with full auto-pilot engaged and all user controls turned off. In this condition, the game required no input from the user.[2] In all conditions, game play was limited to 5 minutes.

False-feedback manipulation

A performance false-feedback manipulation (positive vs. negative feedback) was used to manipulate the satisfaction of competence and autonomy needs. To assure comparability with the results of prior MMT research, a well-established false-feedback manipulation frequently used in MMT research (cf., Biswas, Riffe, & Zillmann, 1994; Knobloch & Zillmann, 2002; Zillmann, Hezel, & Medoff, 1980) was used.[3] The false-feedback manipulation was described as an emotion recognition test. Twenty photographs of men and women with highly ambiguous facial expressions were presented on a computer screen, each for 2 seconds. After viewing a portrait, participants evaluated the expressed emotion in the respective face by choosing from six basic emotions (anger, disgust, fear, happiness, sadness, and surprise). Afterward, the feedback "right" or "wrong" was displayed on the screen for 2 seconds, followed by the next picture. A large bar graph that was updated after each evaluation continuously displayed a bogus percentage of correct answers, fluctuating from 0 to 100%. Performance up to 25% was labeled "terrible," up to 50% "poor," up to 75% "good," and up to 100% "excellent." In the positive feedback condition, participants received positive performance evaluations on 17 of the 20 portraits (85% correct answers, "excellent performance"), whereas participants in the negative feedback condition received positive performance evaluations on only 3 of the 20 portraits (15% correct answers, "terrible performance").

Research on the effects of verbal feedback on the SDT-based needs demonstrates that positive performance feedback significantly increases perceived competence, whereas negative performance feedback significantly decreases perceived competence (Vallerand & Reid, 1984). We therefore expected to find lower levels of competence need satisfaction after negative performance feedback. We further assume that negative feedback will turn the false-feedback task into an aversive situation and undermine feelings of autonomy during task performance (Deci, Koestner, & Ryan,

1999). This assumption is supported by data from Rosenfield, Folger, and Adelman (1980), who demonstrated that negative performance feedback leads to decreased willingness (akin to volition in SDT) to perform the respective task. Thus, we expected to find lower levels of autonomy after negative performance feedback.

Measures

Satisfaction of competence and autonomy needs

These variables were measured using three-item Likert-type subscales from the proprietary Player Experience of Need Satisfaction (PENS) Scale (version 1.6; Ryan et al., 2006). The competence subscale measured participants' feelings of challenge and efficacy during the game or the emotion recognition task, respectively. Items of the subscale included "I felt very capable and effective when [playing the game/working on the task]" and "I felt competent at the [game/task]." The autonomy subscale assessed participants' perception of volition and choice and the perceived opportunity to engage in an activity that interested them during the game or the emotion recognition, respectively. Items for autonomy included "I experienced a lot of freedom in the [game/task]" and "[The game/The task] provided me with interesting options and choices." Reliabilities for need satisfaction were acceptable: competence ($\alpha_{feedback} = .94$, $\alpha_{game} = .83$) and autonomy ($\alpha_{feedback} = .73$, $\alpha_{game} = .80$).

Affect

This variable was measured using an adapted version of the Affect Grid (Russell, Weiss, & Mendelsohn, 1989). The grid asks participants to visually map their current affective state in the semantic space between positive and negative affect (the *x*-axis) and high or low arousal (the *y*-axis) using a 9×9 grid, with the center of the grid representing a "neutral, average, everyday feeling" (Russell et al., 1989, p. 501). The Affect Grid has been validated in prior research as providing measures of both arousal and affect (Killgore, 1998; Russell et al., 1989).[4]

Enjoyment

This variable was measured with four items from the interest/enjoyment subset of the Intrinsic Motivation Inventory (IMI; Ryan, 1982). The Likert-type items were modified for video games: "I enjoyed playing this video game," "This video game was fun to play," "I thought this video game was an enjoyable activity," and "While I was playing this video game, I was thinking about how much I enjoyed it." The scale had a reliability of $\alpha = .92$.

User demand

This variable was measured using four items from the NASA-Task Load Index (NASA-TLX; Hart & Staveland, 1988). The items measure perceived mental, physical, and temporal demand of the game as well as the perceived effort invested during game play. The four items from the scale were "Mental Demand: How much mental and perceptual activity was required?" "Physical Demand: How much physical activity was required?" "Temporal Demand: How much time pressure did you feel due to

the rate or pace at which the mission occurred?" and "Effort: How hard did you have to work (mentally and physically) to accomplish your level of performance?" The scale ranged from 1 = *low* to 20 = *high*. Participants responded to the NASA-TLX four times throughout the procedure: once immediately after training on each of the three demand conditions and again after the session in which the participant was allowed to select the condition of demand she/he wanted to play. Responses from the session in which participants were allowed to select the demand condition they wanted to play, and also from the training session matching that condition, were used to create two measures: one labeled "level of user demand selected" and the other labeled "user demand experienced during play." The first measure was the composite average score of demand (obtained during training) for the game condition that the player later selected and is referred to in our observed structural model (Figure 1) as "level of user demand selected." Notably, because these scores represent the level of demand experienced by players during training, they are used here to represent the level of user demand expected by players at the time of selection. The second measure was the composite average score of the demand actually experienced during subsequent game play and is referred to in our model as "user demand experienced during play." Reliabilities of the scale were acceptable: training ($\alpha = .94$) and main game ($\alpha = .95$).

Procedure

Participants were told that the purpose of the study was to investigate video game preference and granted informed consent to continue. Next, the experimenter demonstrated the flight simulator controls. Participants were then instructed to practice the game and to land the plane in each of the three user-demand conditions described above, starting with the high-demand condition, followed by the low- and then medium-demand conditions. After each landing trial, user demand was measured with the NASA-TLX scale. Following this, participants were randomly assigned to complete one of the two false-feedback conditions described above, and measures of affect and need satisfaction (competence and autonomy) were taken. Then, participants were asked to play the computer game once again choosing from the three user-demand conditions (low, medium, and high). Once game play was completed, measures were taken of affect, perceived user demand, need satisfaction, and enjoyment. Finally, participants were fully debriefed as to the purpose of the study. The study lasted about 1 hour.

Results

Before testing our proposed model, mean differences between both feedback conditions were tested with independent samples *t*-tests (see Table 1 for means, *SD*s, and significance tests). The data show that the induction successfully varied levels of need satisfaction: Participants in the negative feedback condition reported lower feelings of competence and autonomy as well as lower positive affect than participants

Table 1 Means and Standard Deviations Separated by Condition

	Feedback Condition					
	Positive	Negative	*t*	*df*	*p*	*d*
Affect after feedback	5.58 (1.52)	3.46 (1.62)	7.09	109	<.01	1.36
Competence after feedback	5.47 (1.04)	2.12 (0.92)	17.96	109	<.01	3.44
Autonomy after feedback	3.75 (1.36)	3.10 (1.27)	2.59	109	.01	0.50
User demand selected	8.61 (4.96)	10.98 (4.56)	−2.61	109	.01	−0.50
User demand during play	9.19 (5.32)	11.21 (4.28)	−2.21	106.26	.03	−0.43
Affect after game	5.70 (1.92)	5.44 (1.68)	0.75	109	.45	0.14
Competence after game	2.80 (1.39)	2.44 (1.15)	1.44	109	.15	0.28
Autonomy after game	3.40 (1.49)	3.56 (1.23)	−0.63	109	.53	−0.12
Enjoyment	3.11 (1.49)	3.38 (1.43)	−0.92	109	.34	−0.18

Note: Standard deviations are presented within the parentheses.

receiving positive feedback. Furthermore, participants who received negative feedback subsequently chose media stimuli with significantly higher user demand than participants in the positive feedback condition. After playing the game, participants in both feedback conditions no longer differed with regard to positive affect and the satisfaction of the need for competence and autonomy needs. These results support our basic assumptions that thwarted need satisfaction was associated with selective exposure to media stimuli with higher user demand, which in turn led to mood repair and the satisfaction of the previously thwarted needs.

In the next step, our proposed model was tested using structural equation modeling. Zero-order correlations of all variables included in the model are presented in Table 2. The single-item Affect Grid measure was included as an observed variable in the model. The satisfaction of competence and autonomy needs were represented by latent variables measured from the PENS subscale items described in the Method section. User demand and enjoyment were entered as latent variables computed from items of the NASA-TLX and the IMI enjoyment subscales, respectively. As recommended for structural equation models that include repeated measures (Russel, Kahn, Spoth, & Altmaier, 1998), we allowed the error terms of the items used to measure need satisfaction and user demand to correlate between the first and second time of measurement.[5] Consistency between data and the proposed model was evaluated based on two criteria. First, path coefficients needed to be in the predicted direction and magnitude. Second, model fit was assessed with established fit indices. Model fit was considered acceptable with a minimum discrepancy statistic (CMIN/*df*) below 2.00 (Byrne, 1989), a root mean square error of approximation (RMSEA) approaching .06 or lower (Hu & Bentler, 1999), and a comparative fit index (CFI) above .95 (Hu & Bentler, 1999). The structural equation model was computed with the AMOS 19.0 statistical package using the maximum likelihood method.

Table 2 Zero-Order Correlations

	1	2	3	4	5	6	7	8	9
1. Affect after feedback	—								
2. Competence after feedback	0.62**	—							
3. Autonomy after feedback	0.36**	0.35**	—						
4. User demand selected	−0.25**	−0.26**	0.09	—					
5. User demand during play	−0.24*	−0.21*	0.06	0.92**	—				
6. Affect after game	0.01	0.02	−0.04	−0.03	−0.05	—			
7. Competence after game	0.10	0.12	0.00	0.23*	0.26**	0.28**	—		
8. Autonomy after game	−0.07	−0.04	0.33**	0.30**	0.33**	0.07	0.46**	—	
9. Enjoyment	−0.15	−0.09	0.15	0.41**	0.38**	0.12	0.53**	0.73**	—

**$p < .01$. *$p < .05$.

All observed path coefficients are consistent with the predicted model (Figure 1). Furthermore, the fit indices indicated an adequate overall fit, CMIN/$df = 1.32$, RMSEA = .05 (90% confidence interval from .04 to .07), and CFI = .97. We thus concluded that the predicted model is consistent with the data.[6] Assessment of normality demonstrated that the data significantly deviated from multivariate normality (Mardia's normalized estimate of multivariate kurtosis = 8.66). Thus, all hypotheses were additionally tested using the bootstrapping method, a nonparametric approach recommended for the analysis of nonnormal data (Byrne, 2010). Ninety percent bias-corrected confidence intervals were computed for all parameters reported in Figure 1 based on 5,000 bootstrap samples with replacement. The statistical significance of all results reported below was confirmed with the bootstrap method.

Confirming H1, affect was positively related to the satisfaction of (a) competence ($\beta = .52$, $p < .001$) and (b) autonomy needs ($\beta = .23$, $p = .03$). As stated in the Method section, two measures of user demand were included in the model to test H2 and H3. The *level of user demand selected* measure was used to explore H2 (the effect of competence, autonomy, and affect on selective exposure to media stimuli differing in user demand), as selection should be based on expectations of demand represented by the player's experiences with the game during the training session. The *user demand experienced during game play* measure was used to explore H3 (the influence of experienced user demand on the satisfaction of competence and autonomy needs), as the user demand actually experienced during game play is important for the mood repair process. Importantly, user demand during the training was an almost perfect predictor of user demand during the main game ($\beta = .96$,

$p < .001, R^2 = .92$). Confirming H2, both the task-related satisfaction of competence needs ($\beta = -.26, p = .042$) and the task-related positive affect ($\beta = -.25, p = .046$) were negatively related to the level of user demand afforded by the selected game. Contrary to our expectations, the satisfaction of autonomy needs was positively related to the level of user demand afforded by the selected game ($\beta = .31, p = .029$). Consequently, the data only partially support H2, with antecedent paths explaining 16% of the variance in selective exposure ($R^2 = .16$). Confirming H3, user demand was positively associated with the satisfaction of the need for competence ($\beta = .34$, $p < .001$) and autonomy ($\beta = .41, p < .001$). Finally, confirming H4, the satisfaction of competence ($\beta = .29$, $p < .001$) and autonomy needs ($\beta = .76$, $p < .001$) was positively associated with enjoyment, with the overall model explaining 73% of the variance in enjoyment ($R^2 = .73$).

Discussion

The aim of this study was to extend traditional MMT research by (a) examining the influence of the intrinsic needs for competence and autonomy on selective exposure to entertaining media and (b) determining whether the satisfaction of these needs could predict the resultant enjoyment (as an indicator of mood repair) proposed by MMT. On the basis of the arguments provided by Bryant and Davies (2006) and by recent work on the association of need satisfaction and media appeal (Tamborini et al., 2010, 2011), our findings suggest an extension of traditional mood management understandings of media choice. Traditional understandings have focused on distraction from negative mood, yet our findings also indicate the potential of entertaining media to repair mood through satisfying intrinsic needs.

Study results were largely consistent with our hypothesized model. The first goal of our study was to determine whether research related to MMT can be improved by a needs-based perspective that addresses the influence of intrinsic needs on selective exposure to entertaining media stimuli. As predicted in H1a and H1b, the satisfaction of competence and autonomy needs was positively related to affect. Confirming MMT's traditional distraction mechanism, affect was negatively related to selective exposure to media stimuli with high user demand (H2a).

Consistent with our expectations (H2b and H2c), both the need for competence and the need for autonomy were significant predictors of selective exposure, independent of and in addition to simple affect. In this manner, they suggest determinants of selective exposure beyond the traditional distraction mechanism proposed by MMT. At the same time, and in contrast to the specific predictions of this study, perceived autonomy was positively related to the selection of higher user demand. There may be several explanations for this. First, it may be that an unbalanced manipulation of competence and autonomy needs distorted this relationship. As is apparent from the effect sizes reported in Table 1, though the false-feedback manipulation had a significant effect on both competence and autonomy needs, it had a considerably stronger effect on competence needs (Cohen's $d = 3.44$) than on

autonomy needs (Cohen's $d = .50$). Consequently, the need for competence may have been more salient than the need for autonomy and thus may have distorted the statistical relationship between the need for autonomy and selective exposure. Of course, this remains speculative and needs to be tested in future research. Second, it is possible that high autonomy *needs* do not lead to the selection of high user demand (as hypothesized in our model), but rather strong *feelings* of autonomy lead to an increased willingness to take on the types of greater challenges found in a game with high user demand. This might suggest that our findings do not represent the repair of autonomy needs but instead reflect behaviors stimulated by feelings of autonomy. In either case, by integrating the logics of a needs-based perspective based on SDT into MMT, the findings of the present investigation offer considerable predictive precision and strengthen confidence in Tamborini et al.'s (2010) definition of media appeal as the satisfaction of intrinsic needs.

The second goal of our study was to determine whether this need satisfaction approach could simultaneously predict both choice behaviors and resultant affect repair through need satisfaction. The significant paths from user demand to feelings of competence and autonomy (H3) and the subsequent paths from competence and autonomy to enjoyment (H4) are consistent with MMT and show the ability of this need satisfaction approach to predict both choice and resultant affect. The data support our proposition that in addition to mood alteration through distraction from negative affect, mood repair through the satisfaction of intrinsic needs is a second mechanism of mood management. This repair mechanism, which has been neglected by previous MMT research, may predict selective exposure and mood management processes. The ability of this needs-based approach to simultaneously predict choice behaviors and resultant affect offers strong support for attempts to define media appeal as the satisfaction of intrinsic needs and demonstrates the usefulness of this approach in furthering our understanding of selective exposure and mood management processes.

Limitations

One limitation of this study is related to the experimental design used to explore the role of distraction versus repair processes in MMT. This study simultaneously tested traditional MMT logic suggesting that negative affect leads to exposure to distracting media and a needs-based perspective proposing that thwarted intrinsic needs lead to exposure to media stimuli that have the potential to repair mood through the satisfaction of these needs. This research strategy seems justified; however, the purpose of this study was not to test two competing processes of mood management but rather to extend MMT by proposing an additional mechanism (mood repair through the satisfaction of intrinsic needs). The tested model shows that adding intrinsic needs to variables traditionally studied in MMT research substantially increases the explained variance in selective exposure and resultant mood repair. Thus, the empirical model presented in this study supports our notion that a needs-based perspective is a valuable extension of MMT.

This position may be challenged by arguing that exposure to demanding media stimuli after experiences of thwarted need satisfaction may represent an effort to reach distraction from negative affect rather than mood repair through need satisfaction. We acknowledge the fact that the experimental design presented here does not allow for an ultimate test of mood repair through need satisfaction. We do believe, however, that the combined findings of the first and second part of our model clearly support our interpretation. Thwarted intrinsic needs predicted exposure to media stimuli with high user demand. Subsequently, these media choices predicted the satisfaction of the same thwarted needs. The satisfaction of these needs (through these media choices) led to forms of mood repair represented by enjoyment in our model. Although SDT does not provide evidence for need satisfaction through distraction processes, this chain of results can plausibly be interpreted in terms of a mood repair mechanism based on the satisfaction of intrinsic needs. A further limiting factor that has to be considered with regard to the mood repair mechanisms proposed in this study is the fact that our model tested the effect of need satisfaction on enjoyment rather than on affect or mood per se. However, we believe using experienced enjoyment as a proxy of mood improvement is justifiable as enjoyment is frequently considered a pleasurable reaction to media stimuli (Vorderer, Klimmt, & Ritterfeld, 2004) and thus represents a form of positive affect. Furthermore, the use of enjoyment as the dependent variable bears the advantage of direct comparability with prior studies incorporating a needs-based approach to media enjoyment (Tamborini et al., 2010, 2011).

A second potential limitation concerns the experiential qualities of the low-user-demand video game condition. This condition contained content that, compared with traditional noninteractive media stimuli (e.g., television program), was low in affective and visual stimulation and lacked narrative structure. Although acknowledging that comparability to other noninteractive media might therefore be restricted, we believe this manipulation has merit. To be able to conduct empirical investigations on the implication of the unique features of interactive media, it is crucial to find a valid operationalization of those features. We have experimentally varied one feature (the level of user control and demand) that distinguishes video game experience from other more traditional forms of media entertainment. We chose this manipulation in favor of minimizing the content-based confounds that are inevitable in other operationalizations such as a direct comparison between qualitatively different media experiences (e.g., playing a video game vs. watching television).

The third limitation is the use of a student sample. It could be argued that the use of student participants casts doubts on the representativeness of the findings for a broader population. However, we do not expect the basic processes under investigation in this study (i.e., mood repair) to differ systematically between students and the general population.

A last limitation refers to the small sample size of this study. In structural equation modeling, the risk of improper solutions and of problems with model convergence increases with decreasing sample size (Byrne, 2010). To address these concerns, two other steps were taken. First, we calculated the confidence interval

around the RMSEA. The relatively narrow 90% confidence interval of the RMSEA of our presented model (.04 to .07) shows the precision of the RMSEA fit index and indicates a low risk of inadequate model fit. Second, in addition to the maximum likelihood method, the significance of all path coefficients was confirmed using the nonparametric bootstrapping method. Although model misspecification due to small sample size cannot be ruled out completely by these measures, the results lend support to the validity of our model.

Future research directions

It is possible that the apparent paradoxical choice behaviors found in previous MMT research may be resolved if they were approached from a need satisfaction-based perspective. For example, perhaps the selection of love-lamenting songs by people experiencing a romantic breakup (Knobloch, Weisbach, & Zillmann, 2004) can be explained by the potential for these songs to directly address and repair the source of the negative affect by redefining the positive attributes of the relationship as negative attributes and in doing so reducing the desirability of the relationship and the negative affect resulting from its loss. This hypothesis could be tested by examining the extent to which the relatedness needs of individuals experiencing a romantic breakup predict the choice of these songs and the resultant repair of relatedness needs following their exposure. This not only draws attention to how unique attributes of different media technology must be taken into account for MMT research, it also suggests the value of a needs-based approach to define media appeal. Such an approach can be used to explain media choices that seem initially counterintuitive and potentially at odds with MMT logic.

Furthermore, the current article may also inform future research by drawing attention to the influence of media users' coping styles on mood management behavior. The underlying MMT mechanisms addressed in the current article (distraction from negative mood vs. mood repair through the satisfaction of thwarted needs) can easily be linked to two basic coping styles identified in coping research: While *emotion-focused* coping refers to behaviors directed at reducing the negative affect and stress caused by problems or stressors, *problem-focused* coping aims at finding a solution to the problem causing negative affect (Lazarus & Folkman, 1984). Mood repair through distraction can be categorized as a strategy of emotion-focused coping, whereas attempts to repair mood through the selection of media that directly address and satisfy thwarted needs can be considered a form of problem-focused coping. Several studies have linked coping styles to media use (e.g., Knobloch-Westerwick, Hastall, & Rossmann, 2009; Reinecke, 2009; Sparks, Pellechia, & Irvine, 1999). However, a systematic exploration of the role of coping styles on mood management behavior remains an open task for future research.

Conclusion

The current article provides a valuable contribution to MMT research by incorporating a needs-based perspective into the process of mood management via selective

exposure. This perspective explains that selective exposure, in addition to being driven by distraction from negative affect, can also be driven by processes of mood repair that directly address the source of negative affect through the satisfaction of intrinsic needs. In doing so, this study adds to a recent line of research applying a need satisfaction perspective to the study of media entertainment (Tamborini et al., 2010, 2011). Although previous studies demonstrate that need satisfaction leads to media enjoyment, this study demonstrates that need satisfaction also has a significant effect on selective exposure to entertaining media. In this way, our study emphasizes the usefulness of a needs-based approach to media enjoyment and enhances MMT by further explicating its underlying explanatory mechanisms, namely that mood repair can be attained through the satisfaction of intrinsic needs.

Acknowledgment

This research was supported in part by the German Academic Exchange Service Grant D/09/40983 to Leonard Reinecke.

Notes

1 Tamborini et al. (2011) demonstrated that affect is unrelated to enjoyment in interactive media stimuli when controlling for the satisfaction of competence and autonomy needs. On the basis of these results, we did not include affect in the second part of our model. Exploratory analyses revealed that, as expected, the inclusion of affect in our statistical model did not lead to significant results: Neither did user demand show a significant association with affect after the game nor did affect significantly contribute to enjoyment when controlling for the satisfaction of competence and autonomy needs.

2 This experimental manipulation has proven to lead to significant differences in user demand: Bowman and Tamborini (2010) found significant differences among all three conditions in reaction times in an audio distracter task. In this study, the high ($M = 12.25$, $SD = 2.30$) and medium ($M = 11.74$, $SD = 3.11$) interactivity conditions led to significantly higher levels of subjective user demand measured with the NASA-TLX compared with the low interactivity condition ($M = 2.56$, $SD = 1.88$), $p < .001$.

3 We extend our thanks to Silvia Knobloch-Westerwick who provided us with the original stimuli used in Knobloch and Zillmann (2002). Owing to software incompatibility, the original experimental software had to be reprogrammed using Hypertext Markup Language (HTML). This new version of the false-feedback manipulation used all original visual materials (portraits and bar graphs) of the original version and resembled the original software in all relevant aspects.

4 The feedback manipulation used in the present investigation was intended to affect the satisfaction of competence and autonomy needs as well as general affect. It did not vary levels of arousal ($M_{\text{positive feedback}} = 5.16$, $SD = 1.74$; $M_{\text{negative feedback}} = 5.06$, $SD = 2.07$; $t(109) = .28$, $p = .78$). Thus, the arousal dimension of the affect grid was excluded from further data analysis.

5 The causal paths reported in the model are substantially unchanged when the analyses are conducted with uncorrelated error terms. With uncorrelated error terms, the SEM displayed a model fit of CMIN/$df = 1.55$, RMSEA $= .07$, and CFI $= .94$.

6 In addition to testing the model presented in our article, we also tested a model that included our manipulation as the exogenous variable. This model also fit the data well (CMIN/df = 1.34, RMSEA = .06, and CFI = .96). The findings of the two models led us to the same conclusions.

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Représenter la gestion de l’humeur comme une satisfaction des besoins : les effets des besoins intrinsèques sur l’exposition sélective et la réparation de l’humeur

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Cette étude a cherché à (1) prolonger la recherche traditionnelle sur la théorie de la gestion de l’humeur en étudiant l’influence des besoins intrinsèques de compétence et d’autonomie sur l’exposition sélective aux jeux vidéos et (2) tester l’influence de la satisfaction de ces besoins sur la réparation de l’humeur qui en résulte. Une expérience a varié la satisfaction des besoins de compétence et d’autonomie en utilisation une fausse rétroaction. Les sujets ont ensuite choisi des médias qui variaient au plan de la demande des utilisateurs. Des mesures de satisfaction des besoins ont été prises avant et après le choix de média. Les résultats ont démontré que (1) des besoins intrinsèques contrariés permettent de prévoir de façon significative le choix de jeux vidéos avec différents niveaux de demande des utilisateurs et (2) la satisfaction de ces besoins permet de prévoir le plaisir. Les résultats indiquent que la gestion de l’humeur peut relever de la réparation de l’humeur par la satisfaction des besoins.

Mots clés : gestion de l’humeur, exposition sélective, jeux vidéo, satisfaction des besoins, plaisir, réparation de l’humeur

Stimmungsregulierung als Bedürfnisbefriedigung: Der Einfluss von intrinsischen Bedürfnissen auf selektive Wahrnehmung und Stimmungsreparatur

Diese Studie zielte darauf ab, die traditionellen Forschungsarbeiten zur Mood-Management-Theorie zu erweitern, indem erstens der Einfluss von intrinsischen Bedürfnissen nach Kompetenz und Autonomie auf die selektive Wahrnehmung von Computerspielen und zweitens der Einfluss der Befriedigung dieser Bedürfnisse auf eine resultierende Stimmungsreparatur untersucht wird. In einem Experiment wurde die Befriedigung von Kompetenz und Autonomiebedürfnissen mittels falschen Feedbacks manipuliert. Die Teilnehmer wählten daraufhin Medien, die nach ihrem Nutzeranspruch variierten. Bedürfnisbefriedigung wurde vor und nach der Medienwahl erfasst. Die Ergebnisse zeigen zum einen, dass gescheiterte intrinsische Bedürfnisse die Wahl von Videospielen mit unterschiedlichen Grad des Nutzeranspruchs signifikant vorhersagten und zweitens die Befriedigung dieser Bedürfnisse Enjoyment vorhersagt. Die Ergebnisse bestätigen, dass Stimmungsregulierung aus der Stimmungsreparatur durch Bedürfnisbefriedigung resultieren kann.

Schlüsselbegriffe: Stimmungsregulierung, selektive Wahrnehmung, Videospiele, Bedürfnisbefriedigung, Enjoyment, Stimmungsreparatur

Caracterizando el Manejo del Humor como la Satisfacción de una Necesidad: Los Efectos de las Necesidades Intrínsecas sobre la Exposición Selectiva y la Reparación del Humor

Resumen

El estudio presente trató de 1) extender la investigación tradicional del MMT mediante la examinación de la influencia de las necesidades intrínsecas de competencia y autonomía sobre la exposición selectiva a los video juegos y 2) puso a prueba la influencia de la satisfacción de estas necesidades sobre la reparación del humor resultante. Un experimento varió la satisfacción de las necesidades de competencia y autonomía usando una retroalimentación falsa. Los sujetos entonces seleccionaron los medios que variaron en el nivel de demanda del usuario. Las medidas de satisfacción de la necesidad fueron tomadas antes y después de la selección de los medios. Los resultados demostraron que 1) las necesidades intrínsecas frustrantes predicen significativamente la elección de los video juegos con diferentes niveles de demanda del usuario y 2) la satisfacción de estas necesidades predice el placer. Los hallazgos indican que el manejo del humor puede resultar de la reparación del humor mediante la satisfacción de una necesidad.

Palabras Claves: Manejo del humor, Exposición selectiva, Video juegos, Satisfacción de necesidad, Placer, Reparación del humor