Running head: INCONGRUENT INDUCTION OF PLEASANT MOOD STATES

Induction of Pleasant Mood States Using Incongruent Music and Solitary Recollection

Skyler L. Kanegi, Jad A. Dandashi, and Gary A. Kane

The University of Texas at Austin

Abstract

The ability of incongruent music and solitary recollection to induce pleasant mood states was tested by measuring increase in Brief Moods Introspection Scale (BMIS) index. Two groups of undergraduates at the University of Texas at Austin either listened to pleasant music while writing for 15 minutes about an unpleasant event (PMUR) or listened to unpleasant music while writing for 15 minutes about a pleasant event (UMPR). There was no significant increase in BMIS index for either condition, but the increase in BMIS index for the UMPR condition was significantly higher than the increase in BMIS index for the PMUR condition.

Keywords: incongruent induction, music, solitary recollection, mood state, BMIS

Induction of Pleasant Mood States Using Incongruent Music and Solitary Recollection

Psychological research focused predominantly on thought patterns in a neutral emotional state or emotion outside the context of thought until the ability to induce mood states in a controlled environment facilitated exploration into the relationship between emotion and thought patterns (Martin, 1990). We are interested in how incongruent music, an external stimulus with emotional resonance that leads to thought patterns, and solitary recollection, thought patterns with a strong emotional resonance, induce pleasant mood states.

There are three cognitive models for mood induction: the schema theory, the semantic network theory, and the fragment theory. According to the schema theory pioneered by Bartlett (1932), organized clusters of knowledge built up from life experiences are used to perceive and evaluate incoming information (Bartlett, 1932). The schemata for a given mood state are relatively dormant when the mental system is not experiencing that mood and emerge when the mental system either experiences an event similar to a self-schema or the mood state itself. This suggests that the mental system must contain self-schemata corresponding to a mood state for mood induction to work. Furthermore, effectiveness of mood induction depends on how closely the mood induction procedure matches the content of the self-schema (Beck et. al, 1979).

According to the semantic network theory, knowledge consists of nodes representing perceptual categories, theories, words, and emotions linked together in networks, and activation of one node continues to activate nodes along its network depending on the strength of the semantic connections (Anderson & Bower, 1973). Bower (1981) suggests that each mood state exists as a node and exciting any of the types of nodes (emotion, somatic states, thoughts) connected to it will induce mood. Mood induction is relative to the strength of the semantic connections to the mood state node (Bower, 1981).

According to the fragment theory, incoming information is encoded into multiple independent fragments. Experiences with emotional resonance may not be connected to each other, but each memory fragment is linked to a mood state, and information corresponding to one memory fragment can act as an effective cue for recalling the rest of that experience (Jones, 1983). This is reflected in mood induction's ability to cue fragments of experiences corresponding to the current mood state (Martin, 1990).

Both music and solitary recollection have cognitive and emotional focus, but, according to the fragment theory, music induces a mood state, which cues memory fragments, and, according to the schema and semantic network theories, solitary recollection activates schemata or nodes corresponding to a mood state. Furthermore, music induces a stronger feeling of depression than elation (Clark & Teasdale, 1985), while solitary recollection induces a stronger feeling of elation than depression. In previous experiments, both techniques had over a 75% success rate for mood induction (Martin, 1990).

Pleasant—unpleasant and arousal—calm dimensions form mood states (Russell, 1978) and the emotional context of cognitions (Abelson & Sermat, 1962). The Brief Mood Introspection Scale (BMIS) is a 16-adjective mood scale constructed from eight mood states: (a) happy (*happy, lively*), (b) loving (*loving, caring*), (c) calm (*calm, content*), (d) energetic (*active, peppy*), (e) fearful/anxious (*jittery, nervous*), (f) angry (*grouchy, fed up*), (g) tired (*tired, drowsy*), and (h) sad (*gloomy, sad*). To calculate the index BMIS score for the pleasant—unpleasant dimension, BMIS scores for the eight unpleasant emotions (e-h) are subtracted from the BMIS scores for the eight pleasant emotions (a-d). In experiments by Mayer & Gaschke (1988), the BMIS was shown to have good factorial validity along the pleasant—unpleasant dimension (Mayer & Gaschke, 1988).

In the present study, we manipulated the combination of incongruent music and solitary recollection. Group A listened to pleasant music while writing about an unpleasant event for 15 minutes (PMUR), while Group B listened to unpleasant music while writing about a pleasant event for 15 minutes (UMPR). We studied each condition's ability to induce pleasant mood states, measured by positive change in BMIS index.

Based on the three cognitive models of mood induction and past research, we have suggested that the UMPR condition is more likely to induce a pleasant mood state than the PMUR condition.

Method

Participants

Twenty-four students (17 women, 7 men, *M* age = 20.78 years, age range: 18-43 years) in a Statistics and Research Design course at the University of Texas at Austin received partial course credit for their participation but were given the option of declining without penalty. All participants were capable of hearing and completing a writing task. One result was removed because the participant failed to complete the post-induction questionnaire.

Design

The present study used a two-way between subjects design. The independent variable was the combination of incongruent music and solitary recollection—Group A listened to pleasant music while writing about an unpleasant recollection (PMUR), and Group B listened to unpleasant music while writing about a pleasant recollection (UMPR). The dependent variable was induction of pleasant mood states, measured by positive change in BMIS index.

Materials

A PowerPoint presentation was prepared for each condition on a Windows 7 OS and presented on a Macintosh OS X. Directions were projected onto two blackboard-sized screens at the front of two adjacent computer labs at the University of Texas at Austin. A 15-minute audio file of J. S. Bach's "Brandenburg Concerto No. 3" was embedded in the PowerPoint for the PMUR condition while a 15-minute audio file of Gustav Mahler's "5th Symphony, Movement 4 (Adagietto)" was embedded in the PowerPoint for the UMPR condition. Because "Brandenberg Concerto No. 3" was originally about eight minutes long and "5th Symphony, Movement 4 (Adagietto)" was originally about six minutes long, they were manipulated so both were exactly 15 minutes long. For both files, silence at the beginning and end of the song was removed, and the resulting file was duplicated until slightly over 15 minutes long. After they were trimmed to exactly 15 minutes, a fade-out effect was placed on the last 15 seconds of both files. The solitary recollection task was based on Pennebaker's (1997) basic writing paradigm (Pennebaker, 1997).

Four questionnaires (a baseline and post-induction questionnaire for each group) were developed using questions from Mayer and Gaschke's (1988) BMIS (Mayer & Gaschke, 1988). The first two questions asked for participant age and gender, and the 16 following questions asked participants to rate from 1 to 7 (with 1 being "definitely do not feel" and 7 being "definitely feel") the accuracy of the following adjectives in describing their present mood: lively, happy, sad, tired, caring, content, gloomy, jittery, drowsy, grouchy, peppy, nervous, calm, loving, fed up, and active. The questionnaires were hosted on a personal site, and results were captured using Google Docs.

Participants were provided a Macintosh OS X desktop with internet capabilities to complete the two questionnaires and a single sheet of white printer paper to complete the solitary recollection task. They used their own writing utensils.

Procedure

After controlling for gender, participants were randomly assigned without replacement to either Group A or Group B. As the participants waited in the hallway, the lights were turned off, the blinds were opened, and twenty sheets of printer paper were placed at random seats in both rooms. The PowerPoint presentations were loaded and set to "Slide Show" on the computers at the front of both rooms, and the volume was set to the maximum on the computers and 80/100 on the projectors to ensure participants in the back row would be able to hear the music stimulus. Participants were told which room to enter depending upon the group assignment they had received.

As participants entered their respective rooms, the experimenter read verbatim from printed instructions on the PowerPoint. Participants were instructed to sit down and refrain from talking to others, then log into the computers in front of them and go to the website containing the BMIS questionnaires (www.skylerkanegi.com/**d/**flubberstudy/groupa/ for Group A and www.skylerkanegi.com/**g/**flubberstudy/groupb/ for Group B—the URLs were complicated with a random letter directory to keep participants from taking the questionnaires for the other group). After everyone was seated, participants clicked "Show Questionnaire 1" and completed it as accurately as possible without spending too much time on each question. When they had finished, they clicked "Submit" at the bottom of the form and looked up at the front of the room without communicating with the other participants.

Next, participants listened to music while completing an incongruent solitary recollection task. Participants in Group A were instructed to recall an unpleasant experience in their life and write continuously on the sheet of printer paper about the feelings and emotions associated with that experience for 15 minutes while "5th Symphony, Movement 4 (Adagietto)" played

continuously. Participants in Group B were instructed to recall a pleasant experience and write about it in the same manner while "Brandenburg Concerto No. 3" played continuously.

After 15 minutes had passed, participants were asked to stop writing, click "Show Questionnaire 2," and complete it as accurately as possible without spending too much time on each question. When they had finished, they clicked "Submit" at the bottom of the form and looked up at the front of the room without communicating with the other participants.

Results

The ability of incongruent music and recollection to induce pleasant mood states can be seen in Figure 1, which shows the average change in mood for the PMUR condition (M = -10.2) and the UMPR condition (M = 6.15). An independent t-test performed between the increase in BMIS indexes of both conditions showed that there was significantly more induction of pleasant mood states in the PMUR condition than in the UMPR condition, $t(21) = 1.90$, $p < .0355$. Dependent t-tests performed on the baseline and post-induction BMIS indexes in both conditions revealed that there was no significant increase from the UMPR condition's baseline (M = 7.69, SD = 15.93) to post-induction (M = 13.85, SD = 17.92) BMIS index, $t(9) = -2.937$, $p < .992$, nor was there significant increase from the PMUR condition's baseline (M = 9.4, SD = 15.51) to post-induction (M = -0.8, SD = 14.97) BMIS index, $t(12) = .877$, $p < .199$. A two-tailed independent t-test performed on the baseline BMIS indexes of both conditions showed no significant difference in pleasant mood states between the two conditions, $t(21) = 0.258$, $p < .799$.

Discussion

The results indicate that the UMPR condition was more successful at inducing pleasant mood states than the PMUR condition. This supports the hypothesis. The study also showed that

incongruent mood induction techniques counterbalance each other, since there was no significant increase in BMIS scores in either condition.

The study supports the schema and semantic network cognitive models. Organized clusters of knowledge built up from life experiences are used to perceive and evaluate incoming information (Bartlett, 1932). Because the mood induction procedure asked participants to recall an event almost identical to a self-schema, mood induction was very effective (Beck et. al, 1979). Knowledge consists of nodes representing perceptual categories, theories, words, and emotions linked together in networks, and activation of one node continues to activate nodes along its network depending on the strength of the semantic connections (Anderson & Bower, 1973). Exciting emotion and thought nodes connected to the "pleasant" node induced mood. Because participants were asked to think deeply about a past event, mood induction was very effective (Bower, 1981).

Unfortunately, the results have little context because there was no control group. Future research could replace one of the conditions with a control and, depending on the results, measure other mood states such as along the arousal—calm dimension.

Preliminary results indicate there may be significant differences in mood induction between men and women. Suspecting that gender might be a confounding factor after an olfactory mood induction study (Seubert et. al, 2009), we blocked for gender, and results suggest pleasant mood states might be harder to induce in women than men, and the opposite might be true of unpleasant mood states. Future research could explore this.

Preliminary results also indicate that ease of mood induction may be positively correlated with age, but, because of the small sample set, the results are not reliable. According to the

schema theory, the existence of more self-schemata facilitates greater mood induction, so this could be explored in future studies.

References

Abelson, R. P., & Sermat, V. (1962). Multidimensional scaling of facial expressions. *Journal of Experimental Psychology, 63*, 546-554.

Anderson, J. R., & Bower, G. H. (1973). *Human associative memory*. Washington, DC: Winston.

Bartlett, F. C. (1932). *Remembering*. Cambridge, England: Cambridge University Press.

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression* (pp. 291-331). New York, NY: Guilford Press.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36*, 129-148.

Clark, D. M., & Teasdale, J. D. (1985). Constraints of the effects of mood on memory. *Journal of Personality and Social Psychology, 48*, 1595-1608.

Jones, G. V. (1983). Structure of the recall process. *Philosophical Transactions of the Royal Society of London, B302*, 373–385.

Kelly, A. B., & Masterson, P. W. (2008). Relationships Between Alcohol-Related Memory Association and Change in Mood: Systematic Differences Between High- and Low-Risk Drinkers. *Alcohol and Alcoholism, 43(5)*, 551-558.

Martin, M. (1990). On the induction of mood. *Clinical Psychology Review, 10(6)*, 669-697.

Martin, M., Argyle, M., & Crossland, J. (1990). *A trouble shared is a trouble halved: Social and solitary, positive and negative mood induction*. Manuscript submitted for publication.

Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology, 55*, 102-111.

Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8*, 162-166.

Russell, J. A. (1978). Evidence of convergent validity on the dimensions of affect. *Journal of Personality and Social Psychology, 37*, 345-356.

Seubert, J., Rea, A. F., Loughead, J., & Habel, U. (2009). Mood induction with olfactory stimuli reveals differential affective responses in males and females. *Chemical Senses, 34(1)*, 77-84.

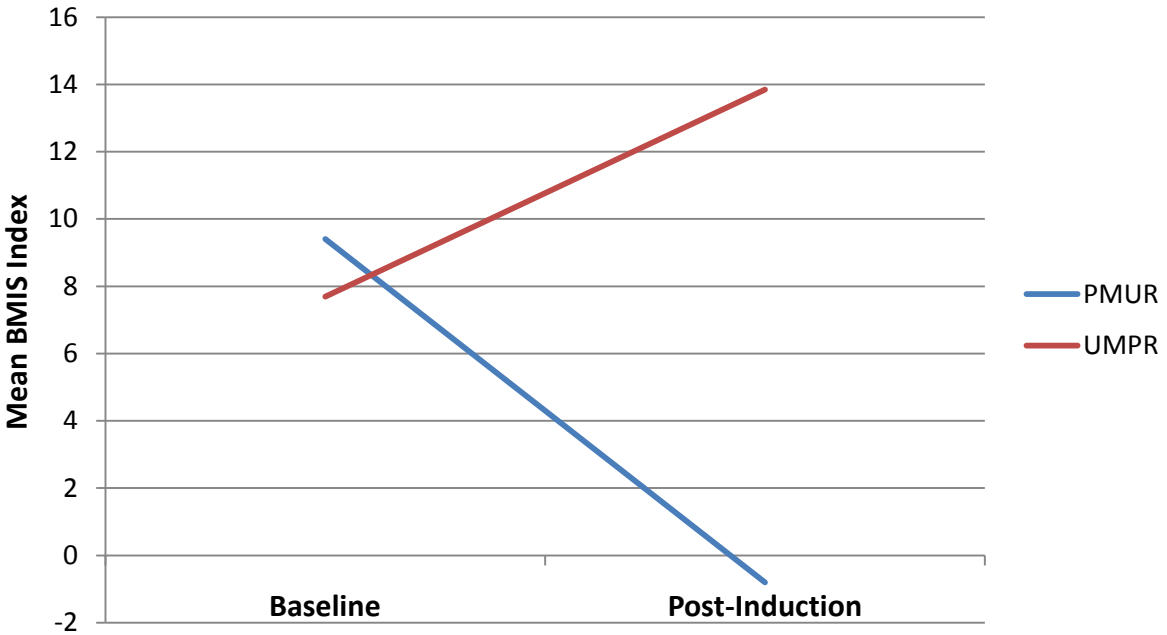

Figure 1. Change in mean BMIS index before and after mood induction. Increase in BMIS index for the UMPR condition was significantly greater than for the PMUR condition.