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## The impact of socio-economic status, life history, and biological sex on affective empathy in adults

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THE IMPACT OF SOCIO-ECONOMIC STATUS,  
LIFE HISTORY, AND BIOLOGICAL SEX  
ON AFFECTIVE EMPATHY  
IN ADULTS


A Thesis Presented to the Graduate Faculty  
of the Fort Hays State University in  
Partial Fulfillment of the Requirements for  
the Degree of Master of Science

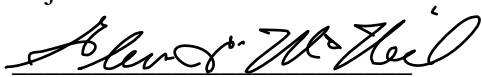
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## ABSTRACT

A discussion of affective (or emotional) empathy as it is impacted by socioeconomic status (SES), life history, and biological sex is presented. The current study examined a gap in prior research by examining the interaction between these three variables and affective empathy. Participants were 504 adults between the ages of 18-68, with average age of 37 and primarily biological sex male (64%). Ethnicity varied with the majority as White/Caucasian (68.8%) followed in descending response rate by Hispanic or Latino/a, Black or African American, Asian, Native American or American Indian, and Native Hawaiian or Pacific Islander and 1.6% as two or more races and the majority of the sample (68%) reporting receiving a bachelor's degree. Participants were assessed using Amazon Mechanical Turk or (MTurk) by completing an informed consent and survey. The survey consisted of demographic information (including biological sex), a measure of affective empathy (BEES; Mehrabian, 1996; 1997), a measure of SES (both objective and subjective), and a measure of life history (ALHB; Figueredo et al., 2017). These surveys were presented in randomized order to reduce potential order effects and a debriefing was provided after the study was completed. Two 2x2x3 factorial ANOVA(s) were used to analyze the collected data. A significant main effect of SES (assessed as high, moderate, or low) which found high and low SES showed more affective empathy than the moderate group, life history (assessed as a fast strategy or slow strategy) which found significant differences in males when the social support function of life history is included, and biological sex (assessed as female or male) on affective empathy where biological females showed more affective empathy than biological males. These main effects were qualified by a significant three-way interaction in which biological males

with high SES and slow life history (social support resources) showed the most affective empathy. Further findings and implications are discussed.

*Keywords:* Affective Empathy, Socioeconomic Status, Life History, Sex, Factorial ANOVA

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## INTRODUCTION

### **Importance of empathy**

Empathy or the ability to vicariously feel another's emotion is a powerful social and interpersonal skill that enables connections with others and supports healthy social development and interactions (Sun, Vuillier, Hui, & Kogan, 2019). Empathy is conducive to increased interpersonal relations and healthy social interactions; such interactions provide foundational and extended benefits for mental health, such as improved support systems, increased pro-sociality, and greater ability to healthfully function within an environment (Greitemeyer, Sagioglou, 2019). Given the well-documented benefits of empathy, the current study intends to view factors that might influence the presence of empathy. These factors include: the impact of socioeconomic status (i.e., SES), biological sex, and life history on the presence of affective empathy in adults. The function of the current study will use monetary income as a specifier in socioeconomic status and apply relative deprivation theory to support the reported differences that are expected in high compared to low socioeconomic status groups. Life history theory also will be applied from the perspective of resources (i.e., organized into fast and slow life history based on prior research) that might play a role in empathic concern for others. Testosterone and social norms will be used as a supportive function to the anticipated difference in biological sex males and females in empathy responses. The overall aim of this work is to better understand not only specific variables associated with empathy, but also the interaction between these variables in enhancing or hindering empathy in an adult sample. The relevant literature regarding empathy and correlates as well as theory

connecting these variables will be reviewed in detail in the sections that follow.

### **Conceptualizing the Variables of Interest**

**Empathy.** Empathy is discussed by the dictionary of the American psychological association as “understanding a person from his or her frame of reference rather than one’s own, or vicariously experiencing that person’s feelings, perceptions, and thoughts” (APA Dictionary of Psychology, 2018). This is the definition of empathy that is used within the current study. It is important to note that empathy generally is presented in three forms including: cognitive, affective or emotional, and compassionate (Powell & Roberts, 2017). Cognitive empathy is the presence of emotion recognition and internal ability of one person to understand the emotional state of others. Affective or emotional empathy reviews attentiveness of individuals to emotional cues and the subsequent externalized or expressive comforting responses. Compassionate empathy is defined as feelings of sympathy compassion or concern for another, often conceptualized as a combination of cognitive and emotional empathy. Compassionate empathy is found to be the most socially desirable as it demonstrates easily recognized prosocial behaviors, such as compassion (Powell & Roberts 2017).

The current study solely focused on emotional or affective empathy as there is a distinct presence of perceiving emotional discomfort in others, reflecting that emotion, and externalized helping behaviors often completed through interpersonal interactions. The perception of discomfort, reflection of emotion and expressive comforting behaviors that are present within emotional empathy may show a mirroring of another’s emotions and attempts to minimize another’s discomfort through positive or prosocial interaction.

This perception, reflection, and assist response is often referred to as “emotion contagion.” This effect has been documented in previous research and provides foundation for the current study focus, that varying levels of emotional empathy will influence prosocial behavior and interpersonal interactions (Belacchi, Carmen, & Farina 2012).

Within this study the discussion of prosocial or helping behaviors is found to be a function of affective empathy, where an individual recognizes emotions of others, reflects the emotion within themselves, then shows a helping or soothing behavior (i.e., prosocial behavior, also referred to as altruism in previous literature). This claim is supported by the empathy-altruism hypothesis which was developed by social psychologist Dr. Daniel Batson (Batson, 1987; 1991). The hypothesis discusses how the increased empathic emotion stimulates altruism motivation, or the use of prosocial interaction to comfort another person. Within the empathy-altruism hypothesis, empathy is assessed as feelings of compassion, concern and reflection of other’s emotions in one’s own self. Altruism is assessed as an intentional state of motivation in which an individual actively tries to comfort the other person, with the goal of resolving or aiding the other person’s discomfort. The processing of another’s emotion through affective empathy has the potential to lead to prosocial helping behaviors. Batson further outlines that “feeling empathy for a person in need leads to increased helping of that person” (Batson, 2002, pg. 488). Although Batson’s original hypothesis of the connection between emotional empathy and altruism (or prosocial behavior) was created several decades ago, current research still reflects similar tenets; that is, emotional or affective empathy can translate

to helping behaviors. For instance, more recent research completed in 2011 by Gerdes, Segal, Jackson, and Mullins evaluated the importance of empathy, the development of empathy, and the role of mirror neurons and neuroplasticity in empathy. Empathy was found to be foundationally necessary to foster prosocial behaviors for others in a community and interpersonal setting as well as develop and maintain cognitive abilities. Gerdes and colleagues (2011) discuss empathy and emotion regulation as a facilitated response that is developed through warm and nurturing relational contexts, this is referred to as the “attachment system” (Gerdes, et al., 2011). The attachment system evaluates the connection and warmth that is found with caregivers and an individual at a young age. The greater the connection and relational development with the caregiver the stronger neural pathways regarding prosocial traits and empathy become through the use of mirror neurons in which one is able to replicate behaviors and emotions in others. The fewer connections an individual has to a caregiver the higher the likelihood that neural pathways enabling empathetic concern and related emotional responses will dissolve (Gerdes et al., 2011).

Gerdes and colleagues also found that while attachment to a warm caregiver at a young age may be useful in the development of empathy and emotional regulation pathways, that warm interactions later in life can also foster the development of empathy and prosocial traits in adults (2011). This work helps to support a connection between emotional empathy and prosocial behavior as well as provides additional explanation regarding the development of empathy. The current study aims to expand on this information by furthering exploring demographic and situational variables, such as SES,

life history, and biological sex that might predict emotional empathy in adults.

**Socio-economic status and life history.** The study examined the factors of socioeconomic status (SES) and life history. Although it is important to note that these are two distinct and separate constructs, prior research suggests that these two constructs can be linked. To conceptualize SES, we draw from a definition provided by the American Psychological Association (2018). Socioeconomic status is “the position of an individual or group on the socioeconomic scale, which is determined by a combination of social and economic factors such as income, amount and kind of education, type and prestige of occupation, place of residence, and — in some societies or parts of society — ethnic origin or religious background” (APA Dictionary of Psychology, 2018). This definition of socioeconomic status (SES) used within the current study; however, the status of SES in this study will focus specifically on monetary income as a means to measure and capture SES among the sample. Socioeconomic status will be measured through subjective and objective means. Subjective self-perceptions of SES will be assessed by a self-report measure that explores how participants feel about the amount of money they make in relation to their overall satisfaction; an objective measure will be comparison of reported monetary income to the median income in America. With this definition and measurement of SES in mind, tenets of life history also can be applied and explored.

Life history theory is a dual modality that has been theorized by researchers to impact behavior based on the presence of resources and interactions in ones' early life. Past research has explored life history theory in relation to a variety of behaviors and

outcomes. For example, Figueredo and colleagues (2013) explored how a person's life history strategy (categorized as fast or slow; more details can be found below on these strategies) may influence decisions, such as reproductive choices. For the purpose of this study, the tenets of life history theory – namely that resources, interactions, and early experiences can influence behaviors and outcomes – will be applied to empathy. As briefly mentioned above, life history theory is divided into fast and slow life strategies. A fast life history strategy (also referred to as the r-strategy; Figueredo, Cabeza de Baca, & Woodley, 2013) indicates instability of resources, such as money, food, housing, social interactions, and other basic needs that would often not be met consistently or at all (Zhu, Hawk, and Chang, 2018). Slow life history (also known as the K-strategy; Figueredo et al., 2013) in contrast would show consistency in resource availability, such as access to financial means, unhindered social development, education, and access to clothing and housing.

For the purposes of this study, specific resources (i.e., interpersonal interactions with others; planning capabilities; and social support resources) were examined in relation to life history. Empathic modeling or the presence of socially learned empathic behaviors is evaluated in life history through *interpersonal interactions* and *planning* resources in early life as well as social support resources. Interpersonal interactions and planning are anticipated to be areas where empathic modeling may take place through friendship, the development of concern for others, as well as intentional planning of future events to engage in interactions with others where levels of connection may vary. In contrast *social support* resources evaluate parental, caregiver, and familial interaction



where the significance of connection (or lack of connection) is anticipated to influence a fast or slow life history as well as the opportunity for empathic modeling to take place.

One having a fast or slow life history (based on available resources) is theorized to impact behavior based on the needs that arise from the stability or instability of one's background. Zhu and colleagues (2018) discussion of fast life history includes that the lack of available resources would lead to more interpersonal reliance within a community. Reliance that is theorized to increase prosocial and helping behaviors in order to obtain needed goods and survive in a hostile environment (Zhu et al., 2018). In contrast, it is also estimated that the lack of need presented by a slow life history group with consistent resources would not support the development of interpersonal reliance such as seen in the fast life history group.

Sun et al., in 2019 support the concept of life history or foundation of resources impacting behaviors and reported empathy in adults. Sun and colleagues (2019) found that those with inconsistency in resources (like money/financial means) showed more adaptive coping to their environment to gain access to resources and reported higher scores on empathy measures. Slow life history, or those with more consistency in resources, were shown to have fewer adaptive coping mechanisms, and reported lower scores on empathy measures when compared to the fast life history group (Sun et al., 2019). In addition, recent research by Martin and colleagues (2019) has indicated that early encounters of unfavorable conditions are in fact solid indicators of fast life history. This involves eccentric situations, including parental occupation, misfortune, and regular changes in family structure, youth abuse, and low financial status (or low SES). Overall,

low SES individuals were found to display fast life history more frequently than the individuals who were not presented to such situations, such as high SES groups (Martin et al., 2019).

**Biological sex.** Biological sex is discussed as “the biological distinctions between males and females, most often in connection with reproductive functions” (Short, Yang, & Jenkins, 2013). This is the definition of biological sex that was used within the study. This study will be specifying biological sex as male and female; although, we would like to note that additional distinctions, such as intersex also may be possible. In 2018, Chen, Feng, and Lu found that biological sex women scored significantly higher in empathy traits than men, in addition the study also reported the presence of free testosterone decreased cognitive and emotional empathy. Research done by Schulte-Ruther, Markowitsch, Fink, & Piefke in 2008 found that biological females often score significantly higher than biological males on generalized empathy measures. Schulte-Ruther and colleagues (2008) found the difference in empathy scores may be explained partially by biological sex male-female differences found in neural regions that mediate the presence of empathy. Differences were found in the mirror neuron activation system, emotional perception that fuels cognitive empathy, and affective empathy responsiveness. The authors found that the mirror neuron and affective responsiveness pathways were more active in females than males, but the emotion perception connections were consistent between male and female participants. This shows females tend to have a greater amount and greater strength of pathways that support empathic behaviors and

responses, whereas men tend to have fewer connections and weaker pathways that reduce empathic responses (Schulte-Ruther et al., 2008).

Supporting the previously mentioned research, a study by Decety and Jackson in 2006 further expresses the difference in biological sex on empathy based on the neural regions used in perceiving, reflecting, and responding to the emotions of another as seen in affective empathy. Decety and Jackson (2006) discuss data regarding biological sex and the functioning of specific brain regions. This includes the insula, right temporal-parietal region and the anterior cingulate cortex, in which the researchers found greater activation in the noted neural regions in biological sex females compared to biological sex males. Further, the distribution of Von Economo Neurons, which are functional in their relation to the noted brain regions and impact the presence of social interaction, may also be distributed differently based on biological sex (Decety & Jackson, 2006; Ibegbu, Umana, Hamman & Adamu, 2014).

Drawing from this literature, the current study aimed to measure biological sex and examine potential interactions between sex, SES, and life history in relation to affective empathy. The current study sought to conceptualize the variables based on the reviewed works definitions. To further support the use of these variables, prior literature connecting these variables to empathy will be outlined below.

### **Review of Prior Literature: Connections between Variables of Interest**

**A connection between empathy and SES.** In 2010, Piff, Kraus, Côté, Cheng, and Keltner found that people who identified as lower-class or low SES reported being more generous, trusting, helpful and charitable in comparison to their high SES

counterparts. Despite lower SES, which is associated with fewer resources, greater threat or risk exposure, and a reduced sense of personal control, those in a lower SES show more prosocial behavior, while those with a higher SES show lower prosocial behavior. The authors discuss this rise in prosocial behavior based on social class and SES as a means for low SES groups to adapt to more hostile environments by orienting themselves to the welfare of others, it is this change in orientation gives rise to greater prosocial behavior. (Piff, et al., 2010). This explanation may speak to the information provided above in connection to life history as well.

In a study performed by Sun and colleagues (2019; described briefly above), the researchers discussed the potential relationship between empathy and coping in relation to an individual's SES. The findings of this study discuss the presence in help-seeking behaviors and willingness to help those in need based on SES. Sun et al, (2019) found that higher empathy individuals were more willing to engage in prosocial helping behaviors as well as more willing to seek those adaptive coping resources out for themselves in times of need, and tended to be of a lower SES. In contrast to the lower SES group, the study discussed the presence of higher SES in participants being related to fewer maladaptive coping mechanisms, but also showed a decrease in prosocial and adaptive coping resources.

The relevance of this research to the current proposal is the relationship discussed between empathy and prosocial behaviors and objective SES, from such research one may form a hypothesis regarding the lack of empathetic and prosocial behaviors among those from a higher SES groups (Sun, et al., 2019). The rich protection hypothesis

discussed by the researchers suggests the presence of empathy is stronger in those with a lower SES than those who have a higher SES. This is due to the individuals with a higher SES having better access to resources and lesser dependence on others in their community. Such findings are supportive of the social power difference that may be found in the high and low SES populations.

The social power difference indicates variation in available resources both financial and emotional. Variations in this power difference and ability to access resources may influence emotional empathy. The presence of this power and influence have implications for the development and presence of emotional empathy in both high and low SES groups as those with fewer interactions due to reduced reliance on others, such as reported in high SES groups, have lesser opportunity to develop the emotion contagion effect previously described, and those with greater interpersonal reliance and more interactions, such as in low SES groups, would have greater opportunity to develop emotion contagion effect of emotional empathy (Belacchi, Carmen, & Farina 2012).

It is estimated that this social power difference between high and low SES enables those of a higher SES to have lesser levels of empathy and prosocial behavior as a lack of the need for prosocial traits; in contrast to the low SES population which would subjectively rely on each other in prosocial behaviors to gain access to needed resources. Using relative deprivation theory as an additional support, Greitemeyer and Sagioglou (2019) discuss the implications of wealth or SES on behavior, emotions, and cognitions, specifically prosocial and aggressive behaviors. The research hypothesized that according to the deprivation theory, participants being targeted with undeserved disadvantage

would respond with actions directed at the source of the inequality. This showed to be consistent with the results, as participants who were exposed to the relative deprivation behaved with a higher presence of aggressive affect and maintained the aggressive tendencies in contrast to those participants who were exposed to a relative gratification condition.

However, it is important to note that in contrast to the aforementioned theories and findings, there also have been reports of less prosocial behavior in low SES groups. “Low subjective SES was related to increased aggression. In contrast, subjective SES was not negatively related to trait and state measures of pro-sociality” (Greitemeyer & Sagioglou, 2019, p.78). This finding, however, was specific to a population sample from Germany, while the current study is focusing on a sample of only individuals from the United States. While the results found contradictory evidence to the present hypothesis what this study demonstrates is that wealth, status, and overall self-perception of ones’ economic power influences how individuals may respond, feel and think about themselves and their surroundings as well as impact the individuals’ outward expressions of behavior. The implications of such research to the current study proposal is a confirmation in an emotional and behavioral difference in those with higher self-perceived income, and those with low self-perceived income. Subjective and objective income is an important qualification to observe, as when Greitemeyer and Sagioglou described participants who felt neutrality towards the inequality did not experience cognitive and behavioral differences compared to the control group (2019).

Further, Foster, Elishberger, & Hill (2018) discuss the influence of SES and

prejudice in mental health. The researchers found that higher subjective SES, lower levels of empathy, and lower levels of knowledge or education about mental illness increased the likelihood of prejudice to occur against those with a mental illness. The discussion of empathy, personal acquaintance or prosocial interactions and socioeconomic status by Foster and colleagues (2018) describes a significant relationship between the predictors. High subjective SES participants tended to show lower empathic concern and higher prejudice thoughts and behaviors to those with mental illness compared to their low SES counterparts; high SES also related to lower levels of knowledge regarding the mentally ill population (Foster et al., 2018). Having a higher subjective SES represents a personal belief of having a high social class, including feelings of high income, high education, and availability of resources. “High-SES participants showed significantly higher levels of social disengagement behaviors (i.e., self-grooming, doodling, object manipulation) and significantly lower levels of social engagement behaviors (i.e., nodding, laughing, raising eyebrows) than their low-SES counterparts” (Foster et al., 2018, p.140). The authors speculate on the difference in social disengagement and social engagement behaviors to be based on interpersonal relations and dependence on others. Similar factors, interpersonal relation and dependence also are discussed as a function of life history.

**Empathy and its relation to life history.** Life history theory discussion by Zhu and colleagues in 2018 posits a dual-modality of life-history theory as intuition in sequence with mortality, however, only the discussion of life history theory will be presented here, as it applies to the evaluation of SES in the presence of empathy in adults.

Zhu et al., discuss Life History theory (LH) as a way to identify prosocial and empathetic behaviors, as well as apathetic and non-prosocial behaviors based on the availability of resources during one's childhood into adulthood. Life history theory discusses other person-centered behaviors or empathetic and prosocial responses to be valued in most cultures and societies. Zhu et al., discuss the presence of theoretical perspectives that include the evolutionary benefits of being prosocial, such as the ability to access resources and support longevity and health in an individual's life.

The question of why we may see an absence of prosocial behavior in some is important to explore. It is estimated by LH theory that one may develop or dismiss such empathetic responses and prosocial behavior based on the availability of resources during an individual's development. The presence of fast life history or slow life history is not determined by genetic features but rather socially evolved cognitions and behaviors. The development of either a slow or fast life history is heavily dependent on the consistency or unpredictability of one's environment and resources within this environment. Influences to a fast or slow life history is further described by evaluating two sections/resources: *interpersonal interactions* and *intentional planning abilities* as well as *social support* resources. These sections (or resources) of life history are thought to encompass areas measured by life history that look at the potential of empathic modeling or a social learning of empathic behaviors. Interpersonal interactions and planning such as ability to manage one's personal interactions and describe having emotional interaction in early development may lead to a fast or slow life history based on the availability of such planning or interactions. Further social support is also anticipated to



influence affective empathy where functions of one's development, such as parental or caregiver support are instrumental in understanding how the presence of empathic modeling; namely, connection between those close to an individual in early life may impact the development of a slow or fast life history and consequently influence empathic behavior in the individual in later life.

If fierce competition for resources is present, then one may find the fast life history strategy to be more receiving. Fast life history emphasizes a need for survival and consequently increased dependence on others as well as increased prosocial behavior requirements compared to slow life history; in which an individual has consistency in resources and does not require the ability to produce prosocial and empathetic behaviors though they may have more access to empathic modeling. More specifically, the researchers suggest that "slow LH strategies also involve emotional processes that prompt individuals to care for others, such as emotional attachment and empathic concern" (Zhu et al., 2018, p.188).

Further, Zhu and colleagues (2018) found that cognitive processes, such as coping and prosocial behavior as an emotional process positively predict the presence of empathy such as would be found in those who are dependent on others. Fast life history would show less adaptive coping depending on the severity of the instability of resources, and socially insecure emotional display such as overattachment. Important for the current study, fast and slow life history provide a means to help further explain how lack of resources (such as money or consistency in social environment) influence empathy, and perhaps subsequently, prosocial behaviors.

In relation to financial resources, Korndörfer, Egloff, and Schmukle in 2015 evaluated the likelihood that social class impacted prosocial behavior, this analysis looked at varying types of prosocial behavior, country of origin, and measures of social class. Eight studies were performed that found that those of higher social class were more likely to make charitable donations and contribute higher percentages of family income to a charity than low SES counterpart. Aside from donations, those with high SES in this study were found to be more likely to volunteer, be helpful, and be more trusting and trustworthy when engaging in economic games with strangers. The presence of types of prosocial behavior did not vary across social classes.

Implications of Korndörfer and colleagues' study would encourage that those of a high SES show more prosocial behaviors than low SES participants primarily through the distribution of excess resources and monetary funds; however, the prosocial behaviors may serve other functions of social influence rather than a demonstration of empathy. The discussion of Life History Theory, specifically slow life history would support this discussion of high SES participants in regards to donations and monetary fidelity, due to a more generalized sense of security both monetarily and in connection to other resources, which may allow those with slow life history and high SES to be less restricted, such as with the use of resources both in games and monetary donations (Zhu et al., 2018). Prosocial behaviors were noted to be consistent in both the high and low SES groups suggesting that empathy is a feature of prosocial behavior (similar to Batson's empathy-altruism hypothesis), however, empathy is independent from prosocial nature in its development and presence in the adult population. In addition to

demographic and situational factors, like SES and life history, biological sex also may play a role in empathy.

**Empathy as a function of biological sex.** Biological sex influences hormonal distribution in the brain and body, the difference of hormonal distribution between biological sex male, female, and intersex have been shown to impact empathic capabilities (Chen et al., 2018). In a study by Chen, Feng, & Lu, free testosterone levels were found to be negatively correlated with self-report scores on measures of empathy, while estrogen levels showed a positive correlation with self-report scores on measures of empathy.

As mentioned previously, research completed by Schulte and colleagues (2008) found differences in the mirror neuron activation system between biological males and females, the mirror neuron is a vital function of empathy ability as mirror neurons support the reflection of another's emotion within ones' self and enables an individual to display cognitive empathy. Further, research by Ibegbu and colleagues (2014) found that the anterior cingulate cortex, insula, and right temporal-parietal region impact the capacity of an individual to display empathy based on the presence of Von Economo Neurons and activation of these regions. The anterior cingulate cortex which relays neural signals transmitted from the amygdala functions as a focus of the primary processing of emotions to narrow the complex transmission patterns of emotional responses to stimuli. This shows that the amygdala's reception of emotional stimuli and processing of such emotion is reliant in part on the anterior cingulate cortex to narrow the proportion of neural response patterns into relevant information, activation in this region

may show that one is more capable of perceiving, processing and reflecting the emotions of others as a functional portion of showing affective empathy.

The insula enables an individual to engage with others intentionally as it relates to self-awareness, intentional deceit, planning and willingly engaging a specific role with other people (Ibegbu et al., 2014). The interaction between activation in the insula and intentional engagement with other individuals and self-awareness supports the consistency between being able to perceive another's emotions, and engage in helping or soothing behaviors as shown by affective empathy, low activation in this or other noted regions may restrict an individual's ability to intentionally interact with others. The presence of such neurons is also found in the dorso-lateral prefrontal cortex where many emotional processes, memory, and intentional restriction of inapt responses. Activation in the dorso-lateral prefrontal cortex serves a vital function in coordination with the insula and anterior cingulate cortex which regulates the amygdala to enable an individual to act intentionally based on perception and reflection of emotional stimuli (Ibegbu et al., 2014). Lack of activation within the noted regions as based on biological sex may impact an individual's ability to show affective empathy (Ibegbu et al., 2014).

Differences based on biological sex also were found based on the activation of the affective responsiveness pathways in participants, these pathways enable a person to perceive and reflect in themselves the emotions of others. The noted neurocircuitry that is encompassed by the affective response pathway includes the medial prefrontal cortex and the amygdala which Schulte, Müller-Oehring, Pfefferbaum, and Sullivan in 2010 through a study using

functional neuroimaging found that the affective response pathway is not a dedicated pathway rather it is better defined by the researchers as “Not a single brain region, but rather the interaction of various interconnected structures, that enables emotional control (Schulte, et al. 2010, pg 555)”. The epicenter of such control researchers discussed the impact of the medial prefrontal cortex and the amygdala, though the affective response pathway also influences other limbic regions the such as the prefrontal cortex, and hippocampus. The amygdala was found to directly mediate emotional learning. Neural plasticity in this region was found to be associated with encoding emotional components and facilitating emotional memory. The medial prefrontal cortex maintains inhibitory control regarding emotion and reward processing these areas were found to show inverse activity which may influence presentations of affective empathy based on activation of the noted neurocircuitry commonly referred to as the affective response pathways. (Schulte, et al. 2010).

Schulte and colleagues in 2008, found that the affective or emotional response pathways were more active in females than males (Schulte, et al. 2008). This shows a difference in neural region activation, mirror neurons, affective response pathways and hormonal influence in biological sex male and female that better enable female participants to perceive and reflect emotions of others. Differences in the ability to perceive the emotions of others impacts one’s ability to reflect the emotion and respond in a prosocial or helping behavior as would be measured by affective empathy.

Additional research supports this finding. For instance, Kanthan, Graham, & Azarchi (2016) performed a study in which middle school aged participants responded to

empathy related questions and the use of laughter to bridge social connections with the “in” and “out” groups over time. The purpose of this study was to understand empathy in children as a form of primary prevention of low empathy levels in college age students. The researchers found that male participants responded with less prosocial interaction and lower scores on an empathy measure than the female participants. This quasi-experimental study found that levels of reported empathy are lower in males than females. The researchers also found that as age was related to empathy; as females got older so did the score on an empathy measure, however, males were found to show similar rates of empathy throughout the entire study, regardless of age. The researchers suggest this biological sex difference is found due to the influence of social norms on displays of emotion and empathy. Wherein males are shown far less encouragement to show emotion than their female counterparts based on the dominant culture. The researchers also speak to an inherent difference between males and females regarding capacity for empathy (Kanthan, et al., 2016).

Further, Kanthan and colleagues discuss a cultural influence, and inherent difference regarding capacity for empathy with female participants tending to receive higher scores on measures of empathy compared to male counterparts. The difference is supported by previously discussed literature noting differences in biological sex on the presence of activation in mirror neurons and affective response pathways (Kanthan, et al., 2016; Chen et al., 2018; Schulte et al., 2008; Gerdes et al., 2011; Decety & Jackson., 2006). The current study aims to support this difference by examining the affective empathy scores of biological sex male and biological sex female participants. A

difference is anticipated due to influence of neural activity and hormonal difference found between biological sex male and female and social norms as influenced by SES and life history on capacity for affective empathy.

### **Overview of the Current Study**

The current study examined the influence of SES, life history, and biological sex on emotional empathy in the adult population within the United States of America. Although each variable of interest has been previously examined in relation to empathy, prior research and findings on this topic suggest some inconsistencies. For example, some research suggests that people who report low SES also generally report more affective empathy; however, other reports suggest the inverse that high SES individuals report more affective empathy. The current work expanded on prior literature by examining the variables of interest to better understand how each variable impacts the presence of affective empathy. Furthermore, the current study expanded on prior literature by connecting the variables of interest to test for possible interaction effects. The interaction found in relation to SES, life history, biological sex and affective empathy, contributes useful information to the existing (but somewhat inconsistent) literature. With prior research and theory in mind, the following hypotheses were developed.

H1: There will be a main effect of SES on affective empathy. Participants who report low SES will report higher emotional empathy compared to participants who report high SES.

H2: There will be a main effect of life history strategy on affective empathy. Participants who report a faster life history strategy will report more emotional empathy

than participants who report a slower life history strategy.

H2a and H2b<sup>1</sup>: Life history will be measured through the resources of *interactions* and *planning* as well as *social support* resources. For both sets of resources (H2a: interactions and planning; H2b: social support), we expect that participants with a faster life history (or less interaction/planning resources and less social support resources) will report more affective empathy than those with a slower life history.

H3: There will be a main effect of biological sex on affective empathy.

Participants who report a biological female sex will report more emotional empathy than participants who report a biological male sex.

H4: These main effects will be qualified by a significant three-way interaction.

Female participants who report low SES and faster life history strategy will report the highest affective empathy.

## METHODS

### Participants

The current study recruited 504 participants. Participants were 181 females (36% of the sample) and 322 males (64% of the sample). A majority of participants self-identified their ethnicity as White/Caucasian (68.8%) followed by 10.7% identifying as Hispanic or Latino/a, 9.5% identifying as Black or African American, 5% as Asian, 4% as Native American or American Indian, 0.4% as Native Hawaiian or Pacific Islander and

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<sup>1</sup> Based on the survey used to measure life history, the researchers created two variables. One variable assessed resources of interpersonal interaction and planning and the other social support resources as consistent with the questions used on the life history measure. As such, these two sets of resources were analyzed separately as contributing to life history.



1.6% as two or more races. The age of participants ranged from 18-68 years old with the average being 37 years of age ( $SD = 11.17$ ). A majority of participants (62.7%) reported earning a Bachelor's degree with about 19.5% reporting an advanced degree (e.g., Masters or Professional degree). About 13.4% reported at least some college experience (e.g., Associates degree or college credit) and about 4.4% reported having a high school degree.

The individual annual reported income of the sample ranged from \$2,000 to \$200,075; the average income of the sample was approximately \$50,700. From this information we created three groups (low; moderate; high-income groups) based on the reported income information obtained from our participants. The average individual income for the low-income group was \$24,162. For the moderate-income group the average individual income was \$48,671 (almost at the average for the entire sample). Finally, for the high-income group the annual individual income was \$84,448. Compared to the national average the participants of this study showed to report higher than average income in comparison to the national average of \$30,621 and median joint income of \$60,293 per house hold. However, poverty is also reflected in the sample with 11% of the United states falling below the poverty line of \$12,000 per person per year (U.S. Census Bureau QuickFacts: United States., 2019). Similar distribution of poverty was found in the current sample.

The sample was selected from the United States of America population using random sampling through the service Amazon Mechanical Turk (MTurk). No restrictions or exclusions were placed on participants, aside from participants needing to be 18-65

years old and currently living in the USA. All APA ethical guidelines were followed in gaining consent, providing a debriefing, and keeping all identities and responses of participants anonymous; this was achieved by maintaining any records in MTurk secure drive and limiting access only to researcher and thesis advisor. Any information that may have been linked to personally identifiable information such as names, social security number, phone numbers, and email addresses was not collected. Important for the present study, prior research has shown that MTurk samples tend to be more diverse than convenience samples, such as undergraduate samples (Keith, Tay, & Harms, 2017; Landers & Behrend, 2015). Additionally, researchers have found that data collected through MTurk is similar in quality and reliability to data collected from undergraduate psychology students (Buhrmester, Kwang, & Gosling, 2011). For this particular sample, we did find slightly more diversity of age, ethnicity, income, and education level than a typical college sample.

### **Design**

This comparative study analyzed using a 2x2x3 factorial ANOVA to account for multiple levels in the independent variables and a single dependent variable. The independent variables (or factors) used in this study were SES (analyzed as either low, moderate, or high), life history strategy as further separated into subcomponents of *interactions and planning* as well as *social support*, (both forms of resources analyzed as either fast or slow), and biological sex (analyzed as either male or female). The dependent variable was affective empathy analyzed as a continuous variable. Conducting a 2x2x3 factorial ANOVA allowed the researcher to assess possible main effects for each

independent variable on the dependent variable as well as possible interaction effects.

Although we primarily probed for and focused on a three-way interaction between SES, life history (at the interaction and planning as well as support levels), and sex, two-way interactions between the independent variables also were examined in addition to possible main effects.

## **Materials**

**Affective Empathy.** The main outcome variable for this study was affective empathy. The *Balanced Emotional Empathy Scale* developed by Mehrabian consists of 30 items and has a construct validity and internal consistency in prior research of  $\alpha = .87$  (BEES; Mehrabian, 1996; 1997). The BEES is a unidimensional measure of affective/emotional empathy. The BEES follow a self-report style of empathy in which participants respond to items on a scale that assess their ability to vicariously experience other's emotions with higher scores representing higher levels of empathy. Items were measured on a 5-point Likert Scale (1=strongly disagree to 5 Strongly agree). Examples of the items include: "I cannot feel much sorrow for those who are responsible for their own misery" and "I am moved deeply when I observe strangers who are struggling to survive." A composite score was created by averaging the items used for this scale. The current study found the Cronbach's alpha to be  $\alpha = .86$ , suggesting strong reliability. For the full scale, please see Appendix A.

**Socioeconomic status (SES).** As mentioned previously, SES was examined from both a subjective and objective assessment (see Appendix B). Although we only included the objective assessment (i.e., asking people to report their individual annual income in

US dollars) in our main analysis to examine how high SES compared to low SES might influence affective empathy, we did ask participants to complete a more subjective measure based on their satisfaction with their annual income. This question was rated on a Likert-Type Scale of 1-5 (1 = very dissatisfied to 5 = very satisfied). This subjective measure was not included in the main analysis; however, it is important to note that for this sample that the average score on this question was a 3.46 ( $SD = 1.02$ ). This might suggest that participants were at least somewhat satisfied with their current annual income as the average score was above the mid-point of the 1-5 scale.

**Life History.** The K-SF-42 Short Form of the Arizona Life History Battery (ALHB; Figueredo et al., 2017) was used to assess life history strategy. This short-form is a battery of cognitive and behavioral indicators of life history and asks participants to respond to a series of questions regarding various types of resources. Overall, the measure consists of 42 questions that examine many domains including: interpersonal interactions and planning (e.g., “I spend a great deal of time per month giving informal emotional support to casual acquaintances (such as neighbors or people at church); “I find I usually learn something meaningful from a difficult situation) and support resources (e.g., “How much have your relatives told you that you had done something well?; “How much have your friends shown interest and concern for your well-being?”).

For the purposes of this study, the researchers created composite scores of life history by averaging items assessing similar resources. For example, an *interactions and planning* variable was created by averaging the items used to measure involvement and interactions with others in the community (like helping neighbors, family, and communal

connection with church members/religion) as well as planning and problem-solving questions (like taking the time to thoughtfully plan through situations). These questions were measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Twenty-four total questions were used to comprise the *interaction and planning* variable. The Cronbach's alpha value for this composite variable was .90, suggesting strong reliability.

In addition to the *interactions and planning* variable, we also created a variable to denote *social support* resources. This *social support* variable consisted of questions regarding support resources and care received from others, such as how much love and affection the participants received from people around them (e.g., caregivers, relatives, and friends). These items were measured on 4-point Likert type scale (1 = not at all to 4 = a lot). Eighteen total questions were used to comprise the *social support variable*. The Cronbach's alpha value for this composite score was .83, suggesting strong reliability. For the full scale and list of all items, please see Appendix C.

**Biological sex.** Participants were asked to identify their biological sex from a list of male, female, or intersex/other. If other was selected, we requested that the participant completed information about their preferred biological sex. To see the demographic questions, please see Appendix D.

**Additional demographic information.** Participants responded to additional questions about their age as well as their ethnicity from a predetermined list including: White, Hispanic or Latino/a, Black or African American, Native American or American Indian, Alaska Native, Asian, Native Hawaiian or Pacific Islander, Other, two or more

ances. Participants also identified their level of education and current employment. For a full list of demographic questions, please see Appendix D.

### **Procedure**

Eligible participants were recruited online using Amazon's MTurk. After reading and electronically signing the consent form, the participants were presented with the demographic questions, questions about SES and sex, the K-SF-42, and the BEES in randomized order to reduce potential order effects. After completion of the survey, participants were presented with a debriefing form with more information about the study. They also were asked to enter a unique code generated at the end of the survey to enter as form (or proof) of completing the study. Participants were then paid .50 cents. After collection of data was completed, the data were directly transferred from MTurk to SPSS for statistical analysis.

## **RESULTS**

### **Data Screening**

Hypothesis testing was accomplished through the use of SPSS Version 26 software. The data were screened using the explore function of SPSS. The researchers first assessed for missing data. Any missing data were determined to be missing at random, and as such, mean values were inserted in place of missing data. Examination of boxplots for each variable of interest indicated no outliers. Further, examination of histograms indicated that the distribution shape for all variables appeared to be normally distributed; however, skewness and kurtosis scores were examined to further assess the distributions. The skewness and kurtosis values were within an acceptable range, thus

normal distributions were assumed.

Two factorial ANOVAs were conducted to test the hypotheses. Levene's test of homogeneity of variance was performed for each main analysis reported below.

Unfortunately, a violation of the assumption of homogeneity of variance was found as Levene's test was significant for each analysis ( $p < .001$ ). To account for this violation, post-hoc tests for variables with more than two-groups assuming unequal variances were used. For example, the Games-Howell unequal variances assumed post-hoc test was used when examining differences between the three income groups (low; moderate; high).

### **Hypothesis Testing**

Two factorial ANOVAs were conducted to test the designed hypotheses. SES and biological sex were used as factors and affective empathy was used as the dependent variable for both ANOVAs. The only difference between these two ANOVAs was the use of either the community interaction life history variable or the use of the social support life history variable. Both main effects and interaction effects were tested for each factorial ANOVA, and significant findings reported below.

**The effect of SES, biological sex, and life history (*interactions and planning*) on affective empathy.** A between subjects 2x2x3 factorial ANOVA was conducted. Three factors (SES; sex; life history as measured through interaction and planning resources) with two levels each for sex (male; female) and life history (slow; fast) and three levels for SES (low income; moderate income; high income) were tested to assess for differences in affective empathy. A significant main effect of SES was found [ $F(2, 491) = 4.67, p < .01, \text{partial } \eta^2 = .02$ ]. Participants reporting a moderate level income also

reported a slightly lower level of affective empathy ( $M = 3.34$ ,  $SE = .04$ ) compared to participants reporting high income ( $M = 3.51$ ,  $SE = .04$ ) and low income ( $M = 3.43$ ,  $SE = .04$ ). However, there was no significant difference between participants reporting high or low income on affective empathy. Results also indicate a significant main effect of sex [ $F(1, 491) = 30.22$ ,  $p < .001$ , partial  $\eta^2 = .06$ ]. Participants reporting as biological male ( $M = 3.30$ ,  $SE = .03$ ) scored slightly lower on affective empathy than participants reporting as biological sex female ( $M = 3.55$ ,  $SE = .04$ ). A significant main effect of life history measured through interactions and planning was not found [ $F(1, 491) = .87$ ,  $p = .35$ ].

In addition to these main effects, a significant two-way interaction between life history (measured as community interaction) and SES was found [ $F(2, 491) = 4.11$ ,  $p = .02$ , partial  $\eta^2 = .02$ ]. When probing this significant interaction, results indicate that participants reporting low income and a faster life history (or less interaction and planning resources) reported slightly more affective empathy ( $M = 3.53$ ,  $SE = .07$ ) than participants with low SES and a slower life history (or more interaction and planning resources;  $M = 3.28$ ,  $SE = .07$ ). Beyond this significant two-way interaction, no other interactions were found to be significant ( $p$ -values ranged from .30 to .55).

Overall, results of this analysis indicate partial support for the tested hypotheses. A significant main effect did emerge for SES and sex, however, no significant main effect for life history (community interaction) was found. In addition, the three-way interaction between SES, sex, and life history (community interaction) was not found.

**The effect of SES, biological sex, and life history (social support) on affective empathy.** A second between subjects 2x2x3 factorial ANOVA was conducted. This



ANOVA was identical to the first ANOVA with the exception of the life history variable. Life history as measured through social support was used as a factor for this analysis with two levels (slow; fast). Results from this analysis mirror some of the results found above. More specifically, a significant main effect of SES was found [ $F(2, 491) = 5.28, p = .01$ , partial  $\eta^2 = .02$ ]. Participants reporting a moderate level income also reported a slightly lower levels of affective empathy ( $M = 3.34, SE = .04$ ) compared to participants reporting high ( $M = 3.51, SE = .04$ ) and low income ( $M = 3.43, SE = .04$ ). However, there was no significant difference between participants reporting high or low income on affective empathy. A significant main effect of sex also was found, [ $F(1, 491) = 33.43, p < .001$ , partial  $\eta^2 = .06$ ]. Participants reporting as biological male ( $M = 3.30, SE = .03$ ) scored lower on affective empathy than participants reporting as biological sex female ( $M = 3.55, SE = .04$ ). Contrary to the first ANOVA, a significant main effect was found for the variable of life history measured as social support [ $F(2, 491) = 14.50, p < .001$ , partial  $\eta^2 = .03$ ]. Participants reporting faster life history reported slightly less affective empathy ( $M = 3.35, SE = .03$ ) than participants reporting a slower life history ( $M = 3.51, SE = .03$ ).

No significant two-way interactions emerged ( $p$ -values ranged from .14 to .98). However, these significant main effects were qualified by a significant three-way interaction [ $F(2, 491) = 3.18, p = .04$ , partial  $\eta^2 = .01$ ]. When probing this interaction further, results suggest that certain levels of SES and life history (social support) impact affective empathy for biological male participants in particular. That is, participants who reported being biological sex male as well as having a high-income level and slower life

history (more social support) reported slightly more affective empathy ( $M = 3.65$ ,  $SE = .08$ ) than male participants reporting a high-income level but faster life history ( $M = 3.22$ ,  $SE = .08$ ). See Figure 1. However, there were no significant differences when comparing biological sex female participants across levels of SES and life history (all  $p$ -values ranged from .10 to .48).

Overall, results of this analysis indicate partial support for the tested hypotheses. A significant main effect emerged for SES, and sex. However, the null hypothesis was rejected in regards to life history (social support) but the findings were in the opposite direction hypothesized. In addition, these main effects were qualified by a significant three-way interaction between SES, sex, and life history (social support).

## DISCUSSION

Two separate 2x2x3 factorial ANOVAs were conducted to assess main effects and interaction effects of the variables of interest; one using life history with the subcomponent of community interactions and the other using life history subcomponent of social support. Our results align with some of the proposed hypotheses. First, we found a significant main effect of SES on affective empathy as hypothesized; however, results suggest that the moderate-income group was significantly different than the high- and low-income groups. Participants who reported low levels of income did not significantly differ on affective empathy compared to participants who reported high levels of income. This finding does not support the anticipated differences between low- and high-income groups like originally hypothesized. Previous studies have found that high- and low-income groups have had higher empathic response, but little research has been done to

evaluate the empathic response of those within the moderate-income range. This finding that those with the highest income, and the lowest income show more empathy than the moderate income group may be explained by examining the level of personal and social connection that is present in those populations (Greitemeyer, Sagioglou, 2019); those in the high income group likely show more charitable donations and connections with others, while those with the lowest income have greater connection with other individuals and rely on such connections to achieve basic needs (Korndörfer, Egloff, Schmukle, 2015). Those in the moderate-income group would not have such interpersonal reliance, but would also be limited in how much monetary donation and social connection may be present. However, it is important to note that this finding should be explored further in future research as more information is needed to further explain the differences in affective empathy among those in the moderate-income group compared to the low- and high-income groups.

It also was hypothesized that biological sex females would report more affective empathy than biological sex males. This finding was supported in the current study as biological females reported slightly more affective empathy than biological sex males. This is estimated to be due to the combination of neurological differences that impact the capacity for empathy, and the social learning or environmental influence that may influence if such empathic traits may be learned or reinforced. The social learning factor of empathy becomes increasingly evident when comparing the capacity of empathic traits based on biological sex in that biological women did not differ in empathic response due to life history or SES, and are considered to be have a higher neurological capacity for

empathy; while biological men with lower neurological capacity for empathic traits would require more social empathic learning in order to display higher levels of affective empathy (Ibegbu et al., 2014; Schulte, et al., 2010; Zhu, et al., 2018). Although this main effect of sex was found, it is important to interpret this slight/small difference between these two groups with caution. The difference between biological sex male and biological sex female on affective empathy was about .25 (3.55 compared to 3.30). More detail can be found below about this small difference in the Limitations section.

An additional hypothesis was developed with respect to life history. It was expected that participants with a faster life history (indicating less resources) would report more affective empathy than participants who reported a slower life history (indicating more resources). To better analyze the resources, present (or not) in a participant's life history, we used a measure to assess *interaction and planning* resources (e.g., helping neighbors, family, and communal connection with church members/religion as well as planning and problem-solving resources) and social support resources (e.g., love and affection the participants received from people around them, such as caregivers, relatives, and friends). Findings indicate no significant main effect of interaction and planning resources; however, there was a significant main effect of social support resources. Participants reporting faster life history (or less social support resources) reported slightly less affective empathy than participants reporting a slower life history (or more social support resources). This finding is contrary to the hypothesized effect; originally, we anticipated that those with a faster life history would report more affective empathy than those with a slower life history. This finding, although preliminary, might

be explained through modeling and leaning literature.

This finding that slower life history individuals (with more *social support* resources) scored slightly higher on affective empathy than faster life history individuals is estimated to be caused due to the lack of empathic modeling or the learned function of empathy. Coping and prosocial behavior as an emotional process positively predicts the presence of empathy. Such skills would be more present in those with a slow life history (and social support resources available) as empathic modeling may be more present while maladaptive coping, instability in social support among other resources and insecure emotional displays would be more common in those with fast life history further limiting the potential for empathic traits to be learned. Fast life history emphasizes a need for survival and consequently increased dependence on others, while slow life history in an individual has consistency in resources such as social support which models empathic behaviors, attachment and concern (Zhu et al., 2018). However, similar to the finding of the main effect of biological sex, it is important to note that the significant difference found here between slow and fast life history measured through social support resources is small (3.51 compared to 3.35). In fact, the mean difference here is about .16 (and smaller than the mean difference found above for the main effect of gender). As such, although this finding is significant, it is important to interpret and discuss differences between these groups with caution. As previously mentioned, more detail about this is presented in the Limitations section below.

Although not hypothesized, a significant two-way interaction between SES and life history measured through *interaction and planning* resources emerged; those with

low SES and fast life history (less interaction/planning resources) showed slightly more affective empathy than those with low SES and slow life history (more interaction/planning resources). Such finding may suggest that in those with a slow life history an increased presence of empathic modeling, that SES may be a significant factor in the display of affective empathy compared to the fast life history group where financial and interpersonal resources are insecure or scarce, in comparison to the slow life history group where only financial resources are scarce and may not have the complete means to bridge the neural empathic capacity difference presented between biological sex males and females. This finding suggests that it is a combination of factors that fully enable the capacity for emotional empathy and that empathic modeling found in life history may be supported or dissolved by SES. We find there may be influence of life history, SES, and a combination thereof that defines the boundaries of current capacity for emotional empathy. When high SES is present empathic modeling is more likely to take place due to availability of resources found in the slow life history, but when low SES is present availability of resources becomes scarcer in the interpersonal interactions/planning function of life history, such that these functions of life history may be reliant on and are relied on by SES to enable the full display of affective empathy.

Finally, we hypothesized a significant three-way interaction between SES, biological sex, and life history. While a three-way interaction effect was found for the second ANOVA (using life history measured through social support), it did not fully support the proposed hypothesis. Rather, when looking and the social support subcomponent of life history, participants who identified as high-levels of SES, slower

life history (social support), and biological male reported higher affective empathy than biological males with high-levels of SES who show a faster life history (social support). It also was found that biological females did not differ on affective empathy across levels of income and life history.

This finding, that high income biological men with access to social support as a function of slow life history showed significantly more affective empathy than high income biological men without social support (or faster life history) is estimated to be due to the combined presence of limited capacity for empathy found in males compared to females and the presence of the social learning function. Empathy can be learned if modeled in one's early childhood as would be found in a slow life history (Gerdes et al., 2011). From which it is estimated that an individual who has a slow life history, with social support present would be subjected to more individualized examples of empathy in young life compared to those who lacked the presence of individualized social support and had a limited capacity for empathy such as in biological males in the fast life history.

Fast life history and the requirement of interpersonal relations to achieve resources did not previously consider the implications of a lack of resources on social learning or empathic modeling where in there would be less interaction with others and less emotionally weighted social support found in a fast life history. In contrast, slow life history provides more opportunity for empathic modeling through interpersonal interactions, and significantly through social support functions of a slow life history. Women did not vary in empathic response regardless of SES or life history but showed more empathic empathy than biological males in the study suggesting that the neural

capacity difference for empathic behaviors has significant influence when empathic modeling such as found in the social support function of a slow life history and SES are not sufficient to bridge the display of affective empathy. Suggesting that in males specifically, the presence of learned empathic behaviors as supported by a slow life history are important in understanding how and where we may see differences in empathic response based on life history, and sex. Having a high SES shows more empathic behaviors, specifically when coupled with being male and having a slow life history; when given availability to resources, and having empathy modeling in childhood that men show affective empathy and concern for others suggesting that it is not only the empathic modeling that is found within a slow life history but also an advanced means to be empathic that may be influential in the display of empathic behaviors in biological sex males.

Overall, any differences found in this study should be interpreted with caution given that most of the effect sizes for the noted interactions (and main effects) were small. The findings of the current study combined with previous literature suggest that empathy has a capacity designated by biological sex and that in women further environmental impacts such as SES and empathic modeling found in life history do not have significant influence in the display of empathy; however, in males it is not only SES and the empathic modeling function of life history but a combination of environmental factors that may influence the display of emotional empathy. Such that a fast life history may increase dependence of on others but a lack of financial opportunity, social support or interpersonal connection may not introduce the empathic modeling necessary for the



development or display of empathic behaviors.

### **Limitations and Future Research**

No study is without limitations, and below we note a few limitations of this work. First, a limitation might include accessibility of the study to a more representative sample. Although MTurk served as a platform for assisting the researchers in gaining a more diverse sample than a traditional convenience sample of college students, this sample may not truly represent the general population. Specifically, individuals with a low SES may not have access to technology to participate in studies of this kind. Similarly, there are also concerns regarding assessing extremes of high and low SES as groups were created based on the data collected which may not represent the diversity of SES in the United States. In addition to this limitation, the current study did not account for many factors that may influence the results, such as regional culture and other unidentified potential influencers. To better understand the variables of interest and the connections between these variables, future research might benefit from considering additional factors that serve to influence empathy in adults.

Finally, an important limitation to mention is the small mean differences and small effect sizes found in this study. The significant main effect of SES showed a small effect size of partial  $\eta^2 = .02$ ; which shows small significant difference on empathic behaviors found in the moderate (showing less affective empathy) compared to the high and low SES groups (showing more affective empathy). A significant main effect of sex showed a medium effect size partial  $\eta^2 = .06$  giving more support to the defined difference between affective empathy levels in biological females (high empathic

response) compared to males (lower empathic response).

A significant two-way interaction between life history (measured as community interaction) and SES was found with a small effect size partial  $\eta^2 = .02$  showing less support for the difference found between the fast (more affective empathy) and slow life (less affective empathy) history groups that reported low SES.

The results from the second analysis mirror some of the results found above. A significant main effect of SES was found but showed a small effect size partial  $\eta^2 = .02$  in which participants reporting a moderate level income showed slightly lower levels of affective empathy than the high- and low-income groups which reported more affective empathy. A significant main effect of sex also was found in the second analysis and retained the medium effect size described on sex differences above partial  $\eta^2 = .06$  such that biological male) scored lower on affective empathy than biological sex female.

Contrary to the first ANOVA, a significant main effect was found for the variable of life history measured as social support and showed a small effect size partial  $\eta^2 = .03$  where participants reporting faster life history reported slightly less affective empathy than participants reporting a slower life history these significant main effects were qualified by a significant three-way interaction but showed a small effect size partial  $\eta^2 = .01$ .

The presence of small effect sizes suggests that while these groups may be significantly different from each other in this and previous studies that the differences found are small and should be interpreted and applied to clinical and other interactions with caution.

## **Conclusions and Potential Implications**

Emotional empathy, as shown by previous research, has been shown by this work to be impacted by SES, life history, and biological sex. To our knowledge, prior research has examined these variables separately with respect to emotional empathy; however, these variables have not yet been tested for interaction effects. Through this work there has been found to be main effects, and a three-way interaction between the variables of interest specifically when looking at social support as a component of life history. This finding expands on prior literature and provides an opportunity for a better understanding of variables that influence affective empathy.

The interaction of these variables may have significant implications for individuals in mental health settings in understanding how SES, life history, and biological sex may influence the presence of emotional empathy in adult clients. The significant three-way interaction between the variables found suggests implications that biological males (in particular) who have a faster life history with little *social support* resources may tend to show less affective empathy and may have difficulty relating to others or with interpersonal interaction compared to those with high social support regardless of life history. Such results may provide mental health professionals with understanding about the differences in working with high, moderate or low SES, fast or slow life history with special consideration to social support and community interactions, and the influence of biological sex on a client's capacity to intentionally engage in affective empathy.

Findings of the current study suggest that the biological women in this sample

were not likely to differ on emotional empathy based on the variables of interest due to a higher neural capacity for emotional empathy than biological sex males. Biological sex males with lack of access to empathic modeling, such as found in a slow life history or with presence of high social support and financial security are more likely to display affective empathy in comparison to males that have not had empathic responses modeled in early childhood, here it is fundamental to understand not only where an individual currently aligns their moralistic values in relation to empathic display but to consider the presence of empathic modeling and social learning in the clients history that may support, or neglect the development of such empathic behaviors or traits. Given the findings of this study, more research on this topic is warranted and may help to further expand the literature on affective empathy and correlates.

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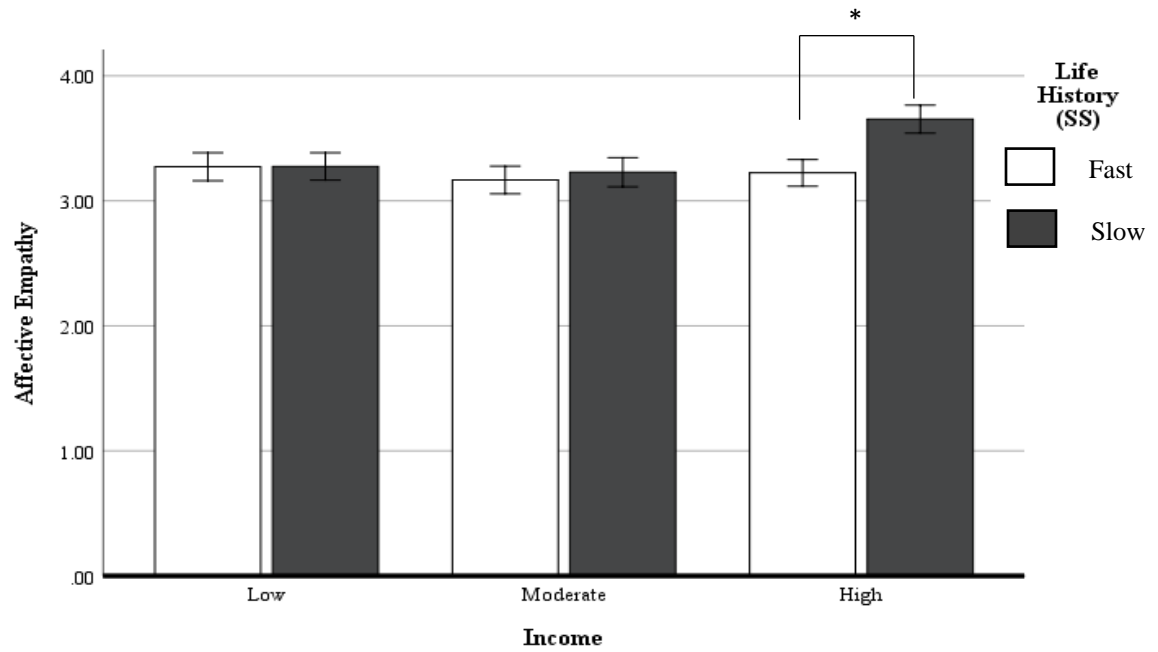
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*Figure 1.* Mean affective empathy ratings for biological male participants across levels of SES/income and life history (measured as *social support* resources). Error bars represent a 95% confidence interval. \*  $p < .05$ .

## Appendix A

### *The Full-Length (30 Item) BEES*

Please use the following scale to indicate the degree of your agreement or disagreement with each of the statements below. Record your numerical answer to each statement in the space provided preceding the statement. Try to describe yourself accurately and in terms of how you are generally (that is, the average of the way you are in most situations—not the way you are in specific situations or the way you would hope to be).

1 = strongly disagree

2 = disagree

3 = neutral

4 = agree

5 = strongly disagree

\_\_\_\_\_ 1. I very much enjoy and feel uplifted by happy endings.

\_\_\_\_\_ 2. I cannot feel much sorrow for those who are responsible for their own misery.

\_\_\_\_\_ 3. I am moved deeply when I observe strangers who are struggling to survive.

\_\_\_\_\_ 4. I hardly ever cry when watching a very sad movie.

\_\_\_\_\_ 5. I can almost feel the pain of elderly people who are weak and must struggle to move about.

\_\_\_\_\_ 6. I cannot relate to the crying and sniffing at weddings.

\_\_\_\_\_ 7. It would be extremely painful for me to have to convey very bad news to another.

\_\_\_\_\_ 8. I cannot easily empathize with the hopes and aspirations of strangers.

\_\_\_\_\_ 9. I don't get caught up easily in the emotions generated by a crowd.

\_\_\_\_\_ 10. Unhappy movie endings haunt me for hours afterwards.

\_\_\_\_\_ 11. It pains me to see young people in wheelchairs.

\_\_\_\_\_ 12. It is very exciting for me to watch children open presents.

- \_\_\_\_\_ 13. Helpless old people don't have much of an emotional effect on me.
- \_\_\_\_\_ 14. The sadness of a close one easily rubs off on me.
- \_\_\_\_\_ 15. I don't get overly involved with friends' problems.
- \_\_\_\_\_ 16. It is difficult for me to experience strongly the feelings of characters in a book or movie.
- \_\_\_\_\_ 17. It upsets me to see someone being mistreated.
- \_\_\_\_\_ 18. I easily get carried away by the lyrics of love songs.
- \_\_\_\_\_ 19. I am not affected easily by the strong emotions of people around me.
- \_\_\_\_\_ 20. I have difficulty knowing what babies and children feel.
- \_\_\_\_\_ 21. It really hurts me to watch someone who is suffering from a terminal illness.
- \_\_\_\_\_ 22. A crying child does not necessarily get my attention.
- \_\_\_\_\_ 23. Another's happiness can be very uplifting for me.
- \_\_\_\_\_ 24. I have difficulty feeling and reacting to the emotional expressions of foreigners.
- \_\_\_\_\_ 25. I get a strong urge to help when I see someone in distress.
- \_\_\_\_\_ 26. I am rarely moved to tears while reading a book or watching a movie.
- \_\_\_\_\_ 27. I have little sympathy for people who cause their own serious illnesses (e.g., heart disease, diabetes, lung cancer).
- \_\_\_\_\_ 28. I would not watch an execution.
- \_\_\_\_\_ 29. I easily get excited when those around me are lively and happy.
- \_\_\_\_\_ 30. The unhappiness or distress of a stranger are not especially moving for me.

## Appendix B

### Monetary income/SES:

1. What is your estimated individual annual income? Please fill in the blank with the most accurate representation of your individual income using only whole numbers (in US dollars).

\_\_\_\_\_

2. If living on a joint income please provide the total income for the household below.

\_\_\_\_\_

3. How satisfied do you feel about your individual annual income?

1 = Very dissatisfied

2 = Dissatisfied

3 = Neutral

4 = Satisfied

5 = Very satisfied

## Appendix C

### *The K-SF-42 Short Form of ALHB*

Please indicate how strongly you agree or disagree with the following statements. Use the scale below and write your answers in the spaces provided.

1 = strongly disagree

2 = disagree

3 = neutral

4 = agree

5 = strongly disagree

1. \_\_\_\_\_ When faced with a bad situation, I do what I can to change it for the better

2. \_\_\_\_\_ When I encounter problems, I don't give up until I solve them.

3. \_\_\_\_\_ I find I usually learn something meaningful from a difficult situation.

4. \_\_\_\_\_ When I am faced with a bad situation, it helps to find a different way of looking at things.

5. \_\_\_\_\_ Even when everything seems to be going wrong, I can usually find a bright side to the situation.

6. \_\_\_\_\_ I can find something positive even in the worst situations.

7. \_\_\_\_\_ I spend a great deal of time per month giving informal emotional support to my blood relatives.

8. \_\_\_\_\_ I contribute a great deal to the welfare and well-being of my blood relatives in the present.

9. \_\_\_\_\_ I spend a great deal of time per month giving informal emotional support to casual acquaintances (such as neighbors or people at church).

10. \_\_\_\_\_ I contribute a great deal to the welfare and well-being of my friends these days.

11. \_\_\_\_\_ I spend a great deal of time per month doing formal volunteer work at school or other youth-related institution.

12. \_\_\_\_\_ I often contribute to any other organizations, causes, or charities (including

donations made through monthly payroll deductions).

13. \_\_\_\_\_ I'm a very religious person.
14. \_\_\_\_\_ Religion is important in my life.
15. \_\_\_\_\_ Spirituality is important in my life.
16. \_\_\_\_\_ I closely identify with being a member of my religious group.
17. \_\_\_\_\_ I frequently attend religious or spiritual services.
18. \_\_\_\_\_ When I have decisions to make in my daily life, I often ask myself what my religious or spiritual beliefs suggest I should do.
19. \_\_\_\_\_ I worry that romantic partners won't care about me as much as I care about them.
20. \_\_\_\_\_ I don't feel comfortable opening up to romantic partners.
21. \_\_\_\_\_ I want to get close to my partner, but I keep pulling back.
22. \_\_\_\_\_ I often want to merge completely with romantic partners, and this sometimes scares them away.
23. \_\_\_\_\_ I am nervous when partners get too close to me.
24. \_\_\_\_\_ I find that my partner(s) don't want to get as close as I would like.

The following are some questions about means of help that people offer each other. Use the scale below and write your answers in the spaces provided, indicating about how often any parent, family member, or friend has helped you in each of the following ways.

1 = Not at all

2 = A little

3 = Some

4 = A lot

While you were growing up...

25. \_\_\_\_\_ How much time and attention did your biological mother give you when you

needed it?

26.\_\_\_\_\_ How much effort did your biological mother put into watching over you and making sure you had a good upbringing?

27.\_\_\_\_\_ How much did your biological mother teach you about life?

28.\_\_\_\_\_ How much love and affection did your biological father give you while you were growing up??

29.\_\_\_\_\_ How much time and attention did your biological father give you when you needed it?

30.\_\_\_\_\_ How much did your biological father teach you about life?

During the last month...

31.\_\_\_\_\_ How much have your relatives helped you get worries off your mind?

32.\_\_\_\_\_ How much have your relatives told you that you had done something well?

33.\_\_\_\_\_ How much have your relatives told you that they liked the way you are?

34.\_\_\_\_\_ How much have your relatives shown you affection?

35.\_\_\_\_\_ How much have your relatives listened to you when you talked about your feelings?

36.\_\_\_\_\_ How much have your relatives shown interest and concern for your well-being?

37.\_\_\_\_\_ How much have your friends helped you get worries off your mind?

38.\_\_\_\_\_ How much have your friends told you that you had done something well?

39.\_\_\_\_\_ How much have your friends told you that they liked the way you are?

40.\_\_\_\_\_ How much have your friends shown you affection?

41.\_\_\_\_\_ How much have your friends offered to take you somewhere?

42.\_\_\_\_\_ How much have your friends shown interest and concern for your well-being?

## Appendix D

### Demographic Information (including Biological Sex)

- 1) What is your biological sex?
  - (1) Female
  - (2) Male
  - (3) Intersex
  - (4) Other: Please specify \_\_\_\_\_
  
- 2) What is your age: \_\_\_\_\_
  
- 3) What is the highest degree or level of school you have completed? (If you're currently enrolled in school, please indicate the highest degree you have received.)
  - (1) Less than a high school diploma
  - (2) High school degree or equivalent (e.g. GED)
  - (3) Some college, no degree
  - (4) Associate degree (e.g. AA, AS)
  - (5) Bachelor's degree (e.g. BA, BS)
  - (6) Master's degree (e.g. MA, MS, MEd)
  - (7) Professional degree (e.g. MD, DDS, DVM)
  - (8) Doctorate (e.g. PhD, EdD)
  
- 4) What is your current employment status?
  - (1) Employed full time (40 or more hours per week)
  - (2) Employed part time (up to 39 hours per week)
  - (3) Unemployed and currently looking for work
  - (4) Unemployed and not currently looking for work
  - (5) Student
  - (6) Retired
  - (7) Homemaker
  - (8) Self-employed
  - (9) Unable to work
  
- 5) What is your ethnicity?
  - (1) White/Caucasian
  - (2) Hispanic or Latino/a
  - (3) Black or African American
  - (4) Native American or American Indian
  - (5) Alaska Native
  - (6) Asian
  - (7) Native Hawaiian or Pacific Islander



(8) Other

(9) Two or more races

If other is selected please specify your ethnicity here: \_\_\_\_\_

## **Appendix E**

### **Recruiting Script/Information Statement**

Hello. My name is Shadow Love, and I am a graduate student researcher at Fort Hays State University. I would like to invite you to participate in a research study. The purpose of this study is to explore how certain factors (like socioeconomic status, life history, and biological sex) impact affective empathy.

**To participate in this study, you must be between the ages of 18-65  
and currently live in the United States of America.**

If you choose to participate, you will answer demographic questions about yourself (e.g., age; biological sex; ethnicity) and will complete survey questions regarding your early life experiences and your general outlook on life. You will receive .50 cents for completing this research study.

I would appreciate your help with this research project. If you would like to participate, please click on the link below. Before starting the survey, you will read and electronically sign an informed consent. The study will take approximately 15-20 minutes. If you have any questions about the study and/or would like more information about the study before deciding to participate, please contact me or Dr. Whitney Whitaker (my faculty research sponsor). Thank you in advance for your participation!

Shadow Love ([srlove@mail.fhsu.edu](mailto:srlove@mail.fhsu.edu))

BS in Psychology, Clinical Masters Student

Dr. Whitney Whitaker ([wkwhitaker@fhsu.edu](mailto:wkwhitaker@fhsu.edu))

Faculty Sponsor

Assistant Professor of Psychology

**INSERT SURVEY LINK HERE**

## Appendix F

### Informed Consent Form

#### CONSENT TO PARTICIPATE IN RESEARCH

*Department of Psychology, Fort Hays State University*

**Study Title:** Factors that influence affective empathy

**Student researcher name and contact information:** Shadow Love  
([srlove@mail.fhsu.edu](mailto:srlove@mail.fhsu.edu))

**Faculty sponsor:** Dr. Whitney Whitaker ([wkwhitaker@fhsu.edu](mailto:wkwhitaker@fhsu.edu))

**You are being asked to participate in a research study. It is your choice whether or not to participate. To participate in this study, you must be between the ages of 18-65 and currently live in the United State of America.**

#### **What is the purpose of this study?**

The purpose of this study is to examine how certain factors, such as socioeconomic status (SES), life history, and biological sex impact affective empathy among adults in the United States of America.

#### **What does this study involve?**

If you decide to participate in this study, you will answer demographic questions about yourself (e.g., age; biological sex; ethnicity) and will complete survey questions regarding your early life experiences and your general outlook on life.

You will not be required to provide your name or any other identifying information while completing this study. If you decide to participate in this study, you will be asked to electronically sign this form to indicate your given consent. After completing the survey, you will be given a debriefing statement. The length of time of your participation is approximately 15-20 minutes. Approximately 500 participants will be in this study.

#### **Are there any benefits from participating in this study?**

This work may allow participants to gain a better sense of self and recognize factors that may influence the experience of affective empathy.

#### **Will you be paid or receive anything to participate in this study?**

Participants will receive .50 cents for completing this study.

#### **What about the costs of this study?**

There are no costs for participating in this study other than the time you will spend completing the survey.

### **What are the risks involved with being enrolled in this study?**

It is unlikely that participation in this project will result in harm to participants. It is unlikely that you are at risk for psychological, physical, social harm or any risk that is more than minimal. However, you may skip any questions you do not feel comfortable answering and may withdraw from the study at any point without penalty. You may contact the PI, faculty sponsor, and/or the Office of Scholarships and Sponsored Projects at Fort Hays State University (FHSU) with any questions. Please see below for contact information for these resources.

### **How will your privacy be protected?**

No names or identifying information will be asked. This data is collected only for research purposes. Data files which do not contain your identifying information will be kept in electronic format. Responses to survey questions will be entered into a computer program and stored for 3 years, after which the data will be deleted. Only the student researcher and faculty sponsor will have access to the data. Results of the survey will be shared with the scientific community through presentation and possible publication. When results are shared, information will be presented in aggregate and will contain no names or identifying information.

### **Other important items you should know:**

- **Withdrawal from the study:** You may choose to stop your participation in this study at any time. If you chose to do so, please stop completing the survey and alert the researcher (via email) that you wish to withdraw from the study.
- **Funding:** This project was funded through an internal research grant from Fort Hays State University.
- **Alternative options:** Your participation in this study is voluntary. You can choose to participate in other studies listed on Mechanical Turk if you decide not to complete this study.

### **Whom should you call with questions about this study?**

Questions about this study should be directed to Shadow Love ([srlove@mail.fhsu.edu](mailto:srlove@mail.fhsu.edu)) and Dr. Whitney Whitaker ([wkwhitaker@fhsu.edu](mailto:wkwhitaker@fhsu.edu)). If you have questions, concerns, or suggestions about human research at FHSU, you may call the Office of Scholarship and Sponsored Projects at FHSU (785) 628-4349 during normal business hours.

### **CONSENT**

I have read the above information about this study, and I agree to participate in this study. I understand that I can change my mind and withdraw my consent at any time. By continuing with this survey (clicking on the “next” button), I understand that I am not giving up any legal rights and I am between the ages of 18 and 65.

**If you would like to continue, please click on the “next” button – this action will serve as your electronic consent to participate in this study.**

## Appendix G

### Debriefing Form

You have just completed a study titled “Factors that influence affective empathy.” The purpose of this study is to better understand the influence of socioeconomic status (SES), life history, and biological sex on affective empathy in adults.

You were asked to fill complete a survey asking questions about your thoughts and opinions related to questions and statements relevant to your current income, past experiences, and your outlook regarding affective empathy. It is important to note that there were no right or wrong answers. The information provided will help researchers understand how SES, life history, and biological sex may interact to impact affective empathy in adults.

The research team is exceptionally grateful for your participation. If you have any questions about this research, please contact the PI and faculty sponsor (contact information below). If you have questions in general about the research, please feel free to contact the Office of Scholarship and Sponsored Projects (OSSP) at Fort Hays State University (785) 628-4349 during normal business hours. If you feel distressed after your participation in this project, please contact the PI and faculty sponsor. You also may contact the NAMI mental health hotline at 1-800-950-NAMI (6264) or [info@nami.org](mailto:info@nami.org) to seek assistance.

Please remember to enter the code provided to receive payment (.50 cents) for completing this study. Thank you again for your participation! Sincerely,

Shadow Love ([srlove@mail.fhsu.edu](mailto:srlove@mail.fhsu.edu))  
BS in Psychology, Clinical Masters Student

Dr. Whitney Whitaker ([wkwhitaker@fhsu.edu](mailto:wkwhitaker@fhsu.edu))  
Faculty Sponsor (Thesis Advisor)  
Assistant Professor of Psychology

## Appendix H

### IRB Approval Letter



**FORT HAYS STATE  
UNIVERSITY**

*Forward thinking. World ready.*

---

#### OFFICE OF SCHOLARSHIP AND SPONSORED PROJECTS

DATE: April 20, 2020

TO: Shadow Love, B.S in psychology, Candidate for M.S. clinical psychology

FROM: Fort Hays State University IRB

STUDY TITLE: [1593271-1] The impact of socio-economic status, life history, and biological sex on affective empathy in adults

IRB REFERENCE #: 20-0043

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: April 20, 2020

REVIEW TYPE: Exemption category # 2

Thank you for your submission of New Project materials for this research study. The departmental human subjects research committee and/or the Fort Hays State University IRB/IRB Administrator has determined that this project is EXEMPT FROM IRB REVIEW according to federal regulations. Please note that any changes to this study may result in a change in exempt status. Any changes must be submitted to the IRB for review prior to implementation. In the event of a change, please follow the Instructions for Revisions at <http://www.fhsu.edu/academic/gradschl/irb/>. The IRB administrator should be notified of adverse events or circumstances that meet the definition of unanticipated problems involving risks to subjects. See <http://www.hhs.gov/ohrp/policy/AdvEvtGuid.htm>. We will put a copy of this correspondence on file in our office. Exempt studies are not subject to continuing review. If you have any questions, please contact Whitney Jeter at [IRB@fhsu.edu](mailto:IRB@fhsu.edu). Please include your project title and reference number in all correspondence with this committee.

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