Authenticity and Physiological Changes during Defensive Verbal Response

By

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Abstract

Defensiveness affects people negatively in terms of their psychological and physical well-being. Curbing one's defensive response is especially difficult when the individual does not acknowledge how their cognition and physiology change when they respond defensively. Authentic disposition involves a flexible self-concept, which facilitates cognitive and physiological self-regulation in difficult situations. In the current study, participants answered personally threatening questions while their physiological state was measured. Galvanic skin response and heart rate were used to examine arousal and respiratory sinus arrhythmia was calculated to examine the degree of emotional regulation. Authenticity, assessed by self-report, was used to predict to what degree participants were aroused by the stress of revealing sensitive information about the self, and how well they were able to regulate their emotional state. Results of the study showed that defensive verbal response predicted higher physiological arousal measured in terms of changes in skin conductance and heart rate throughout the four stages of experiment, and behavioral authenticity predicted lower cardiovascular response during the four stages. Meanwhile, high authenticity predicted better recovery after the interview. These findings indicate that while defensive verbal response results in increased arousal during a sensitive conversation, authentic disposition may act as a buffer for the negative effects of such arousal.

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Introduction

Think back to a conversation where someone responded to a question with: "Let's not talk about that." Better yet, think of a time when someone said: "I don't understand why anyone would even think of asking a question like that." These are two examples of defensiveness in an everyday setting. Questions that threaten one or more people in a conversation elicit defensiveness. Defensiveness results in negative feelings and prevents speakers from getting to know each other and themselves. Although moments of defensiveness permeate people's lives and typically cause mild psychological discomfort, such as a bad feeling that lasts a couple of hours, excessive defensiveness carries more detrimental effects. The effects can be psychological or physiological, or both. Psychological negative effects include persistent negative mood while physiological negative effects involve enhanced stress response. Defensiveness also results in decreased ability to cope with stress. Investigating factors that help people monitor and adjust their defensiveness may diminish its negative consequences.

Physiological arousal and negative emotional state evidence withdrawal from a conversation that an individual perceives as threatening. Retreat from a conversation without acknowledgement and resolution of the threat causes an individual to remain in a stressed state. Lack of resolution can have adverse effect on one's relationship with family members, friends, and colleagues because a defensive individual cannot settle an argument. A defensive person's relationship with themselves declines as well because they do not take the time to evaluate their thoughts and emotions objectively. Finally, defensiveness contributes to negative health outcomes because defensive people respond with more stress when their social self is threatened. In medical settings, defensiveness interferes with treatment and recovery. Thus, defensive

withdrawal entails negative outcomes for the individual in various parts of their life. Decreasing the motivation to withdraw from a threatening situation can reduce these negative outcomes.

Up to date researchers have not yet explored the physiological defensive arousal during a conversation where individuals discuss sensitive topics. Testing whether physiological defensive arousal translates to conversational context is important considering that defensiveness is typically triggered in verbal communication. A unique contribution of this study is that it investigates whether authenticity decreases defensiveness. Specifically, whether there is a link between authenticity and flexible emotional responding during threatening situations, which contributes to lesser defensiveness and better physical health. The proposed mechanism is that understanding of one's authentic self enables an individual to pay attention to all aspects of the self, including physiological self-processes, which enhances one's ability to cope with stress.

Importance

People who are defensive are less healthy than non-defensive people. Specifically, defensiveness contributes to cardiovascular health problems and lowered immune response. For example, increased defensiveness partnered with hostility is correlated with decreased blood supply to parts of the body in men who suffer from heart disease (Helmers, Krantz, Merz, Klein, Kop, Gottdiener, & Rozanski, 1995). Other cardiovascular health problems, such as increased blood pressure in young adults are related to defensiveness and this relationship is mediated by enhanced reactivity to stress (Rutledge & Linden, 2003). Finally, defensive coping with pain is associated with reduced monocyte counts, which reflects decreased functioning of the immune system (Jamner, Schwartz, & Leigh, 1988). These findings point to a direct relationship between physiological changes that take place when a person responds defensively and decreased physical health.

Non-compliance in medical settings due to defensive responding to authority extends into psychological domains. Defensive individuals are likely to quit programs or therapies that increase their openness to threatening information because therapeutic feedback poses an additional threat. For example, high defensive patients engaged in psychotherapy are more likely to abruptly end engagement because of the discomfort associated with self-assessment and accompanying feedback from the therapist (Strickland & Crowne, 1963). Defensive participants are also more unwilling to accept negative feedback and they disclose less information about themselves in personal interviews, which hinders their progress and their relationship with researchers (Mosher, 1965; Doster, 1975). Thus, facing threatening information may be difficult if the person is unaware of his or her defensive processes. In therapy situations individuals may blame the therapist for early termination instead of investigating their own avoidant responses to therapy and what it reveals about their self.

Defensiveness contributes to reduced satisfaction in interpersonal relationships. Defensive responses to a friend, colleague, or a partner lead to feelings of interpersonal discontent and negatively impact conflict resolution. Gottman and Krokoff (1989) found that disagreement among married people lead to marriage dissatisfaction in the long run only if partners approached each other defensively. In the study, defensive partners denied responsibility for their contribution to the conflict. Defensive partners were also more likely to withdraw from conflict altogether, leaving their negative feelings unresolved (Gottman & Krokoff, 1989). Helping people understand how they can curb defensive response when they are trying to resolve a conflict with a loved one is important for people's well-being and depends on effective management of their interpersonal relationships.

Role of defensiveness in constructing and maintaining self-concept

Although defensiveness impacts people's lives negatively, its function is to protect individuals from potential harm. From an early age, children learn to avoid internal and external information so they are not constantly overwhelmed by negative emotions. The process of self-construction requires that children develop defense mechanism because unnecessary anxiety over the multitude of threats and contradictions would interfere with children's ability to form an identity (Loewenstein, 1967). However, if the child develops defense mechanisms that are inflexible to the changes in their environment, that is they remain active when the threat is gone, these defensive mechanisms cause problems in relationships and prevent people from experiencing negative and positive emotions as adults (Schwartz, 1990). Overactive defense mechanisms have a cognitive manifestation because defensive individuals have difficulty recalling negative emotional memories from their childhood (Davis & Schwartz, 1987). Thus, although defensiveness emerges as part of normal development as children adapt to their environments, overactive defensiveness in adulthood precludes full acceptance and understanding of the self in adulthood.

The self that begins developing in childhood organizes people's knowledge about who they are, what they like and dislike, and what incoming information the person should attend to. The resulting self-structure enables persons to orient attention to information that is important to their self. These structures are called self-schemata and they serve as selective mechanisms to bias people's attention toward self-relevant information. Using self-schemata people identify adjectives that describe their personality features faster than those do not, thus conscious conceptualization of the self affects how people process information about the world (Markus, 1977). Individuals with a rigid self-schema, such as "I am always a nice person," emphasize

importance of control over their emotions as an important aspect of the self (Weinberger, 1990). Experience of an emotion that signals a trait the individual does not use to describe themselves, causes defensive people to diver their attention and they are not able to regulate that emotional response.

Awareness and acceptance of multiple self-constructs determines whether contradictions among them will create an internal conflict. An example of a psychological conflict is when an individual notices that the moral they endorse does not match their actual behavior. According to Higgins (1987), the broad domains of the self that may contradict each other are the actual self, the ideal self, and the culturally prescribed self. Large discrepancy between a person's actual self and their ideal self causes them to feel depressed. On the other hand, if there is a discrepancy between the actual self and the prescribed self, the person will experience anxiety (Higgins, 1987). Inauthentic approach to life exacerbates pathology that accompanies realization of discrepancy because inauthentic people deny the reality of their thoughts, emotions and actions (Wood, Linley, Maltby, Baliousis, & Joseph, 2008). Thus, defensiveness is a strategy that people use not to acknowledge their true thoughts and feelings in order to avoid depression or anxiety. Increasing one's authenticity offers an alternative strategy to deal with discomfort of discrepant self-aspects. Increased awareness of the self neutralizes the threat of discrepancy because the person is able to evaluate himself or herself more objectively.

Defensive people are unaware of the discrepancy between their perceived emotional states and their actual feelings. This unawareness manifests itself when people are put in threatening situations and are asked to report on their feelings. Weinberger and colleagues (1979) were first to discover that highly defensive people report low levels of emotional arousal in threatening situations although their physiological arousal indicates otherwise. The authors

separated defensive individuals into four groups based on their self-reported anxiety and defensiveness and their social desirability scale scores: repressors (highest social desirability, lowest self-reported anxiety), true low anxious (low social desirability, low reported anxiety), and high anxious (low social desirability, high reported anxiety). They found that repressors showed highest physiological activity during a phrase association task despite self-reported emotion (Weinberger, Schwartz, & Davidson 1979). Unawareness of an internal process implies a withdrawal and relocation of attention, which prevents regulation of a physiological response. For example, in threatening situations, when a person experiences anxiety, a rigid idea of the self as a calm and collected person influences them to not confront their emotional state but instead, repress it.

Defensiveness and authenticity

Defensiveness denotes a more global inauthentic disposition. Inauthenticity, or self-deception, entails denial of aspects of the self that are incongruent with individual's self-concept. Inauthentic people have a bias for information that reflects only positive self-traits. Lakey and colleagues (2008) found that self-reported authenticity correlated with lower defensiveness. In the study, they assessed verbal defensiveness in an interview, where they asked subjects questions that explored socially unacceptable behaviors, such as cheating. The authors rated people's verbal responses for avoidance of the subject, intellectualization, and generalizing of negative experiences as verbal manifestations of defensiveness. They found that verbal defensiveness correlated with lower authenticity (Lakey, Kernis, Heppner, & Lance, 2008). These findings indicate that authentic disposition is the inverse of defensiveness. Following the logic, by increasing one's authentic disposition, a person would decrease their defensive

response. Authentic people are aware that the self is fluid and that in different contexts it may differ from the ideal.

Authentic disposition promotes flexible functioning of the self. Flexible functioning involves awareness of possible contradictions that are inherent to thoughts, emotions, and different self constructs that people develop in order to fulfill roles they play in everyday life (i.e. student, employee). Authenticity entails fusion of all of the information in regard to the self – past emotions, thoughts, and behaviors – into a cohesive core self (Kernis & Goldman, 2006). Meanwhile, inauthenticity correlates with externally imposed and rigid self-concept, which leads to increased distance between the true self and the preferred self (Horney, 1951). Individuals who are more authentic experience higher subjective well-being because they feel in control of their self (Kifer, Heller, Perunovic, & Galinsky, 2013). Thus, by paying attention to how one's cognitions, physiology, and behavior support or challenge self-constructs, one can increase authentic disposition. Increasing authenticity can be a motivator that attenuates defensive response and leads to increased psychological well-being.

By becoming more authentic, people become less defensive. Participants primed with autonomous motivation are less verbally defensive and less hesitant to respond to researchers' questions, indicating that increasing peoples feeling of authenticity increases their communicative openness and attenuates withdrawal from a threatening situation (Hodgins, Weibust, Weinstein, Shiffman, Miller, Coombs, & Adair, 2010). Autonomous motivation reflects authentic disposition because individual uses self-generated information to initiate behavior (Goldman & Kernis, 2002). Intrinsic locus of control is associated with improved self-regulation and greater perception of subjective well-being (Ryan & Deci, 2000). Therefore, increased authentic disposition results in less verbal defensiveness and more openness about the

self. Based on the hierarchical relationship between authenticity and defensiveness, authenticity should predict defensive response, as well as the psychological and physiological changes that accompany it.

Defensive cognition

Whether the individual can consciously evaluate his or her own defensiveness is a debated matter because it is difficult to establish what constitutes consciousness and whether a person can truly be unaware of their psychological states. Historically, psychologists investigated defensiveness as a repression of threatening information into the unconscious. This theory of defensiveness began with Freud who was the first to describe importance of unconscious defenses for ego formation ([1915] 1957). He claimed that repression is selective avoidance of knowledge that is painful and that avoidance is beyond conscious awareness (Freud, [1915] 1957). Holmes (1980) argued against the usefulness of repression in empirical investigation of consciousness. He claimed that empirical study of repression is impossible because one cannot test an unconscious orientation that is inaccessible to the person himself. Instead he advocated that defensiveness could be defined as denial and selective perception (Holmes, 1990). Thus, defensiveness is a multifaceted process that involves unconscious and conscious aspects of cognition. Authenticity offers a way for a person to become aware of moments of defensiveness by focusing on the physiological responses that typically accompany defensive response.

Defensive functioning may start out as a conscious defense and then be incorporated into a more global unconscious cognitive process. Just as an individual forgets information without the motivation to rehearse it for retention, motivated avoidance of painful knowledge results in loss of it over time (Erdelyi, 1990). For example, research has found that defensive individuals were less able to recall emotional memories (Davis & Schwartz, 1987). Other research has

shown that repressive avoidance is correlated with inattention to negative words, which explains why defensive people have trouble recalling memories with emotional content (Bonanno, Davis, Singer, & Schwartz, 1991). Therefore, the unconscious perceptual processing reflects a defensive orientation, which determines how the individual directs their attention. It also defines how well individuals can regulate their emotional response to threat. By addressing where an individual is allocating their attention and the accompanying emotional response, one can become aware of defensiveness in order to reduce it.

Support for the generality of cognitive processes involved in defensiveness comes from research that examines allocation of attention to emotional information. When a defensive person encounters emotional stimuli, they respond to it earlier than non-defensive people. People who self-report to be cognitively avoidant (low anxiety, high self-deception) show increased activity in frontal, parietal, and temporal cortex when researchers flash pictures of emotional faces at them below their awareness level (Paul, Rauch, Kugel, ter Horst, Bauer, Dannlowski, Ohrmann, Lindner, Donges, Kersting, Egloff, & Suslow, 2011). These findings support vigilance-avoidance theory, according to which there are two stages of repression of unwanted self-related information: vigilant attentional filtering is the first and avoidant response to threat is the second (Derakshan, Eysenck, & Myers, 2007). These findings indicate that defensiveness may involve a global attentional disposition that registers anything that constitutes a potential emotional threat. Response to emotional threats involves physiological changes. Awareness of the bodily responses may be the aspect of defensiveness that is consciously accessible, and, therefore, modifiable.

Individual differences in lifestyle and the degree to which that lifestyle is accepted also influence whether an individual will become defensive when a particular subject is breached. For

example, threatening health information can cause defensiveness in people who engage in activities that undermine their health. Smokers exhibit defensive attentional allocation when confronted with dangers of smoking. By measuring P300 brain wave, indicative of attentional allocation, researchers found that smokers were faster to orient their attention to threatening smoking-related images, and were faster to divert it from the images (Kessels, Ruiter, & Jansma, 2010). Coffee drinkers recall significantly less information about the negative impact of caffeine on health as compared to participants who don't drink coffee (Block & Williams, 2002). Thus, everyone is likely to be defensive in regard to a subject that puts him or her at risk for social judgment. Broadening our understanding of defensiveness to include people who avoid a particular type of threatening self-information expands comprehension of global cognitive and physiological changes that correlate with defensiveness.

Defensiveness in speech

Interpersonal conversations most often serve as the situational context for defensiveness. Verbal defensiveness most commonly involves avoidance of the subject, denial of relevance of subject to the self, and overall attenuated verbal expressiveness. For example, in a phrase association task defensive people are most likely to avoid phrase content and bring up unrelated information (Weinberger et al., 1979). Defensive participants are also less verbally involved in a phrase association task than non-defensive participants (Mandler, Mandler, Kremen, & Sholiton, 1961). In addition, defensive people have poorer recall and perception of their verbal responses in an interview (Doster, 1975). These findings evince that defensive cognition is not only a particular type of attention allocation, but that one can analyze verbal behavior for evidence of defensive processes. Assessment of verbal responses provides a measure of defensiveness that

goes beyond repression and unconscious attentional allocation. In the current study, verbal manifestation of defensiveness will be considered as part of the defensive response.

While the phrase association task captures the social threats of aggressive and sexual content, it is rather limited in its scope and does not reflect the broad spectrum of social threats that people respond to in everyday conversations. Common social threats involve subjects such as romantic relationships, family, professional honesty, and helpfulness to those in need. The Defensive Verbal Behavior Assessment (DVBA) developed by Barrett and colleagues (2002) includes questions on variety of sensitive subjects that tap into people's defense processes. The manual offers that refusal to answer the question, change in subject, denial of relevance to the self, and generalization of experience are signs of defensive verbal behavior. These patterns indicate defensive distortion of the content of the question aimed at maintenance of a positive self-image (Barrett, Williams, & Fong, 2002). Thus, defensive speech patterns can serve as a measure of underlying defensive processing and the degree to which individual's self-concept is threatened. The measure is useful because it simulates the real-life situation where an individual is most likely to respond defensively and the scope of the questions is broad enough to capture a large spectrum of defensive behavior.

Defensiveness and the body

Measuring physiological responses during a threatening situation quantifies defensive discrepancy between the participant's emotional state and their cognitive evaluation of it. While defensive people may report that they are feeling no anxiety their physiological response indicates otherwise. Repressive defensiveness is associated with low self-reported anxiety, while accompanying physiological arousal, as measured by heart rate (HR), galvanic skin response (GSR), and facial muscle activation is high (Weinberger et al., 1979). Repression in these studies

is defined by high scores on Marlowe-Crowne (MC) (Crowne & Marlowe, 1960) and low anxiety scores in anticipation of the task. Verbal disengagement from the content is mirrored by degree of discord between the state of arousal and the cognitive evaluation of that arousal (Asendorpf & Scherer, 1983). This indicates that there is a shift in attention in defensiveness from the whole situation to its non-threatening parts (Schwartz, 1990). Thus, when people direct attention away from the threat, they do not have access to the emotional changes that are taking place within and are not able to address that emotional response. This is also evident from their speech patterns where the content of the discussion is ignored.

Emotions can arise from self-evaluation in a social context. For example, if a person perceives that his or her idea of themselves as a good person is threatened, he or she will feel negative emotional arousal. People experience positive and negative emotions in situations where they have to evaluate themselves or make inferences about others' judgments of their selves (Leary & Buttermore, 2003). Self-conscious emotions occur when people become aware of not having lived up to a self-representation or an ideal (Tracy & Robbins, 2004). Repressive defensiveness associates with the least amount of reported negative affect in conditions that involve a threat to their self-concept, indicating that repressors distance themselves from negative self-conscious emotion (Mendolia, 2002). The cognitive distancing from negative emotions that arise because of the threat to self-concept, does not allow defensive people to evaluate their state. Without conscious access to self-conscious emotional state, physiological arousal remains unadjusted.

In order to be able to cope with threatening or arousing situations, an individual must have an emotional system that functions flexibly. Flexible emotional response involves objective evaluation of one's psychological and physiological response. According to the neurovisceral

integration model, when an individual encounters a threat, the first behavioral response is anxiety, accompanied by accelerated heart rate and increased attention to the threat. Effective emotional self-regulation enables individual to inhibit the initial response (Thayer & Lane, 2000). Pathology results from disconnection between physiological functioning and self-attention, which means that when a person disconnects attention from their internal state, his or her body is dysregulated (Schwartz, 1990). It is possible to improve the connection between the mind and the body by paying attention to physiological reactions. People are able to selectively lower blood pressure or heart rate simply by observing their state and receiving feedback on whether they improved or failed to improve their cardiac state (Schwartz, 1977). In consequence, for a person to be able to selectively attend and adjust their state, they must be cognizant of it. Because during defensiveness there is a disconnection between cognitive evaluation of the emotional state and the actual physiology, the emotional response cannot be manipulated. People can ameliorate their ability to regulate emotions by becoming more aware of who they are and by paying attention to the self in threatening contexts.

Defensive distancing results in inflexible self-regulation of physiological response to a stressor. Because defensive subjects withdraw their attention from emotions that arise during threatening situations, they are not able to adjust their emotional state. Highly defensive participants have worse emotional regulation before, during, and after a stressful counting task, as indicative by respiratory sinus arrhythmia (Movius & Allen, 2005). High level of respiratory sinus arrhythmia (RSA) is a sign of physiological flexibility that predisposes people for engagement with the task at hand, while low level of RSA is associated with depression, anxiety, hostility, and non-responsiveness to situational cues (Beauchaine, 2001). Thus, defensive orientation involves an impaired ability to regulate emotional state during a stressful situation.

This research will use the RSA measure to investigate emotional regulation in a conversation where individual faces a potential self-threat.

In real-world situations, such as a trip to the doctor's office, people may be unconscious of their own nervous arousal in anticipation of a threatening event. Although defensive individuals may not acknowledge that they respond with increased arousal to a social threat, changes in their skin conductance indicate autonomic arousal that cannot be consciously suppressed. People who score high on the defensiveness scale and declare low anxiety about seeing a dentist, have significantly higher skin-conductance levels right before dental checkup (Benjamins et al., 1994). Developing authentic disposition may aid in these moments. By learning to examine one's own patterns of physiological responses to potential self-threats, an individual may be able to address negative outcomes of defensiveness. In the current research, observing participants' skin response during a threatening interview will serve as an indication of implicit arousal, which will be correlated with participants' authenticity scores.

Increased arousal without conscious awareness is not limited to truly threatening situations. In contexts where the threat is harmless, previous experience with similar event that was threatening can also induce increased arousal. For example, participants who are highly defensive report that they are not disturbed by innocuous questions, such as "Do you have brown eyes?" or "Are you wearing black shoes" but display higher skin response than other participants (Gudjonsson, 1981). These results indicate that repression becomes a generalized response to social threats, where individual shows a tendency to disregard their physiological state. This is corroborated by the finding that once a person learns that a stimulus constitutes a threat (involves a shock), he or she responds with increased physiological arousal regardless of whether the stimulus is positive or negative in nature and is no longer accompanied by a shock (Bradley et

al., 2005). In conversations where there is no objective threat present, defensive people respond with heightened physiological arousal because of the bias to interpret information to be threatening to the self. This is a problem because defensive individuals show physiological arousal more often than non-defensive people. The state of persistent arousal may be the reason that defensiveness is related to negative physical health outcomes.

In addition to skin response, people can keep track of their arousal by observing whether their heart rate indicates a defensive or orienting physiological response. When a person encounters a threat, their heart rate increases; when safety is re-established, heart rate decreases. Research with animals shows that while heart rate decreases in threatening situations signaling orienting to the environment, cardiac acceleration indicates a defensive reaction and rejection of environmental cues with motivation to escape (Lacey & Lacey 1970). Although not completely understood and supported, the same pattern is generally observed with humans: accelerated heart rate signals an aversive threat and a motivation to disengage from it (Graham & Clifton, 1966). In this study, heart rate will serve as another measure to distinguish defensive participants from non-defensive participants. Heart rate is especially important for the study because consciously focusing on slowing down heart rate may help defensive people become less defensive.

During stressful situations, when people encounter a potential threat, their physiological activity increases, which is referred to as stress reactivity, which can be found by comparing arousal during stressful task to arousal during baseline. More physiological reactivity during stress inducing tasks has been associated with more health problems (Goayal, Shimbo, Mostofsky, & Gerin, 2008). Consequent to the stress task, people's ability to regulate their arousal is reflected by recovery, or the extent to which individuals return to baseline levels during rest period following stress (Haynes, Gannon, Orimoto, O'Brian, & Brandt, 1991).

Considering that defensiveness has been related to higher stress reactivity and negative health consequences (Rutledge & Linden, 2003; Shapiro, Goldstein, & Jamner, 1995), physiological reactivity during the interview is a way to measure how much stress individual experiences. A new question posed in this study is whether defensiveness would also be related to return to baseline levels of physiological arousal after a self-threatening task. In addition, authenticity is considered as an individual variable that is implicated in less reactivity during self-threat and more physiological recovery after the interview.

The Current Research

The specific aim of current study is to investigate physiological changes that accompany response to self-threatening questions. Another aim of this project is to examine whether authenticity contributes to lesser physiological arousal. To achieve these aims, participants will participated in an interview where they were be asked questions that tend to elicit defensive reactions. An example of such a question is: "When was the last time you hated your parents?" Although everyone acknowledges that such feeling is possible, admitting to feeling this way requires self-awareness and low defensiveness towards others. Prior to the interview, during the interview, and afterward subjects' physiological activity was monitored and recorded.

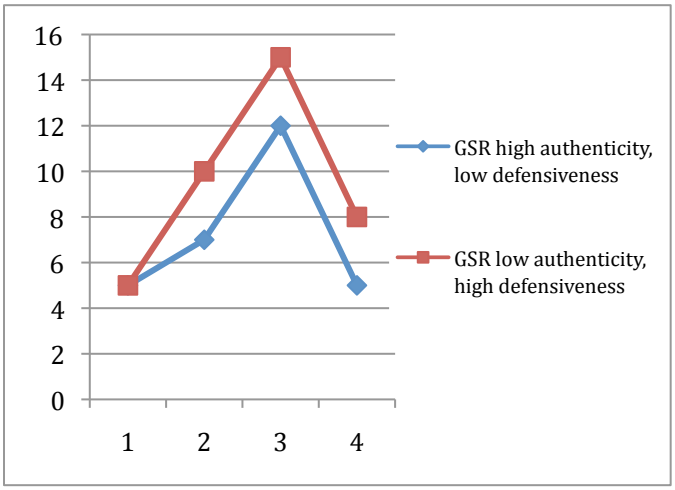
Predictions for the investigation were:

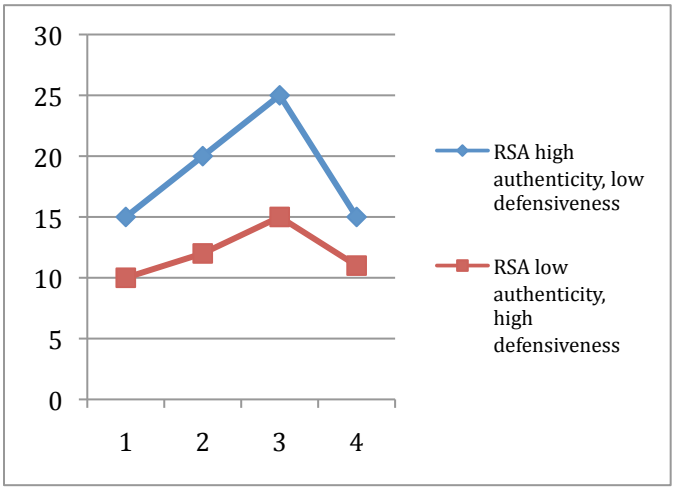
1. higher verbal defensiveness scores and lower authenticity scores are related to defensive physiological response as evidenced by high galvanic skin response (GSR) amplitude and high heart rate (HR).

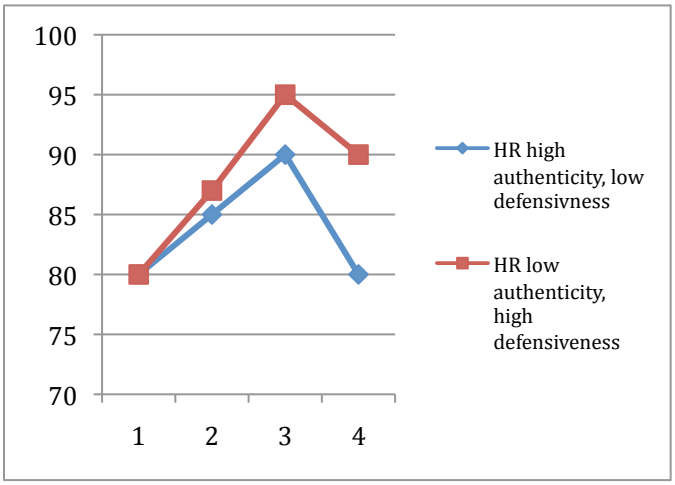
2. higher verbal defensiveness scores and lower authenticity scores are related to lower respiratory sinus arrhythmia (RSA), which is a measure indicative of emotional flexibility

3. high defensiveness, low authenticity, and high Marlowe-Crowne (MC) scores are related to more physiological reactivity and less physiological recovery after the interview

Expected results:







Method

Participants and materials

58 undergraduate students at the University of Kansas (32 males) participated for class credit. One participant was excluded based on incomplete questionnaire response. The age range was 17-23, with mean of 19. The sample included 74% Caucasian, 9% African American, 2% Native American, 7% Asian, and 9% Latino subjects. All participants were recruited through the

SONA pool. The physiological measures for the study included heart rate, breathing rate, and galvanic skin response and were recorded by using the MP150 Biopac system (Biopac Systems, Inc).

Authentic Inventory (AI)

Authentic Inventory was developed by Goldman and Kernis (2006) to measure authenticity globally and based on its four subcomponents. The scale includes 45 statements which participants are asked to agree or disagree with on a scale form one to five. The scale can also be broken up into the four subscales: awareness (12 statements), unbiased processing (10 statements), behavior (11 statements), and relational authenticity (12 statements). Examples from the AI questionnaire: "For better or for worse I am aware of who I truly am" (awareness), "I am very uncomfortable objectively considering my limitations and shortcomings" (unbiased processing), "I frequently pretend to enjoy something when in actuality I really do not" (behavior), "I want people with whom I am close to understand my strengths" (relational). Previous research has shown this scale to be internally consistent with alpha value of .88 for the entire scale. In the present study this measure was used to assess participants' global authentic disposition, as well as their tendency to be authentic based on each subscale.

Marlowe-Crowne (MC)

Defensiveness is difficult to measure because defensive individuals are not aware of their defensive tendencies. However, a possible way to quantify defensive process is to measure the degree of discrepancy between people's perception of their adherence to social standards and their actual behavior. Because defensiveness precludes people from endorsing self-aspects that they consider threatening, defensive people tend to claim that they always follow social prescriptions despite the practical impossibility of such constancy. Crowne and Marlowe (1960)

were first to propose a questionnaire of social desirability that researchers can use to assess people's understanding of their social behavior. The scale includes 33 statements such as: "I never resent being asked to return a favor," and "My table manners at home are as good as when I eat out in a restaurant." Subjects are asked to agree or disagree with the statements. People who score high on the scale are defensive because they do not acknowledge that their behavior may sometimes deviate from the social norm (Crowne & Marlowe, 1960; Wiesenthal, 1974). Previous research has found the Cronbach's alpha of .76. This measure is going to be used to assess implicit level of trait defensiveness.

PANAS-X

In order to assess emotional and attentional states before and after the interview, PANAS-X (Watson & Clark, 1999) was administered to participants. The measure consists of 60 adjectives that describe possible mood and attentional states and subjects are asked to identify on a scale from one to five their current experience of that particular state. The measure offers a way to measure negative affect by adding together scores for adjectives such as "afraid", "hostile", and "irritable" among others. Fear words include "frightened", "nervous", and "shaky". Meanwhile, attentional state is described by adjectives "alert", "attentive", "concentrating", and "determined". The Cronbach's alpha for the full scale has been found to be .96.

Defensive Verbal Behavior Assessment (DVBA)

The task used in the study was an interview developed by Barrett, Williams, and Fong (2002) to measure behavioral manifestation of defensive processes. The interview consists of 25 questions, the first five questions are neutral, "How do you feel about coming in for the interview today". These served as a talking baseline in the study. The next fifteen questions are mildly to moderately unpleasant, "Describe a time when you've said something to hurt someone's

feelings." One of the questions had to be dropped in order to comply with human subject committee's request: "Describe a time when you've had feelings of sexual attraction towards a relative." Instead this question is supplemented with one of the questions from neutral group: "How accepted did you feel growing up?" The following question was added to neutral questions to bring it to five "Tell me about the most recent shopping trip you've made." Finally, participants were asked five gradually restoring questions, such as, "Tell me a little about your family." All interviews were conducted by the author of this paper. The interviewer kept a serious, restrained demeanor with all participants during interviews. This procedure has been found to be internally reliable, with Cronbach's alpha of .86.

Participants' verbal responses were recorded on audio and coded by an assistant following the Defensive Verbal Assessment Manual (Barrett, Cleveland, Conner, & Williams, 2000). Defensive response was coded on a scale from zero to three. When participant displayed high awareness by admitting to unpleasant feelings related to self-concept, answered in first person, and elaborated on emotional experience associated with the question, their response was noted as a zero. When participant generally displayed self-awareness and reflection but followed the response with an explanation for behavior and showed some distancing from the self and unpleasant emotions by trying to get justification from the interviewer, response was coded as a one. A two was assigned to a response where individuals did not reference their feelings or self, answered in de-personalized manner, and did not bring up any self-threatening information. Finally, a three was assigned when participant did not reference any personal feelings or self-attributes, placed responsibility for the event in question on others and showed visible disconnect between verbal and non-verbal emotional state.

Procedure and data acquisition

Upon arrival to the lab, participants were consented and asked to fill out a basic demographics and PANAS questionnaires. The researcher then placed three electrodes in Lead II formation on their chest, a respiration belt, and two electrodes on their index and middle finger of the right hand. Once connected to the Biopac system, participants spent ten minutes resting, which provided the baseline measurement for their physiology. After baseline, researcher asked participants 25 personal questions. Consequent to the questioning, participants spent five minutes in rest. After rest, participants filled out another PANAS form, AI, Marlowe-Crowne, and answered what they guessed the experiment to be and how threatened they felt during the interview.

ECG data were collected at 1000 Hz for sampling rate with amplification factor of 2000. For the ECG recording, the electrodes were placed in Lead II formation, with two electrodes on the collarbones and one electrode on the lowest left rib. This electrode placement minimizes movement artifact, which was necessary due to inherent movement when in individual is talking. Breathing rate was collected at sampling rate of 50 Hz and with amplification factor of 10. The rate was acquired by using a respiration belt. For galvanic skin response, sampling rate was 50 Hz and amplification factor was 5 μmhos. Galvanic skin response was collected by placing two GSR electrodes on index and middle finger of participant's right hand. The data were analyzed offline. For analysis ECG data were sampled at 1250 samples/s and passed through a band pass digital FIR filter that eliminated noise beyond .5 and 35 HZ with 10000 coefficients. For analysis of breathing rate, the waveform was re-sampled at 78 samples/s and a band pass FIR filter was applied between .05 and 1 H with 6250 coefficients. GSR data were filtered with a low pass filter with the cutoff frequency of 2.4 and 32 coefficients.

Results

The four time points at which data were collected: baseline, talking baseline, interview, and rest, served as level 1 variables and were nested inside of participants. Two separate multilevel model analyses were run for RSA and GSR measures. Time variable was a level one predictor with values 1, 2, 3, and 4 corresponding to baseline, talking baseline, interview, and rest. This predictor was centered for ease of interpretation. The time variable was included as a factor, thus making Time1, Time2, and Time 3 variables, which represented difference between talking baseline and baseline, interview and baseline, and rest and baseline.

Respiratory Sinus Arrhythmia

When the null model was ran for the RSA measure, the resulting ICC was 55% indicating that variance among participants was significant enough to run MLM analysis. The random coefficients model allowed the intercept and the slope for RSA measure to vary for each participant. Including Time as level 1 predictor yielded the following model $RSA \sim \beta_{0j} + \beta_{1j}(Time_{ij} - 1) + e_{ij}$ where the intercept and slope were allowed to vary for each participant. Results of the model indicated that only the average RSA value at baseline was significant, b = 99.6, t=11.05, p<.001. For talking baseline: b=-10.2, t=-1.4, p=.1; for interview: b=-1, t=-.1, p=.9; for resting period: b=-5, t=-.86, p=.3. This indicated that RSA values were not significantly different from baseline across the three time conditions. Models that included DVBA scores, Marlowe-Crowne scores, and AI scores as level two predictors yielded no significant results, indicating that variance in RSA measure could not be accounted by these predictors.

Galvanic Skin Response

The ICC for the null model with GSR as dependent variable was 84.5%, indicating variance between the level two units - participants - as a significant predictor. The model testing for Time as a significant predictor was: $GSR\_amp \sim \beta_{0j} + \beta_{1j}(Time_{ij} - 1) + e_{ij}$. The four time points were significant predictors. For baseline: b=9.5, t = 17.3, p<.001; for talking baseline: b=2, t=7.9, p<.001; for interview: b=2.4, t=7.9, p<.001; rest: b=1.7, t=6.6, p<.001. Thus, for the four time points GSR amplitude increased on average. This model was significantly different from the null model $\chi^2(12) = 162.6$, p<.001.

Defensiveness and authenticity scores were added into the model as participant predictors. Defensiveness was entered into the model as DVBA scores and Marlowe-Crowne scores in two separate models. Marlowe-Crowne was not a significant predictor, while DVBA was. The total authenticity score was not a significant predictor, but breaking the score down into the four components provided significant results. Age, race, gender, and smoking were added as level two time-invariant covariates. Subjects were divided in the two groups according to race, with Caucasians coded as 1 and Non-Caucasian coded as 2. Gender was coded with males as 1 and females as 2. In the final model talking baseline (b=1.9, t=7.7, p<.001), interview (b=2.4, t=7.8, p<.001), and rest conditions (b=1.7, t=6.5, p<.001) showed a significant increase in GSR amplitude indicating that overall participants became more aroused during the study. Age (b=0.8, t =2.2, p<.05), race (b=2.7, t = 2.3, p<.05), DVBA (b=17.6, t=2.1, p<.05), relational authenticity (b=.3, t=3.0, p<.01) and authentic behavior (b=-.3, t = -2.5, p<.05) were also significant predictors. Meanwhile gender, smoking, unbiased processing, and authentic awareness were not significant. Deviance testing revealed that the full model was significantly different from a model that only includes Time as a predictor, $\chi^2(18) = 116.4$, p<.001.

Interactions between Time and significant predictors did not reach significance. Thus, talking baseline, interview, rest, age, race, DVBA, and relational authenticity predicted significant increase in GSR amplitude, while behavioral authenticity predicted overall decrease in GSR amplitude.

Heart Rate

Same analysis procedure was applied to heart rate data. The null model ICC indicated that 81.9% of variance in the data could be accounted by level 2 - participant differences. The model with Time as the level one predictor, yielded significance for talking baseline (b=4.6, t = 5.32, p<.001) and for interview (b=3.5, t=6.3, p<.001). Thus, on average, heart rate increased during talking baseline and interview conditions as compared to baseline. The full model included DVBA, authentic awareness, unbiased processing, authentic behavior, and relational authenticity as level 2 predictors, and age, race, gender, and smoking as time-invariant covariates. Same coding was applied to race and gender variable as in GSR analysis. Talking baseline (b=4.6, t=5.3, p<.001) and interview (b=3.5, t=6.2, p<.001) indicated that heart rate increased significantly as compared to baseline. Rest condition showed decrease in arousal (b=-.8, t=-1.5, p>.05) but this was not a significant finding. The other significant predictors included: gender (b=6.7, t=2.8, p<.01), and relational authenticity (b=.6, t=2.3, p<.05), both of which predicted increase in HR. Meanwhile, behavioral authenticity (b=-.6, t=-1.8, p=.06) and unbiased processing (b=.4, t=1.7, p=.08) reached marginal significance. Deviance test between the full model and model that included only Time as a predictor indicated significant difference between these models, $\chi^2(18) = 142.8$, p<.001, meaning that the more complex model explained significantly more variance in the dependent variable. Interactions between time and significant predictors were not significant. These results showed that while gender, relational authenticity,

and unbiased processing resulted in increased heart rate across time points, behavioral authenticity resulted in decrease in heart rate across time points.

Regressions

Exploratory regression analyses were conducted to investigate participants' emotional and attentional state, as measured by PANAS, prior to the study and consequent to the study and how they were related to reactivity and recovery. Neither self-reported fear nor hostility prior or consequent to experiment were associated with GSR reactivity, GSR recovery, HR reactivity, or HR recovery. DVBA scores were also not associated with these emotional states before or after the experiment. Self-reported attention was a marginally significant predictor in a regression model with GSR reactivity score (TBL+Int)-Baseline ($b=0.4$, $t=-1.9$, $p=.06$) and was a marginally significant predictor in a regression model using GSR recovery as the dependent variable ($b=-.2$, $t=-1.78$, $p=.08$). Self-reported attention was also a marginally significant predictor in a regression with HR recovery ($b=-.33$, $t=-1.9$, $p=.06$), but not for HR reactivity. Thus, self-reported attention was associated with more physiological recovery after the task, and with less physiological reactivity during the interview. Interestingly, self-reported attention before the study was also a significant predictor for total Authenticity score ($b=1.5$, $t=2.04$, $p<.05$) and for the awareness component of AI ($b=.76$, $t=2.9$, $p<.01$).

In regard to defensiveness and authenticity predicting reactivity and recovery, DVBA scores, Marlowe-Crowne scores and Authenticity scores were split into two groups. DVBA was split by individuals with scores of 0 and individuals with scores above 0 (27/29). DVBA was a marginally significant predictor of less difference between baseline and rest condition for GSR ($b=-1$, $t=-1.95$, $p=.05$), indicating that as verbal defensiveness increased, recovery scores got closer to 0, implying a better recovery. However, it was not a significant predictor of GSR

reactivity, HR reactivity, or HR recovery. Median split of Marlowe-Crowne scores was not a significant predictor of HR/GSR recovery and reactivity. Meanwhile, median split of Authenticity scores revealed that higher authenticity scores predicted more HR recovery (b=-2.8, t=-2.9, p<.01) and was a marginally significant predictor for GSR recovery (b=-.9, t=-1.8, p=.07) but was not significant for HR and GSR reactivity.

Discussion

Respiratory Sinus Arrhythmia

The results of this experiment failed to support the hypothesis that high authenticity and low defensiveness would be correlated with higher RSA throughout the experiment. A potential explanation for lack of findings may be the technical issues with equipment. Collection and analysis of data were conducted on different machines due to equipment difficulties. This may in part explain the large variance observed in the RSA measure, which negatively impacted analysis. The stress task used in the study - a verbal interview – also likely impacted the measure negatively. It is advocated to calculate RSA from heart rate and breathing measured during a paced breathing task (Butler Wilhelm, & Gross, 2006; Tininenko, Measelle, Ablow, High, 2012). In the present study, speaking during the task affected normal breathing pattern and may have skewed the RSA calculation. The reason why paced breathing was not used in this study is because a normal talking task captures a more realistic day-to-day situation where an individual may get defensive. Thus, although the RSA measure did not provide any new information about defensiveness and authenticity, the task used in the study was the most straightforward way of measuring defensive arousal.

Galvanic Skin Response

The four time points, baseline, talking baseline, interview, and rest, were significant predictors of increase in GSR amplitude, indicating that on average arousal increased for participants across all conditions of the study. This finding evidences that the experimental procedure was effective at setting up stressful conditions. It also supports that when confronted with socially sensitive topics that required sharing information about the self, people responded with elevated arousal. Thus, it appears to be necessary to understand the self in order to cope with situations when self-threatening topics are breached. In addition to time, age was a significant predictor of increased arousal. This may be due to the increased sensitivity to what's socially acceptable and unacceptable as one gets older. Meanwhile, the finding that non-Caucasians had significantly higher increase in physiological arousal can be explained by existence of cultural differences in physiological response to threat (Mauss & Butler, 2010).

Increased relational authenticity predicted increased arousal across the four conditions. This finding counters the prediction that authenticity predicts lower arousal. However, one must consider the limitations of the Authentic Inventory questionnaire as the way to measure authenticity. Correlation research that has investigated relation between components of authenticity in the inventory and other questionnaires, offers evidence that the four components manifest themselves differently in people's everyday lives (Kernis & Goldman, 2006). Relational component of the authentic inventory may be most susceptible to societal judgment. For example, the statement, "My openness and honesty in close relationships are extremely important to me" carries a demand for socially approved response. Therefore, high scores on relational authenticity represented how much participants conformed to the social norm as it applies to relationships.

Meanwhile, behavioral authenticity subcomponent predicted the opposite effect: participants higher in behavioral authenticity showed less arousal during the study. This result supports the prediction that authenticity is related to less arousal induced by a stressful task. Validity if this result is supported by the negative correlation between behavioral authenticity and change in negative affect (see Appendix A). As behavioral authenticity increased, self reported negative affect decreased after as compared to before the study. This indicates that the behavioral authenticity component may have been more effective at capturing self-knowledge that is vital for self-regulation.

The finding that high defensiveness was associated with better GSR recovery contradicted the hypothesis that less verbally defensive participants would have better recovery. Adding to this unexpected result, high authenticity was related to better recovery in terms of skin response and heart rate. This result evinces that verbal defensiveness was tapping at a process completely different from general authenticity. Because total authenticity score was not used in the model but instead was broken down into its components, the finding reflects that verbal defensiveness may be related to some but not other aspects of authenticity. Corroborating the beneficial effect of authenticity was the finding that self-reported attention prior to the experiment was related (albeit marginally) to more recovery and less reactivity. Self-reported attention was also associated with higher authenticity, thus strengthening the link between increased focus and beneficial effects of authenticity on physiological response to stressful situation.

Attentional state also predicted higher awareness and higher total authenticity, meaning that as self-reported attention increased, so did authenticity. Although attention was measured by self-report, the finding that some people were more aware of their attentive state than others

supports the validity of the measure. Other researchers have shown that increasing mindfulness, or being attentive in the present moment, improves endogenous and exogenous control of attentional resources (Jha, Krompinger, & Baime, 2007). This supports the proposition that increased tendency to pay attention to oneself improves people's overall attentional resources and enables them to attend to their own response during a stressful situation. In the current study, the finding that median split of authenticity scores into low authenticity and high authenticity predicted better heart rate and GSR recovery after the stressful task, also offers evidence for beneficial effects of paying attention to the self for emotional regulation.

Heart Rate

Heart rate increased significantly during talking baseline and during the interview, corroborating the finding that the interview served its purpose in eliciting a stress response from participants. Gender was also predictive of enhanced heart rate across the four conditions of the study, with women showing higher heart rate overall. Prior studies support this finding, showing that during stressful situations women have higher heart rate and blood pressure as compared to men (Levesque, Moskowitz, Tardif, Dupuis, & D'antono, 2010).

Replicating GSR results, heart rate increase was predicted by increase in relational authenticity and unbiased processing subscales of AI. Meanwhile, behavioral authenticity predicted decrease in arousal. As discussed earlier, relational authenticity statements impose more social pressure on participants to adhere to prosocial values. Although the unbiased processing subscale of the inventory does not relate the same social pressure, the statements included on this subcomponent may be too difficult for participants to evaluate consciously. For example, "I find it very difficult to critically assess myself" would require one to be assessing

oneself critically in the moment of answering the question. Thus, high scores on the unbiased processing subscale may also reflect high inauthenticity instead of high authenticity.

In contrast to relational and unbiased processing, statements on behavioral subscale require participants to recall their experiences with the self: "I've often done things that I don't want to do merely not to disappoint people." Therefore, scores on this subscale would be less susceptible to social norm pressure or the difficulty of metacognitive evaluation of the self. In addition, previous work has found that authentic behavior subscale is positively correlated with suppression coping (Kernis & Goldman, 2006) and in other studies suppression (as opposed to repression) was found to indicate more engagement of emotional regulation (Butler, Wilheml, & Gross, 2006). Also, behavioral authenticity and not relational authenticity is correlated with less stress as experienced as part of social roles one plays in other lives (Kernis & Goldman, 2006). Thus, results from the behavioral subscale of authentic inventory support the original hypothesis that authenticity predicts less physiological arousal during defensive response. As with GSR, self-reported attention prior to the study predicted more HR recovery with marginal significance, indicating that increased attention helped participants return their heart beat to baseline levels.

Marlowe-Crowne, DVBA, Authenticity, and Attention

Marlowe-Crowne scores were not predictive of arousal patterns during the study. An explanation for this finding is that Marlowe-Crowne, in association with self-reported anxiety, is typically used to determine repressive defensiveness. In this study, defensiveness was considered more broadly than repressive coping. Thus, the procedures used in the study were not strong enough to elicit repressive defensiveness per se. It is also possible that the defensiveness measured by Marlowe-Crowne is not related to the authenticity construct and its subcomponents.

In addition, verbal defensiveness scores were not correlated with total authenticity. This may be due to the relatively non-threatening nature of the interview. Majority of the verbal defensiveness scores were zero. Verbal defensiveness did not exceed score of one for any of the participants. Thus, although different questions elicited some verbal defensiveness from participants, it appears that overall the interview was only mildly threatening. Previous work has found that verbal defensiveness during DVBA was lower after individuals are primed with more authentic motivation (Hodgins et al., 2010). Perhaps because the present study did not involve a manipulation prior to the experiment that rendered participants more or less authentic, these findings were not reproduced.

Another possible explanation for divergence of defensiveness and authenticity scores is that these constructs are fundamentally different in terms of social acceptance of telling the truth on a particular topic. In a norming experiment (unpublished data), the authors of the present paper have noticed a peculiar trend in regard to how likely people were to answer questions honestly. While some questions, such as "How often do you not wash your hands after going to the restroom" were reported to not be offensive but were also rated as less likely to be responded to honestly, others: "Do you live an active lifestyle" were rated to be very offensive but also participants said they were likely to respond to such a question honestly. The norming study offers evidence for divergence of authenticity and defensiveness. While some topics are more offensive and would elicit more defensiveness despite an authentic response, other topics tend to educe inauthentic responses.

In regard to the awareness and unbiased processing subcomponents of authenticity yielding no significant results overall, this can be attributed to the nature of the questions included in each subcomponent. It is possible that awareness and unbiased processing tap into

the unconscious aspects of authentic disposition. For example, the awareness question "I understand why I believe the things I do" may be too difficult to answer for a person who tends to be inauthentic about who they are. Similarly, unbiased processing question "I find it very difficult to critically assess myself" would trigger defensive response from highly defensive people. Testing the cognitive processes involved in authentic and defensive behavior would provide a better way to evaluate these components of authenticity.

Conclusion

In this study, arousal during a defensiveness-eliciting interview was lower for participants who were higher in behavioral authenticity and had more attentional focus prior to the study. Overall, these findings support the notion that authentic disposition impacts people's physiological reactions to threatening events. Although increased arousal during threat is overall adaptive for building appropriate action plans to withdraw or engage, unnecessary or persisting states of arousal are disadvantageous for physical well-being, as individual does not take time to calm down. Authenticity, as emotional genuineness signaling the depth of self-understanding (Peterson & Seligman, 2004), has positive impact on people's ability to respond to self-threat. The pattern of self-honesty enables individuals to use less cognitive resources when addressing a self-threat, because authentic self is flexible enough to include many possible self-concepts and facilitates integration of multiple roles people perform in everyday lives.

Increasing authentic disposition would benefit defensive people in situations when they set a goal. An example of a goal may be "I would like to become more assertive." In order to achieve this goal, the person must objectively evaluate their initial state of assertiveness and be open to feedback as they attempt to improve the initial state. For example, Kiecolt-Glaser and Murray (1980) found that in a real assertiveness training intervention, defensive participants

claimed to be more assertive in the beginning of the training, indicating that they were not able to evaluate themselves objectively. In the course of the training, they set fewer goals and submitted less diary entries about the times they acted assertively. In the end instructors rated these individuals as least improved, indicating that defensive people's inability to evaluate themselves interfered with their progress in the course (Kiecolt-Glaser & Murray, 1980). Hence, defensive persons could benefit from expanding their knowledge of the self because it would aid them in accomplishing their ambitions. Learning to pay attention to their thoughts, emotions, and behaviors serves as a way for defensive persons to accept their shortcomings in order to improve them.

Limitations and Future Directions

There are several limitations to the present research. One of them is that questions used in the interview were not strong enough to elicit a strong defensive response as evidenced by the fact that none of the participants scored higher than one on any of the questions. Although this limitation undermines the extent to which the procedure mirrors all of the situations in which people get defensive, it captures the most likely scenario, where discussion of a questionable topic elicits mild stress response. In everyday life people are more likely to encounter a question such as, "Do you get along with your roommate?" as opposed to, "When was the last time you had violent thoughts about others?" In this way, the interview served to establish an overall defensive state, where participants were expecting an uncomfortable question that required them to share self-relevant information.

Another limitation of the current research is that no conclusions can be drawn about the physiological processes of emotional regulation that took place during defensive response because RSA results were not significant. In addition, self-reported emotional states prior or

consequent to the study were not predictive of the dependent variables. Therefore, the present research does not offer any new findings in regard to what emotions are associated with defensiveness and whether individuals who are higher in authenticity are able to regulate those emotions better. In previous studies, where RSA was measured during a non-verbal stress task, self-reported defensiveness was associated with lower RSA (Movius & Allen, 2005). A possible future study to clarify these results would include both a non-verbal stress task during which RSA is measured, that is followed by a verbal defensiveness interview, which would not include RSA measurement. Such study would provide a correlation between individual's general ability to regulate emotions during stress and their defensiveness during a verbal interview.

A future study that would address the cognitive processes involved in authenticity would assess attentional allocation for people who are primed with authenticity versus those primed with inauthenticity. Such experimental manipulation would provide more conclusive findings in regard to whether authentic disposition involves less attention allocation to threat and more attentional engagement with a threatening task. An example of such a study would be to measure P300 attentional response to threatening words and pictures after authenticity priming. If autonomy priming reflects more engagement with the threat, this would indicate that authentic disposition improves people's ability to get involved in more activities around them and to have a fuller experience of life.

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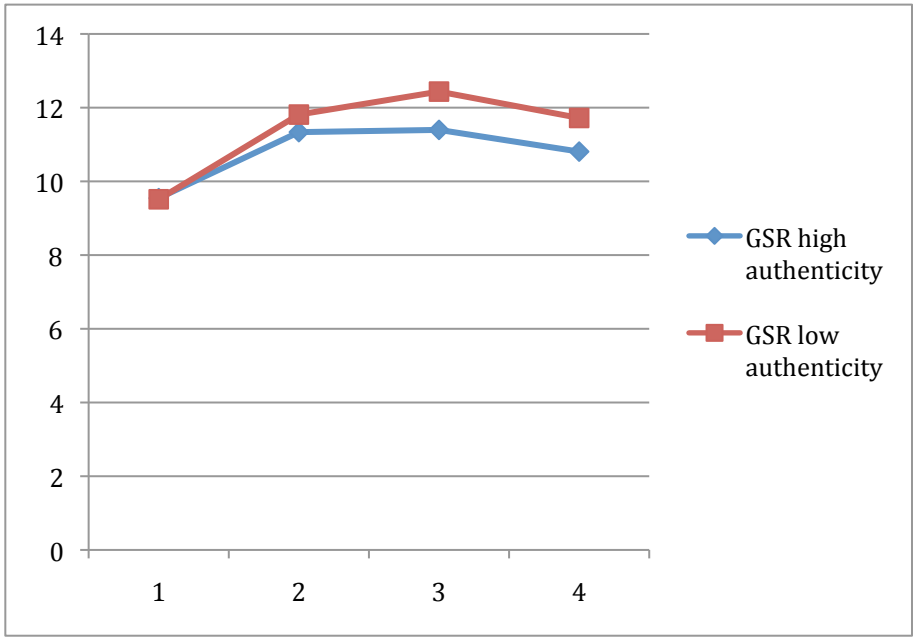
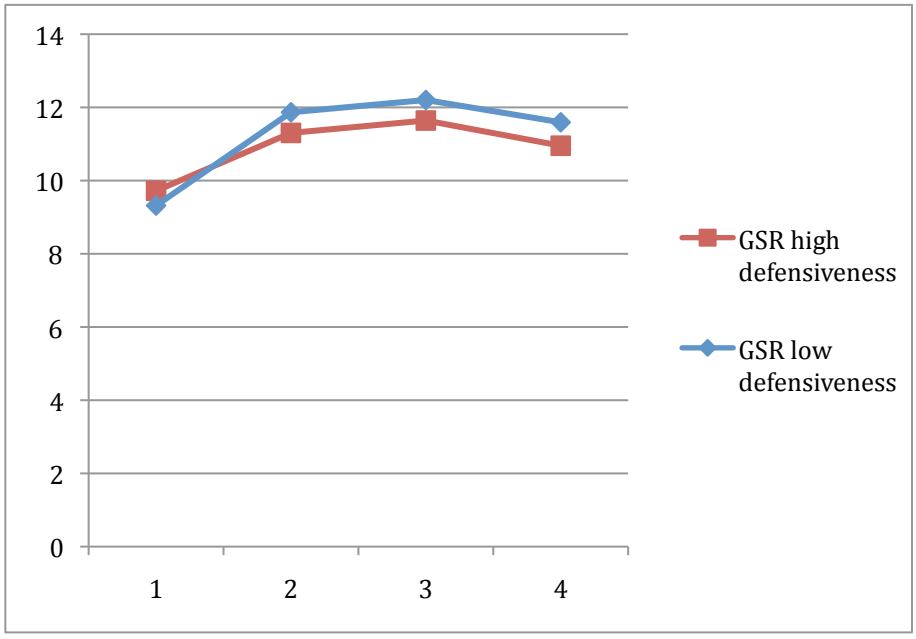
Appendices

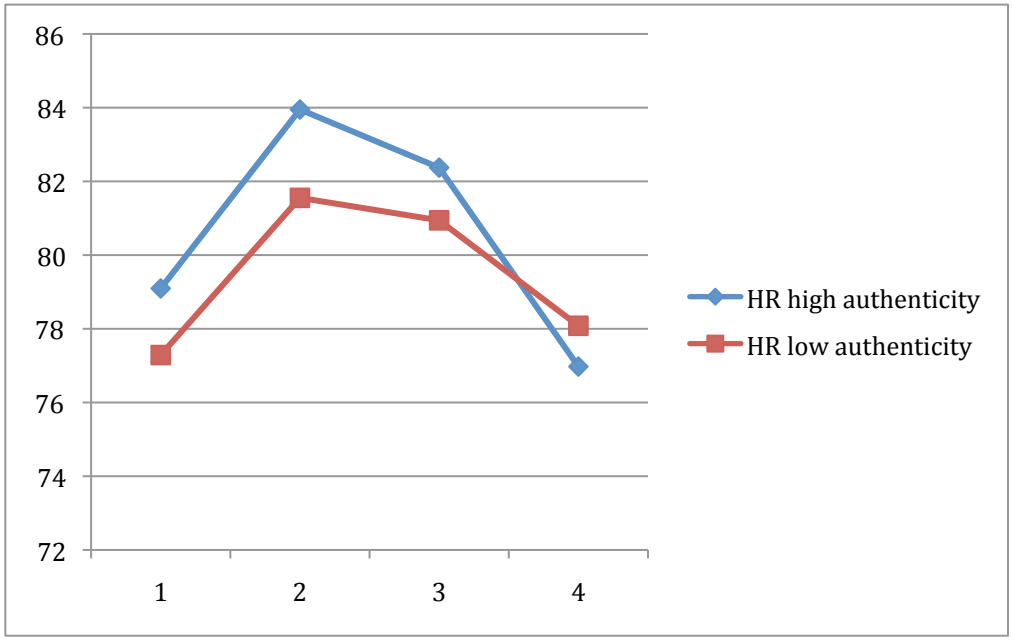
Appendix A: Correlation

	Change in NA	AI	AIUB	AIA	AIR	AIB	DVBA	MC
Change in NA	1	-.33	-.24	-.21	-.18	-.38	-.06	-.28
AI	-.33	1	.60	.88	.75	.79	.18	.49
AIUB	-.24	.60	1	.41	.22	.27	.11	.21
AIA	-.21	.88	.41	1	.54	.67	.19	.53
AIR	-.18	.75	.22	.54	1	.47	.04	.43
AIB	-.38	.79	.27	.67	.47	1	.21	.3
DVBA	-.06	.18	.11	.19	.04	.21	1	-.12
MC	-.28	.49	.21	.53	.43	.3	-.12	1

Appendix B: Mean Graphs



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80
78
76
74
72
1
2
3
4
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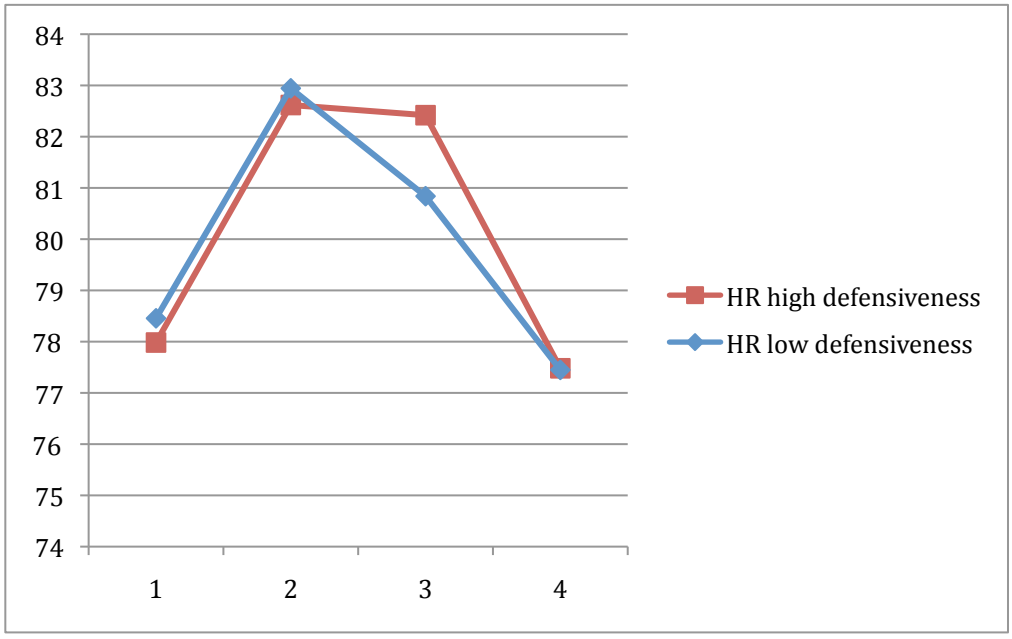
HR low authenticity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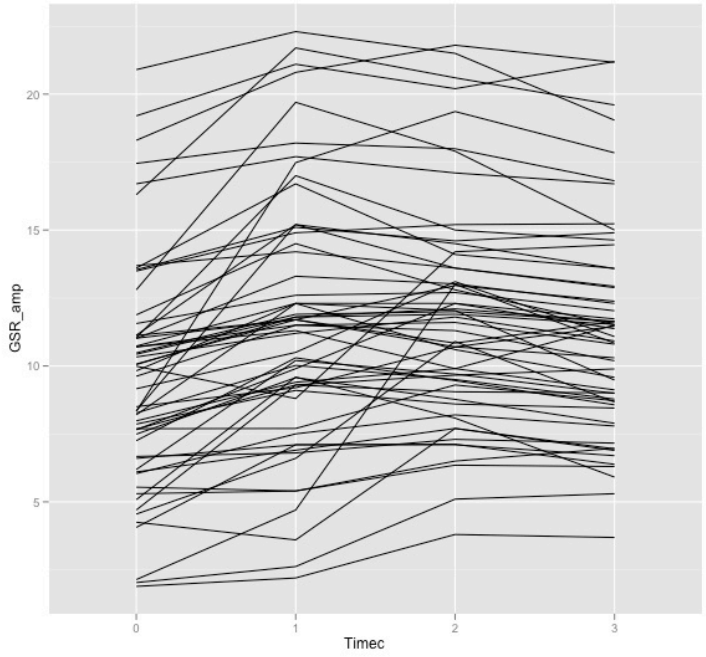
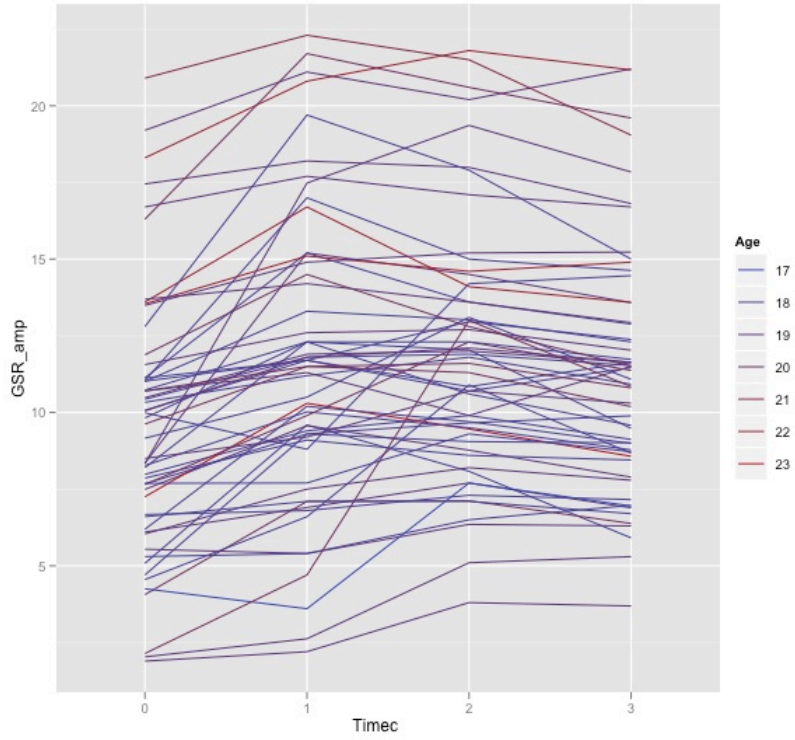
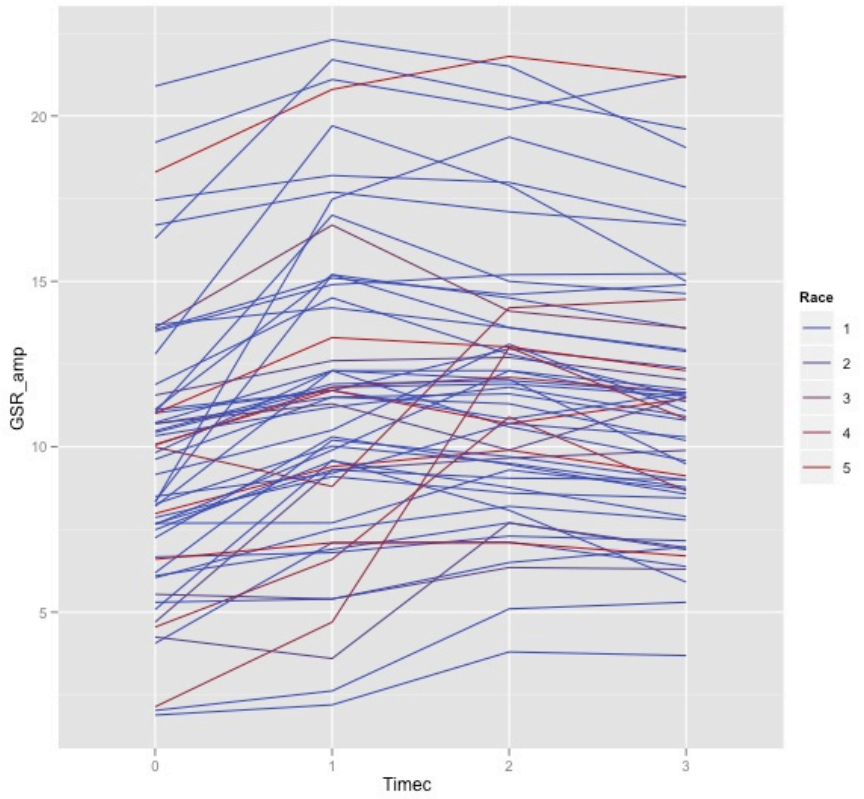
2
3
4
HR high defensiveness
HR low defensiveness

Appendix C: MLM graphs



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2
3
Timec
Race
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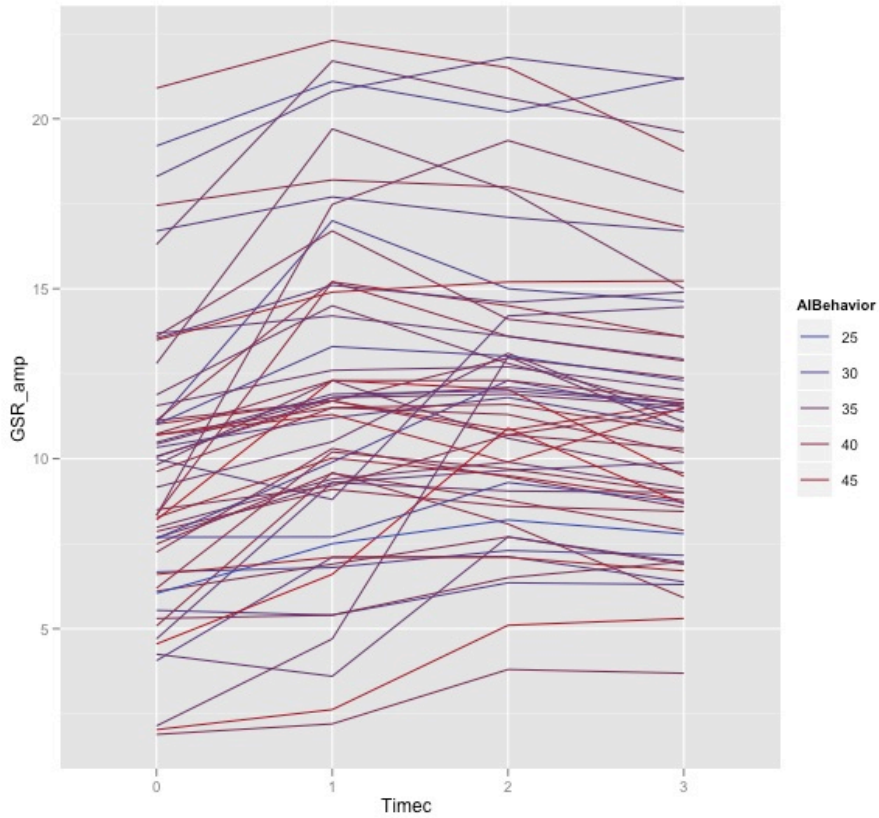
2
3
4
5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3
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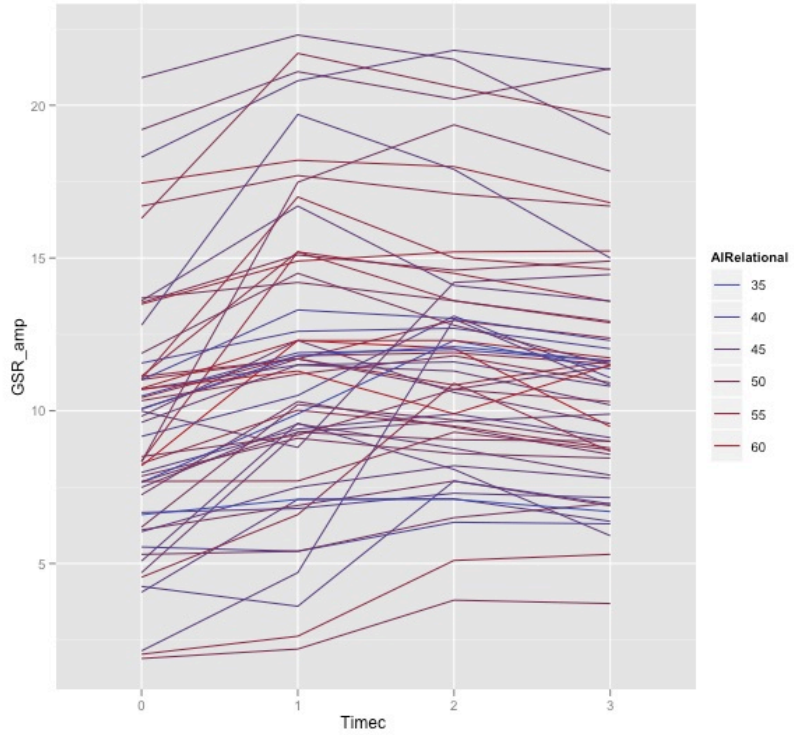
30
35
40
45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3
Timec
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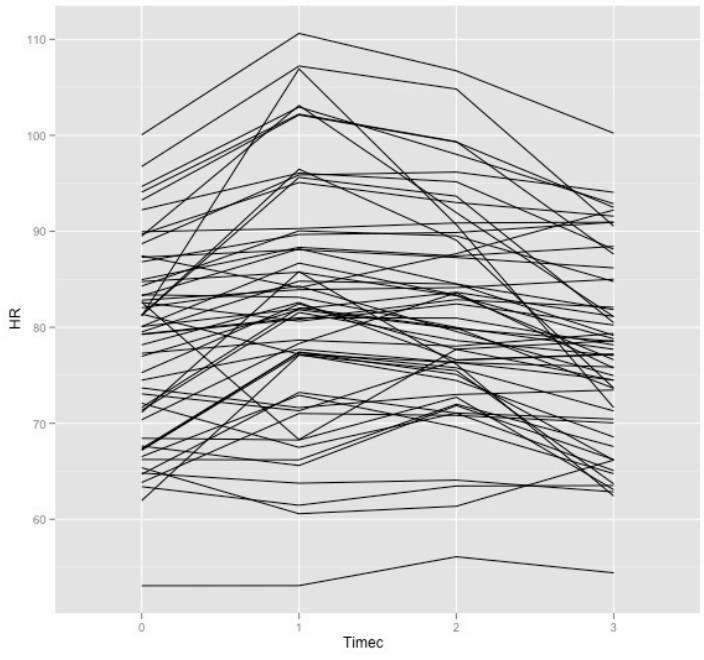
40
45
50
55
60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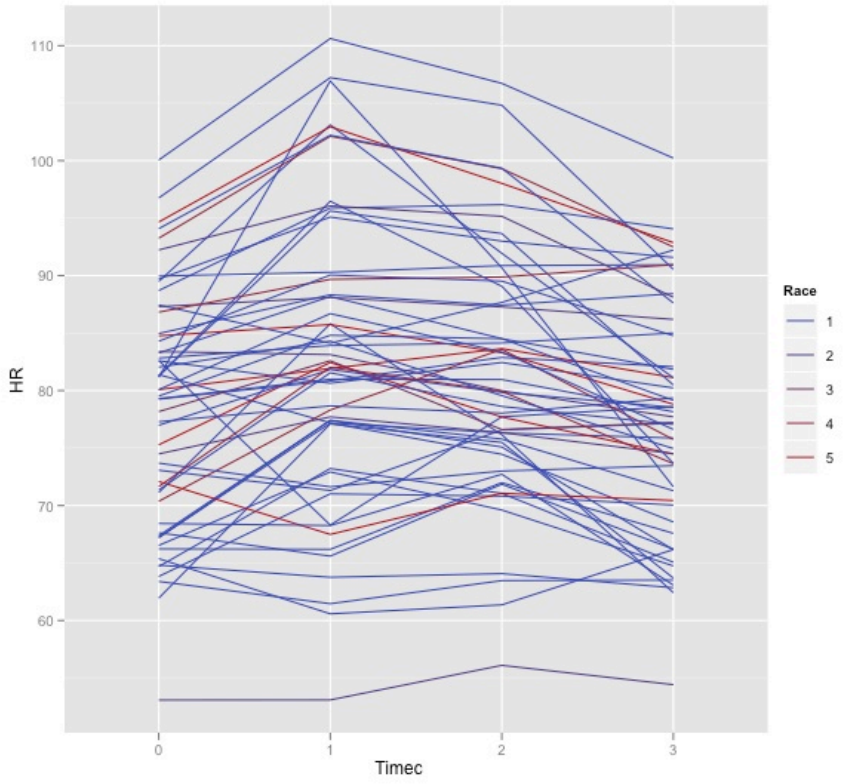
1
2
3
Timec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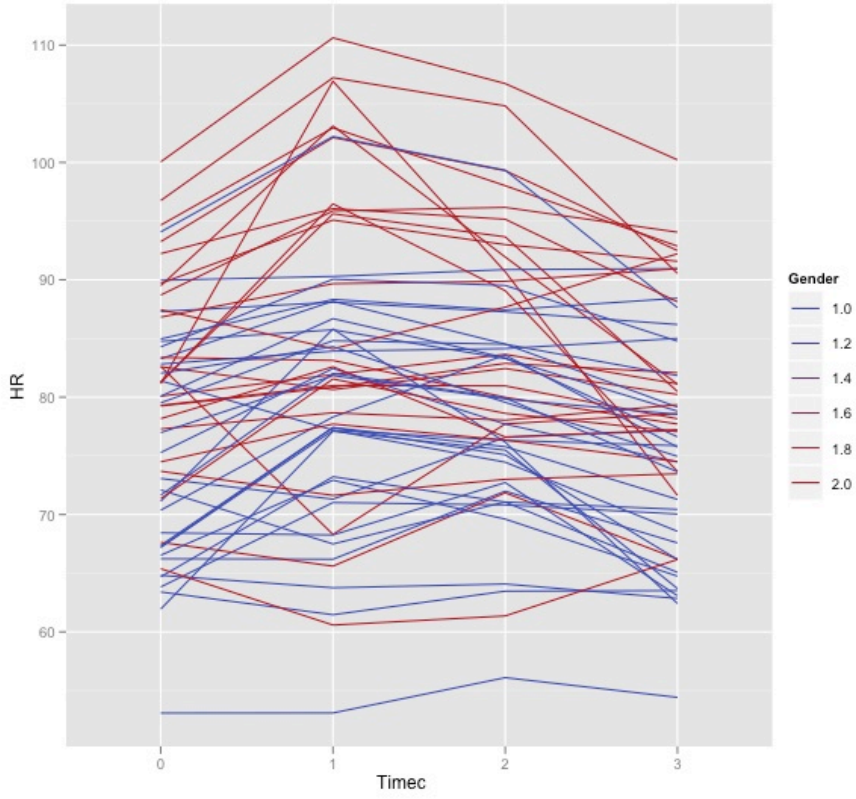
Timec
Race
1
2
3
4
5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Timec
Gender
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1.2
1.4
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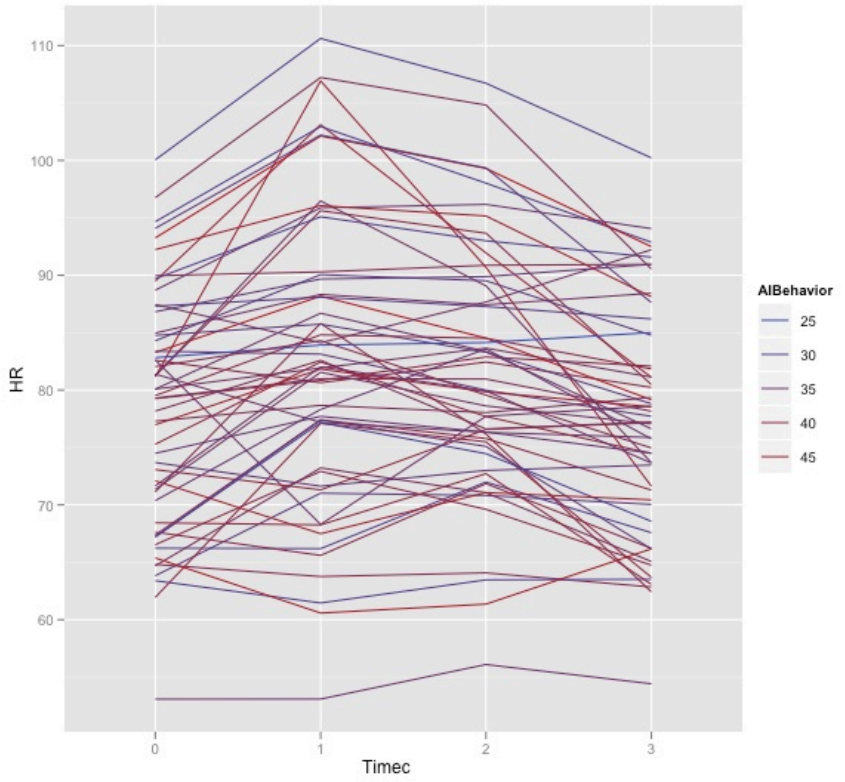
1.8
2.0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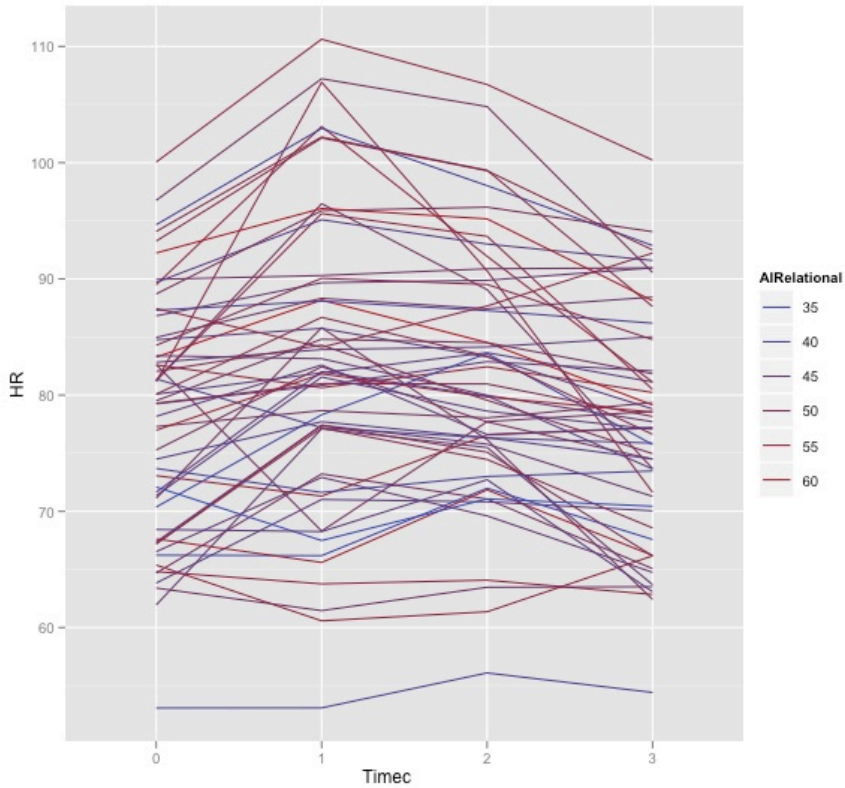
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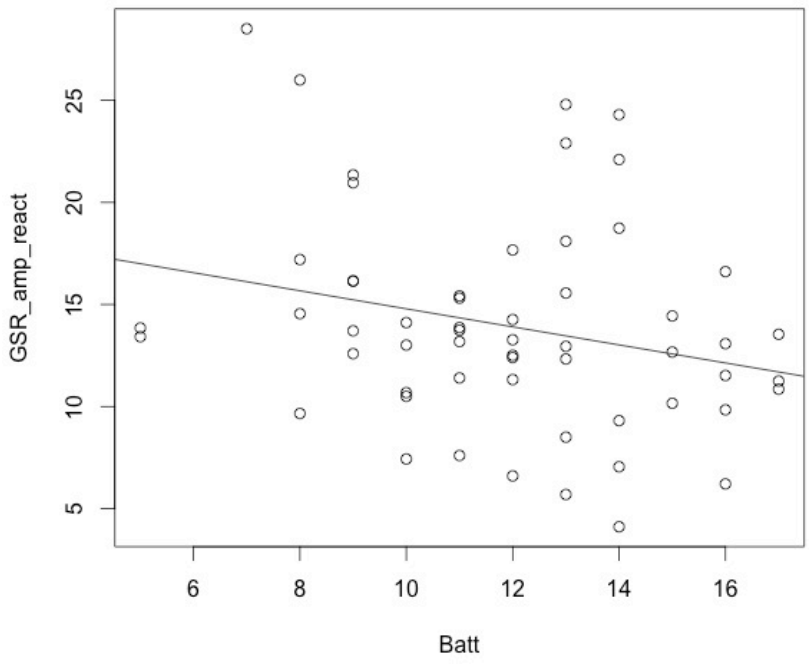
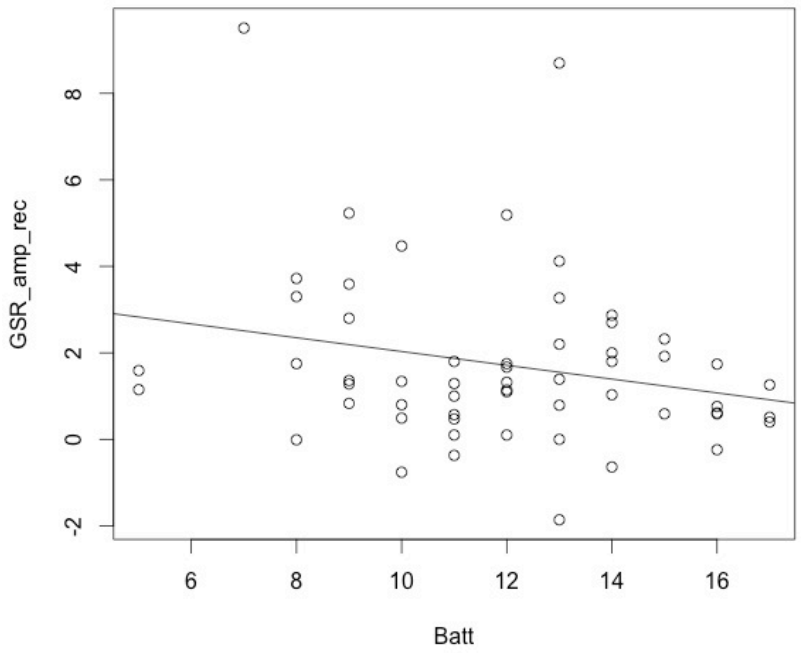
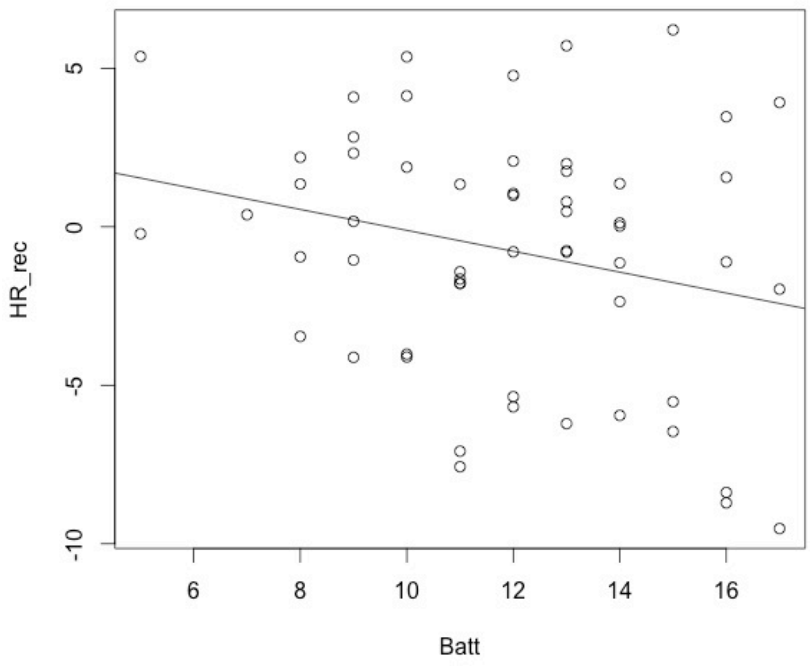
Appendix D: Regression Graphs



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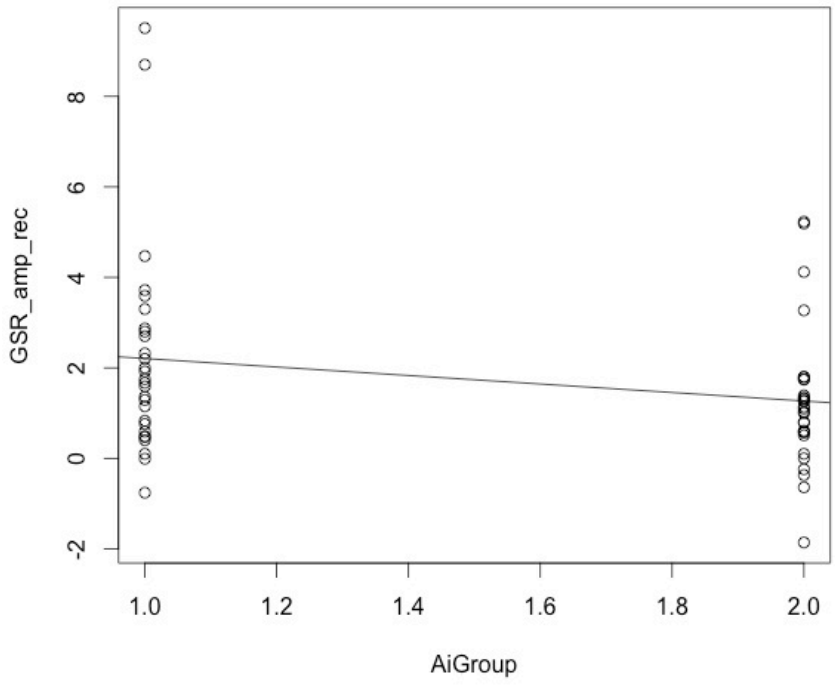
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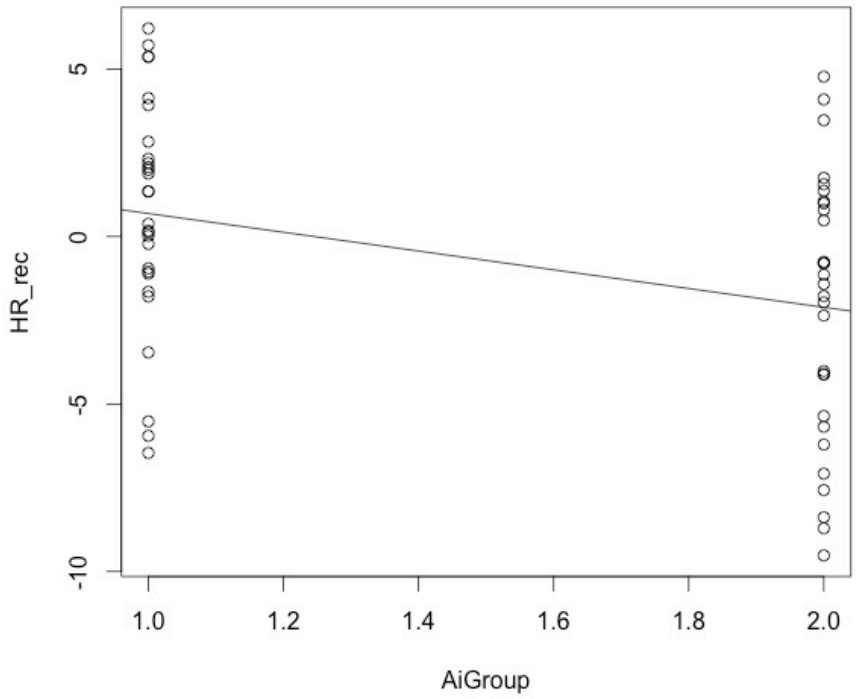
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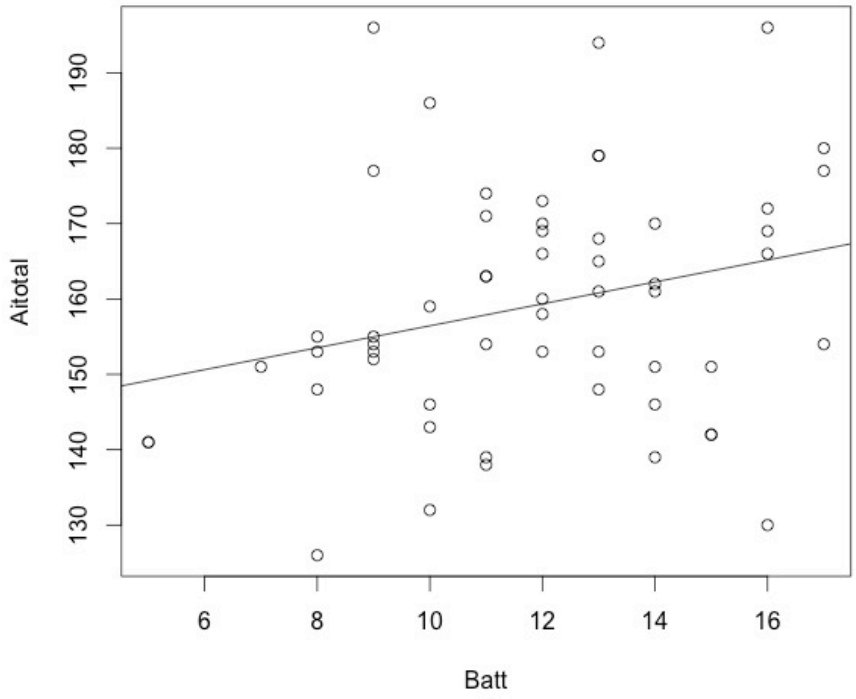
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