Age Related Differences in Response to Emotional Stimulation

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The study of emotional regulation in relation to age has been a growing body of research over the past decade. Research suggests that with age, individuals display superior emotional regulation in response to a sad situation (Charles & Carstenson, 2000). Additionally, older adults are typically considered happier than younger individuals (Mroczek, and Kolarz, 1998). In this study, twelve young and twelve older adults were exposed to both a happy as well as sad song following along with the lyrics. After exposure to both conditions the participants rated how emotional they felt on a scale from 1-10. The higher the score, the more happy or sad they felt from each condition. The results from the sad condition were successful, as the older adults rated the sad song as less emotionally arousing than the younger adults. However, there was no significant difference on ratings in the happiness condition.

Emotions are critical to daily lives and often govern behaviour. Thus, it is not a surprise that the nature of emotion is in continuous investigation by psychologists. Specifically, emotion is a psychological state which refers to an agitated or aroused state in an individual (Young, 1975). Emotional processing involves autonomic, subcortical, and cortical structures (Trainor & Schmidt, 2003). Throughout adolescence, for example, emotions are in their developing stage and are known for inconsistency and variability (Charles & Carstenson, 2007). However, tackling the nature of emotions after this time is difficult. Emotions are universal across human nature and can be endlessly investigated. Early psychologists relied solely on their knowledge of biology in their theorizing about emotional development, assuming that because biological basis peaks in the early 20s, so too does emotional regulation (Charles & Carstenson, 2007). A growing body of research
Age Related Differences in Response to Emotional Stimulation

has compared differences in emotional responses in early and later life. As a result the
myth of age-related decline has since come to a halt, with research suggesting that older
adults display superior emotional regulation. Specifically, self reported negative affect is
lower in older adults than in middle-age and younger adults as are rates of anxiety and
major depressive disorder (Charles & Carstenson 2007).

Tsai, Carstenson, and Levenson (2000) exposed younger (20-34) and older (70-85) Chinese and European American adults to sad and amusing standardized film clips. Behavioural and cardiovascular responses were measured. As hypothesized, older adults demonstrated smaller changes in cardiovascular reactivity to emotionally-eliciting videos versus younger participants. Tsai et al. (2000) found that older adults demonstrated decreases in sympathetic arousal while younger adults showed increases during both the positive and negatively arousing film clips. Furthermore, most behavioural responses to the film were fairly consistent across age groups (Tsai et al., 2000). Last, no cultural differences were found which suggests that older adults’ advanced emotional regulation is innate.

Increased emotional regulation in older adults is also evident in relationships. A study done by Levenson, Carstenson, and Gottman (1994) tested age differences in happiness in long and longer term marriages. Couples were exposed to three 15-minute conversations and then asked to self-report feelings on their marital satisfaction. Levenson et al. (1994) showed that older couples tended to express more positive emotions and display lower physiological arousal than did middle-age couples. This evidence suggests that older couples’ ability to better regulate their emotions can improve their relationships.
Increased emotional regulation can be helpful in many aspects of daily life. In a study examining distress response to daily stressors, older adults perceived stressors as less stressful and life threatening than younger participants (Charles & Carstenson, 2007). Additionally, Charles and Carstenson (2007) found that after having participants engage in an interpersonal argument, older adults report less severe negative reactivity. These results are consistent with studies of older adults’ negative reactivity with reality based coping issues such as chronic illness (Charles & Carstenson, 2007).

It has been proven that older adults respond to fixed situations with better emotional regularity than their younger counterparts. Mroczek, and Kolarz (1998) questioned this in response to real life scenarios by examining the relationship between overall happiness levels and age. The results from the Midlife Development Inventory indicated that positive affect is at its lowest level among the youngest participants and at its highest level among the elderly (Mroczek & Kolarz, 1998). Furthermore, the younger sample reported the most negative affect while the oldest people reported the least (Mroczek & Kolarz, 1998).

Not only do older adults react to negative situations with better emotional regulation, but they are generally more positive than younger individuals. Specifically, in comparison to younger adults older adults tend to remember things in a more positive light (Charles & Carstenson, 2007). This age associated transformation can be seen in a study examining different age related responses in recall and recognition for positive, negative and neutral words and faces. Older adults prefer the more positive words (Leigland, Schulz, & Janowsky, 2004). In another study the subjects were presented with negative and positive features of both health plans as well as apartments. When asked to
recall the features, the older adults tended to focus more on the positive traits (Charles & Carstenson, 2007). Both physiological and experience attributed explanations account for differences in age related emotional responses.

As Charles and Carstenson (2007) explain, emotional experience like all psychological phenomena is dependant on physiological functioning. Past psychologists believed older people had reduced physiological reactivity and were thus unable to experience emotions. However, research has proven that intensity of emotion is consistent in all ages of healthy adults (Charles & Carstenson, 2007). It is possible that physiological and neurological changes may lead to improved regulation. Decreases in synaptic density, neurotransmitters and slowed cardiovascular responses may contribute to this regulation in older adults (Charles & Carstenson, 2007). For example, older people experience slower cardiovascular responses in many situations such as relived emotions, films eliciting happiness, conflicts with their spouses and in sight of negative images (Tsai et al., 1994). Older individual's exhibit reduced reactivity in general which is said to explain why they have better regulated emotions.

Maturational changes that advance a more realistic perspective of life may play a role in reducing overall negativity as seen in the research revealing that older people generally report better control over emotions (Charles & Carstenson, 2007). Perhaps life experience has lead to better regulated emotions in older adults. These results highlight that among healthy adults emotional experiences and emotion regulation do not decline across the lifespan but rather actually appear to be better maintained (Charles et al., 2007, p. 314).
Music is often referred to as the “language of emotions” (Trainor & Schmidt, 2003, p.310). Trainor and Schmidt (2003) presented participants with musical excerpts eliciting responses of happiness, sadness, serenity, and agitation. The impact of the musical selections on emotional response was measured through physiological responses: heart rate changes, respiration rate, blood flow, and skin conductance. Participant’s respiration rates were found to be at the highest levels during the happy and sad excerpts. The power of music to influence emotional state makes it a relevant stimulus in the study of emotional reactivity.

The present experiment will examine whether younger adults exhibit higher emotional arousal in the sad condition and lower arousal in the happy condition than middle age adults. This study will examine both younger and older adults’ self-reported scores of emotional arousal after exposure to a happy and a sad song while following along with the respective lyrics. Musically induced emotions will be used as a reliable source to test differences in emotional reactions. This study will distinguish whether there are age differences in response to emotional stimulation.

Pilot Study

A pilot study was done to decipher the more emotionally stimulating song for both conditions.

Method

Participants. Six participants were used for the study. Three were between 19 and 22-years old and were enrolled in the University of Western Ontario or its affiliated colleges, while the other three were middle age adults between 40 and 65 years from the Greater Toronto Area.
Materials. *Tears in Heaven* by Eric Clapton and *Imagine* by John Lennon were played for the sad condition and *Perfect Day* by Hoku and *Your Smiling Face* by James Taylor.

Procedure. A Dell Latitude D620 computer was used to play the songs. Participants listened to both songs in each condition and informed the researcher which song elicited more emotion.

Results

Five of the six participants voted *Tears in Heaven* and *Your Smiling Face* as more emotionally arousing.

Main Study

Method

Participants

The sample comprised 24 Caucasian participants, 12 young adults (19-22), and 12 middle age adults (40-65). The young adults were all undergraduate students at the University of Western Ontario or its affiliated colleges (specifically Huron University), in London, Ontario. The older adults were from the Greater Toronto area in Ontario. An equal sample of males and females were tested to avoid any sex bias. All participants were family and friends of the researcher.

Setting

All of the participants sat at a table or desk with a chair in a quiet room. The younger adults did the study in London, Ontario at the researcher’s home, and the older adults did so in their respective homes in Toronto.

Materials

A booklet was handed to each participant containing a letter of information, a consent form, 2 pages of lyrics (can be found in Appendix A), 2 scales to self-report, and a debriefing form. A measurement of emotional scale was constructed to test emotion in
Age Related Differences in Response to Emotional Stimulation

Each participant. Half of the booklets were assembled for the happy scenario first (Group A) (See Appendix B) and the other half had the sad scenario first (Group B).

The study made use of 2 songs. The song used for the happy condition was called Your Smiling Face written and sung by James Taylor that celebrates a new love he was experiencing at the time. The song for the sad condition was Tears in Heaven written and sung by Eric Clapton, which expresses his sadness after the loss of his 3-year old son Conor who fell from a window. Both songs were bought for 0.99 cents on the Itunes Store (8th Ed), a proprietary digital media player application. Lyrics of both songs were found at http://www.lyrics.com and transferred to a document in Times New Roman font size 12 in Word Microsoft Office.

A Dell Latitude D620 laptop computer was used to generate the songs. The internal speakers were played at 100% volume at all times. Each song played uninterrupted to their individual ends. A red pen was used by all participants.

Procedure

Participants were handed an package held together by a paperclip and were instructed to read the letter of information and sign the consent form in order to participate. The first 12 participants in both age categories were given the Group A booklet and the rest were given the Group B booklet.

The procedure was set into two parts. The researcher set up the first task by opening either Playlist A, corresponding with Group A, or B corresponding with Group B on Itunes depending on the Group the participant was randomly assigned. Participants were asked to circle their age at the top of both emotional scales and told to inform the researcher once they were done with each condition. Participants were told to listen to the
first song while following along with the lyrics and then flip the page to and abide by the instructions, self-evaluating and reporting their level of emotion on a scale from 1-10 (10 being the highest level of emotion). The researcher set up the second condition and told the participant to follow the same steps as the first condition but with the second song.

Once the participants completed their self-reports for both scenarios they were given the debriefing form to clarify what this experiment was examining. Participants were asked to place their results in a pile so they would remain anonymous. The amount of total time the participant was subjected to the experiment varied depending on the time taken to complete the self report. After all the data was collected, appropriate scoring for the scales was followed and further statistical analyses were completed to examine the results.

Results

A 2x2 Mixed ANOVA design was used to examine the relationship between Age, Song, and Emotional responses. For the Emotional Scale, the higher the scores, the more emotional the participant felt after engaging in the experience. The possible range was 1-10 in both the happy and sad condition. Participants' scores ranged from 4-10 in both the sad and happy condition. The mean of the middle age adult's responses to the happy condition was 8.54 and 6.33 for the sad condition. The means for the younger adults were 7.00 for the happy condition and 7.91 for the sad condition. *Figure 1* illustrates a highly significant interaction (\( F(1) = 22.26 \ p< 0.05 \)) between the younger and middle age adult's scores in the sad condition and the results of the happy condition. Both main effects were insignificant. These results can be found in Appendix C Table 1.
Figure 1 - Age differences in response to happy and sad music and lyrics, based on scores on The Emotional Scale.
Age Related Differences in Response to Emotional Stimulation

A planned contrast using an Independent-Sample t-test was performed to determine whether the younger and older adults differed in their responses to the sad and happy condition. There was no significant difference between younger and middle age adults’ scores for the happy condition ($t(22) = 1.31$, $p>0.05$). However significant differences were found between the two age groups responses to the sad condition, as the younger adults displayed higher rates of sadness in response to the condition ($t(22)= 3.32$, $p<0.05$).

A planned contrast using two paired-samples t-tests were conducted to test differences of scores within each participant. Results for the younger adults were statistically significant ($t(22)= 2.74$, $p<0.05$) rating the sad condition higher than the happy condition. The middle age adults scores were also significant ($t(22)= 4.18$, $p<0.05$), having rated the happy condition as more emotionally arousing than the sad condition.

Discussion

This study was done to examine age differences in emotional responses in a sad and happy musically elicited condition. It was hypothesized that that the middle age adults would rate the sad condition as less emotionally arousing because they are known for having improved emotional regulation. Furthermore, it was predicted that middle age adults would give higher scores in the happy condition as they are known for viewing situations more positively than younger individuals. As predicted, the middle age adults were less emotionally aroused during the sad condition in comparison to the younger participants. However, there was no significant difference in the scores for the happy condition between subjects.
There are many confounding factors that could have contributed to the insignificant results of age differences in response to the happy condition. First, Mroczek & Kolarz (1998) used over 2000 participants in their study of happiness, while only 24 participants were used for this study. With more participants the results could have been more conclusive. Further, a convenient sample set was used which weakens the generalization of the results. In future studies participants outside of the researcher’s friends and family should be used. Secondly not all participants were placed in a controlled setting during testing. While the younger adults completed the tasks outside of their comfort zone (in the researchers home), the middle age participants completed the experiment in their respective homes. When one is removed from their home they tend to be more easily aroused. This could explain why the younger adults reported higher arousal in the sad condition than the middle age adults which poses further limitations to the validity of the results. Last, time could have been a factor in this experiment as the participants had confined time schedules. Some participants were tested in the night and some in the morning which may have affected attentiveness in individuals. All subjects should have been placed in the same experimental setting to control for possible distractions.

There are numerous limitations of this study. While other studies of this nature conduct a longitudinal study, this this study tested participants only once. Participant’s moods at the time of testing could have deeply affected the participant’s scoring, making the results less reliable. To make the results more conclusive, participants should have been tested several times with different songs for both conditions. Furthermore, music is very individual. One participant could have a previous association with one of the songs
while another could be hearing it for the first time; skewing the scores. Although the happy song was self explanatory, Eric Clapton’s saddening song is known for arousing much emotion because of its story. The results could be unreliable because some of the participants could have known the story, while others may have not. To control for this, an explanatory paragraph for both songs should have been inserted in each experimental booklet before each condition began to control for this.

To have increased the external validity of the study there should have been more precaution during testing. Specifically, the researcher should not have been present during testing. It is likely that some participants were worried the researcher was watching. A playlist should have been made with a two minute silence break between each song, allowing the participants to evaluate their emotion without pressure. This study should be done again, with careful notice to extraneous variables.

Past research suggests that music immensely elicits emotion (Trainor & Schmidt, 2003). This study is consistent in that music elicits emotion and that young adults feel more upset in the sad condition than the middle age adults do. It has been suggested that with experience, emotions are better regulated. Since music is able to elicit emotion, and emotional regulation improves with experience, further research should examine whether music can help unstable individuals. A larger focus should be given to help younger individuals deal with their emotions in a controlled environment. Further research should investigate the importance of music as a useful tool to help induce emotion and in turn help regulate negative or unhappy emotions in younger individuals.
References


Appendix A

Please circle your age: 18-22 or 40-65

How happy/excited do you feel after engaging in this experience? Please circle the number which correlates to your level of emotion at this time.

(Not at all) 1 2 3 4 5 6 7 8 9 10 (extremely happy)
How upset/sad do you feel after engaging in this experience? Please circle the number which correlates to your level of emotion at this time.

(Not at all) 1 2 3 4 5 6 7 8 9 10 (extremely upset)
"Your Smiling Face"
Written and Sung by James Taylor

Whenever I see your smiling face
    I have to smile myself
Because I love you (Yes, I do)
And when you give me that pretty little pout
    It turns me inside out
There's something about you, baby (I don't know)

(Chorus)
Isn't it amazing a man like me
    Can feel this way
Tell me how much longer
It will grow stronger every day
    Oh, how much longer

I thought I was in love
A couple of times before
With the girl next door
But that was long before I met you
Now I'm sure that I won't forget you
And I thank my lucky stars
That you are who you are
And not just another lovely lady
Sent down to break my heart

Isn't it amazing a man like me
    Can feel this way
Tell me how much longer
It can grow stronger every day
    How much longer

No one can tell me that I'm doing wrong today
Whenever I see you smile at me
No one can tell me that I'm doing wrong today
Whenever I see your smiling face my way
No one can tell me that I'm doing wrong today
No one can tell me that I'm doing wrong today
Tears In Heaven
Written and Sung by: Eric Clapton

Would you know my name
If I saw you in heaven
Will it be the same
If I saw you in heaven
I must be strong, and carry on
Cause I know I don't belong
Here in heaven

Would you hold my hand
If I saw you in heaven
Would you help me stand
If I saw you in heaven
I'll find my way, through night and day
Cause I know I just can't stay
Here in heaven

Time can bring you down
Time can bend your knee
Time can break your heart
Have you begging please
Begging please

(instrumental)

Beyond the door
There's peace I'm sure.
And I know there'll be no more...
Tears in heaven

Would you know my name
If I saw you in heaven
Will it be the same
If I saw you in heaven
I must be strong, and carry on
Cause I know I don't belong
Here in heaven

Cause I know I don't belong
Here in heaven
Table 1. The Summary Table of the 2x2 Mixed ANOVA.

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