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Art & Culture, Music

THE EFFECT OF EMPATHY MANIPULATION ON EMOTION AND PHYSIOLOGICAL ACTIVITYThe effect of empathy manipulation on emotion and physiological activity Nicklas DahlUniversity of South Wales16059077AbstractIn this study, we investigated what the effect of manipulation of empathy would have on music-induced emotions and physiological activities by playing two pieces of music, one considered sad and one considered joyful, to 63 participants with instructions of high and low empathy. During the listening of the music, physiological measures, skin conductance level (SCL), heart rate (HR) and respiration rate (RR) were measured and music-induced emotions were measured using Geneva Emotional Music Scale, provided to the participants after the listening of the music. The results indicated that high empathy had a significant effect on the music-induced emotions and all physiological activities except for SCL and high empathy increased heart rate, sad activation and respiration significantly. IntroductionWhen speaking about empathy, one is referring to the ability of a person to understand and react to another individual's experiences. (Decety & Jackson, 2006). The idiom " to walk in someone else's shoes" refers to the capacity to see place oneself in a fellowman's situation and to consider their perspective which expresses the core of empathy.

These deliberate endeavours to understand how another individual might feel is called cognitive empathy (Davis, Hull, Young & Warren, 1987) and will induce similar autonomic activity that one would experience during personal emotional experiences. Accurate empathy has been suggested to be dependent not only on the capacity of individuals to comprehend the emotional reaction others would have in a given situation but also on an

individual's ability to physiologically synchronise with the observed individual (Levenson & Ruef, 1992) and measuring physiological patterns when investigating the agency of empathy might, therefore, be advantageous. In the last decade, a lot of research has been conducted regarding empathic reactions to music. While being a big part of empathy, cognitive empathy has been argued to a central route of music-induced emotions (Nyklicek, Thayer & Van Doornen, 1997) with the theory that the emotions induced by music occur when the observant presume the emotions of the performer or creator of the music in question by listening to the character of the music, the colors of the voice or the lyrics (Scherer & Zentner, 2001). Miu and Baltes (Mui & Baltes, 2012) argue that manipulation of empathy during music listening is key to further build knowledge about the matter, in their study where they tested the causal relationship between music-induced emotions and cognitive empathy.

Similarly, in this current study, the aim is to explore how the manipulation of cognitive empathy will affect the music-induced emotions and physiological activity. Our three hypotheses are: compared to low empathy, high empathy would increase music-induced emotions and physiological activities. Compared to joyful music, sad music would increase physiological activities. BIOPAC measure is consistent with scale measure.

MethodParticipants63 participants were included in this two-way within participants study (gender and age were not recorded or collected). The participants were all second-year university students of psychology. MaterialTwo pieces of anonymous classical music, both played with a violin

and both lasting for one minute each, were used in this study. Prior to the study, an independent group was used to rate the emotion induced by each piece. One piece was rated as joyful and the other was rated as sad. A pair of regular computer headphones was used to play the pieces of music for the participants from the computer. Self-report measuresTo measure the music-induced feelings, the Geneva Emotional Music Scale (GEMS) was used by giving the participants a paper composed of nine emotional scales: power, joyful activation, nostalgia, wonder, transcendence, peacefulness, tenderness, tension, and sadness, asking them to scale their emotions induced by the music but using numbers, 1-5. Physiological measuresRespiration rate, skin conductance level and heart rate were recorded throughout the experiment using a BIOPAC MP36 unit and a specific set of transducer and electrodes.

Respiration rate – Respiration was recorded into BIOPAC recorder, going through one channel of the BIOPAC using a respiratory belt transducer model SS5L, which is capable of recording extremely fast and extremely slow respiration patterns resulting in an accurate recording. It was placed around the chest, applied over thin clothing, below the armpits and above the nipples with correct tension. Skin conductance level – The skin on the fingertips of the participant was cleaned accordingly. Then, the EDA SS57L electrodes, connected to one channel of the BIOPAC, were connected to two disposable Ag-AgCl electrodes (EL507), filled with isotonic gel, and attached to the volar surfaces of the participant's medius fingers and index fingers of their non-dominant hand. The skin conductance level was recorded to the BIOPAC. Heart rate – The SS2L electrode lead set was attached to three

points of every participant's body using sticky electrodes. On the inside of the right leg just above the ankle bone, on the inside of the left leg just above the ankle bone and the last sticky electrode was attached just above the wrist on the inside of the right forearm.

ProcedureAfter attaching the electrodes for the physiological measures to the participants, they were given instructions using E-prime. Firstly, they were asked to relax and close their eyes for a 30 second period to calculate the baseline measures for the physiology measures and then given the instructions for low and high empathy listening of the music, before being presented with the two pieces of music, both lasting for one minute each. In the low empathy setting, the participants were asked to objectively listen to the music and in the high empathy setting, they were asked to vividly listen to the music. The participants were then asked to finish the GEMS after every listen to both of the pieces, in both settings.

ResultsPhysiological activityTwo-way within ANOVA revealed no significant interaction between heart rate and music type (joyful or sad) ($F_{(1. 60)} = 0. 745$, $= 0.$

392). However, there was a significant main effect for empathy level ($F_{(1. 60)} = 6. 514$, $p = 0. 013$).

Similarly, no significant interaction was found between respiration and music type ($F_{(1. 61)} = 2. 695$, $p = 0. 106$) but there was a significant main effect for empathy level ($F_{(1.}$

61) = 21. 00, p = 0. 00). Furthermore, no significant interaction was found between skin conductance level and music type (F (1.

61) = 0. 384, p = 0. 384). Similarly, empathy level showed no significant main effect (F (1. 61) = 0.

126, p = 0. 724). Scale empathyTwo-way within ANOVA revealed no significant interaction between music type and empathy for sadness (F (1. 55) = 1. 752, p = 0.

191). However, there was a significant main effect for empathy level (F (1. 55) = 72. 008, p = 0. 00)Furthermore, no significant interaction between music type and empathy was found for joyful activation (F (1. 55) = 0. 486, p = 0. 489).

There was a significant main effect for empathy (F (1. 55) = 55. 06, p = 0. 00).

DiscussionIn support of the hypothesis that high empathy would increase music-induced emotions and physiological activities, the results indicated that high empathy had a significant effect on the music-induced emotions and all physiological activities except for SCL, which was increased but not significantly (p = 0. 724), and high empathy increased heart rate, sad activation and respiration significantly, similar to the results in the study of Miu and Baltes (2012). Unlike the study of Miu and Baltes, we did not take into account the individual emotions of the GEMS (such as wonder and nostalgia) leading to us missing out on that type of specificallity in the results. However, similar results were still seen. Furthermore, compared to

joyful music, sad music was believed to increase physiological activities but this was rejected. It should be stated though, in the study of Miu and Baltes, the sad piece of music degreased SCL and similar results have been reported in earlier studies, decreases in SCL can be associated with music-induced sadness (Krumhansl, 1997; Baltes, Avram, Miclea & Miu, 2011; Khalfa, Isabelle, Jean-Pierre & Manon, 2002). BIOPAC measures and scale measures were believed to be consistent throughout the results and this was true for all measures but the SCL, which was not significantly affected by the empathy level (p = 0.

724). Similar results were found in the study of Miu and Baltes. Where the physiological activities and music-induced emotions were affected in a coherent manner. One considerable difference between the current study and the study of Miu and Baltes, which might be the cause of the different results of the two studies, is that Miu and Baltes showed their participants a video of an opera singer performing the two pieces while we only played our participants the two pieces of music with no video. Operas are theatrical in nature and the performers are acting while performing the song in question and therefore changing their body language and facial expressions accordingly to the song being performed.

One could suggest that further studies on music-induced emotions are key for further deepening the knowledge about how manipulating empathy affects music-induced emotions and physiological activities. Testing people with different empathic abilities could also help further build the knowledge about the matter. Furthermore, replicating the experiment but using songs

from different genres more relevant to the participant's pallet could give other results and more insight. In the current studies, the participants listened to classical music but if more modern music was used, their response might have been different.