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Psychological Influences on Reaction When Faced with Failure and Difficult Experiences

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Honor's Thesis

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Abstract

The current study investigated the impact of psychological traits on emotional reactions in the face of challenges. The study employed tasks designed to induce negative psychological states, such as a Learned Helplessness (LH) task (Hooper & McHugh, 2013) and the difficult Compound Remote Associate (CRA) task (Bowden & Jung-Beeman, 2003). A correlational study was conducted using a within-subjects design. All participants were given initially the same questionnaires measuring the following predictor variables: Grit, Need for Cognition (NFC), Psychological Flexibility (PF), *Trait* Cognitive Fusion (CF), and Emotional Stability. Participants then engaged in the LH and CRA tasks followed by completing outcome questionnaires measuring *State* Cognitive Fusion and positive and negative Affect. Participant recruitment occurred among Western Michigan University students, resulting in a sample of fifty-two participants (N = 52) with a mean age of 22.33, and comprised of 23.08% male, 73.08% female, and 3.85% nonbinary. Data analysis involved computing composite scores, Pearson's product-moment correlation coefficients, and linear regressions to explore relationships between the predictor and outcome variables. Results indicated that PF was the best predictor of overall affect following the LH ($\beta = 0.421$, $p = 0.021$) and the CRA ($\beta = .416$, $p = .033$) tasks, suggesting that higher PF was associated with increased Affect following a failure and a difficult experience. *Trait* CF ($\beta = 0.361$, $p = 0.041$) was the best predictor of *State* CF following the LH task, suggesting that the more fusion they typically experience, the more fusion they experience in the moment following a failure experience. Lastly, NFC emerged as the best predictor of *State* CF ($\beta = -.309$, $p = .029$) post-CRA task and as a significant predictor of affect following the CRA task ($\beta = .272$, $p = .049$), implying that the more one enjoys difficult or

challenging tasks, the less their affect and cognitive fusion are impacted following a difficult task.

Introduction

Whether expected or unexpected, everyone faces challenging problems, be they academic, occupational, interpersonal, familial, physical, or financial. How one reacts to these challenges, however, varies across individuals. This variation may be due to different psychological characteristics. Certain psychological traits may help one persevere and stay motivated when faced with challenging problems. Conversely, other psychological traits may hinder one's ability to deal with challenging problems, leading to dysfunctions in thinking, feeling, and acting (Ng & Diener, 2009).

Grit, defined as perseverance and passion for long-term goals, is a trait that involves the ability to maintain focus and effort over long or extended periods while facing challenges, setbacks, and failure (Duckworth et al., 2007). Grit encompasses two main elements: perseverance of effort and consistency of interest (Duckworth, 2016). Need for cognition (NFC) is a psychological concept that refers to an individual's tendency and motivation to engage in and enjoy cognitive activities. Individuals high in NFC find pleasure and satisfaction in effortful and cognitively complex tasks and are more likely to choose activities that involve higher cognitive demands (Cacioppo & Petty, 1982). Psychological flexibility refers to an individual's ability to adapt, be open, aware, and persist in behaviors and actions that align with one's values despite the challenges they face (Hayes et al., 2016). The constructs of grit, need for cognition, and psychological flexibility are all worth mentioning as they may positively influence one's emotional reaction and persistence to challenges, problems, or tasks.

Psychological inflexibility, the opposite of psychological flexibility, refers to the maladaptive approach to dealing with thoughts, emotions, and situations. Psychologically inflexible individuals tend to behave in ways that are inconsistent with their values and may struggle to adapt to the challenges and demands of life in a constructive manner (Levin et al., 2014). Cognitive fusion, one of the six core processes of psychological inflexibility, refers to the tendency for individuals to become entangled or "fused" with their thoughts. Individuals high in cognitive fusion may regard negative content, such as thoughts, images, and feelings as if they are factual, literal, or real. With that, they may also have difficulty distancing themselves from their thoughts (Hayes et al., 2016; Gillanders et al., 2014). Neuroticism is one of the big five personality traits and is characterized by the tendency and susceptibility to experience negative affect, such as anger, anxiety, depression, irritability, and emotional instability. Those high in neuroticism may respond more poorly to threats and stressors (Widiger & Oltmanns, 2017). Learned Helplessness (LH) is a phenomenon that occurs when individuals believe that their actions have no impact on the outcome of a situation. An LH attribution style involves attributing negative outcomes to internal, stable, and fixed aspects of the self. leading to feelings of helplessness and decreased motivation to act differently (Teasdale & Fogarty, 1979; Hiroto & Seligman, 1975). While grit, need for cognition, and psychological flexibility may positively influence a person's reaction and persistence when experiencing challenging events, psychological inflexibility, cognitive fusion, neuroticism, and LH attribution style may have the opposite effect.

An environment that promotes LH is one where an individual’s behavior has no impact on the consequences experienced. That is, there is no relationship between their actions and the outcomes experienced. Hooper and McHugh (2013) created a computerized Learned

Helplessness task where participants were instructed to select between two different stimulus patterns that differed in shape, color, size, and letter. Using trial and error, participants were instructed to determine which of the two stimulus patterns was correct. Furthermore, participants were told this task was easily accomplished by most. However, unbeknownst to them, each answer was predetermined as incorrect 60% of the time at random, capturing the defining feature of LH: the feedback was response-independent.

In behavior analysis, the absence of a relationship between behavior and consequence is an extinction condition (Michael, 2004, p. 35). In the LH task, the participant's choices were unrelated to the computer's feedback. Therefore, it did not allow the participant to earn a reinforcer upon their choice. Unlike the LH task however, the compound remote associate task (CRA) produces a similar experience of failure without it being response-independent. In a CRA task participants are asked to generate a connector word (e.g., honey) that is associated with the other three words given to them (e.g., dew, bee, comb). Based on established norms, the CRA task can be curated to include increasingly difficult word association problems, such that failure to be able to solve the problem could be predicted to occur for most items (Bowden & Jung-Beeman, 2003). Thus, the CRA task condition represents a very lean reinforcement schedule when curated for higher difficulty. Therefore, individuals may experience changes in their negative or positive affect and cognitive fusion following the curated CRA task.

Individuals enter experiments with life histories that are unknown to the researchers, and these life histories are often captured in the constructs measured as predictors. The study examined whether individual differences in these traits play a role in shaping how individuals react and persist in the face of challenges. Hooper & McHugh's (2013) LH task and the CRA task were used to induce experiences of uncontrollability and failure. The tasks provided a

platform to observe how individuals with varying levels of grit, need for cognition, psychological flexibility, psychological inflexibility, cognitive fusion, emotional stability, and learned helplessness reacted emotionally and cognitively to unrewarding experiences. Understanding the best predictors of emotional and cognitive responses to tasks has implications for comprehending characteristics that one might target to help individuals persevere through challenges and promote resilience.

In the current study, data were gathered on participants' grit, need for cognition, psychological flexibility*, trait* cognitive fusion, personality traits (consciousness, agreeableness, extraversion, and emotional stability), and learned helplessness. Subsequently, participants were exposed to both the unsolvable Learned Helplessness task and the Compound Remote Associates task. The primary focus was on observing the relationship between the predictor variables (e.g., emotional stability, grit, need for cognition, and psychological flexibility) and the dependent variables, which included scores on a measure of *State* cognitive fusion and positive and negative affect. The purpose of the study was to understand the psychological influences and traits that impact emotional reactions when a person is faced with failure experiences.

Methods

Participants

Table 1
Ethnoracial and Class Standing Distribution

	N=52	Percent (%)
Race/Ethnicity		
White or Euro American	40	76.9
Black or African American	4	7.7
Hispanic or Latinx	5	9.6
Mixed	3	5.8
Year in School		

First Year	14	26.9
Second Year	12	23.1
Third Year	14	26.9
Fourth Year	12	23.1

In order to be included in the study, participants must have been students at Western Michigan University, above the age of eighteen years old, have the ability to read, write, and understand English, and sit and use a computer. As long as these criteria were met, no specific exclusion criteria existed. The study included a total of fifty-two Western Michigan University students (N = 52), comprising 23.08% male, 73.08% female, and 3.85% nonbinary individuals. Participants' ages ranged from 18 to 46 years (Mean = 22.33, SD = 6.56). Ethno-racial background varied, with 76.92% identifying as White, 7.69% as Black, 9.62% as Hispanic, and 5.77% as Mixed. Participants were distributed across academic years, with 26.92% in the first year, 23.08% in the second year, 26.92% in the third year, and 23.08% in the fourth year. The cumulative Grade Point Average demonstrated a broad academic spectrum ranging from a 2.4 to a 4.0 GPA (Mean = 3.45, SD = 0.43).

Recruitment

Participants were recruited through the posting of recruitment flyers (see Appendix A) and through course announcements publicized by the course instructors (see Appendix B for recruitment email sent to course instructors). Physical recruitment flyers were posted on bulletin boards throughout WMU's campus, and online copies were posted by instructors who offered extra credit for research participation in their respective courses. Students interested in participating were responsible for contacting the student investigator to schedule a session. Upon session completion, the student researcher was responsible for sending a confirmation email (see Appendix C) to the course instructor if participation granted extra credit.

Setting

The study took place in two individual research laboratory rooms at a Midwestern University that included both a chair and a computer.

Instruments

Participants were seated in front of a computer and were asked to complete the surveys and problem-solving tasks, which were all guided through a computer program via the experimental platform Testable (https://www.testable.org/). The details of the experimental procedure are described below in the procedures subsection.

Predictor Variables

The Short Grit Scale (Grit-S):

The Short Grit Scale (Grit-S) is a widely used measure designed to assess an individual's level of grit, which is defined as the perseverance and passion for long-term goals. The scale consists of eight items, each rated on a 5-point Likert scale ranging from 1 (not at all like me) to 5 (very much like me). Respondents indicate the extent to which they agree or disagree with statements reflecting perseverance and consistency of interest over time. Internal consistency, assessed using Cronbach's alpha coefficient, indicates that values have typically ranged from $\alpha = 0.73$-0.83, suggesting adequate to good internal consistency (Duckworth & Quinn, 2009).

Need for Cognition Scale (NFCS-6):

The Need for Cognition Scale (NFCS-6) is a brief measure designed to assess an individual's tendency to engage in and enjoy effortful cognitive activities. It consists of six items, each rated on a 5-point Likert scale ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). Respondents indicate the extent to which

they agree or disagree with statements reflecting their inclination toward engaging in cognitively challenging tasks. Internal consistency, assessed using Cronbach's alpha coefficient, indicates values ranged from $\alpha = 0.86$-0.90, suggesting good internal consistency (Coelho & Wolf, 2018).

Psychological Flexibility (Psy Flex-6):

The Psychological Flexibility (Psy Flex-6) scale is a brief measure designed to assess an individual's ability to adaptively respond to various internal experiences, thoughts, feelings, and sensations while still engaging in meaningful actions in line with their values. This construct is central to Acceptance and Commitment Therapy (ACT) and other contextual behavioral approaches. The Psy Flex-6 scale consists of six items, each rated on a 5-point Likert scale ranging from 1 (very seldom) to 5 (very often). Respondents indicate how often each statement occurred in the past seven days, reflecting their psychological flexibility. Calculated using Raykov's coefficient, the reliability of the Psy Flex-6 across all samples is reported to be 0.91, indicating excellent internal consistency (Gloster et al., 2021).

Multidimensional Psychological Flexibility Inventory (MPFI-SF):

The Multidimensional Psychological Flexibility Inventory - Short Form (MPFI-SF) is a comprehensive measure designed to assess the various facets of psychological flexibility and inflexibility. The MPFI-SF consists of 24 items that cover the six dimensions of both psychological flexibility and inflexibility, with two items per dimension. Each item in the MPFI-SF is rated on a Likert scale, with response options ranging from 1 (strongly disagree) to 7 (strongly agree). Respondents indicate the extent to which each statement applies to them. Internal consistency, assessed using Cronbach's alpha coefficient,

indicates that values ranged from α = 0.78-0.93, suggesting adequate to excellent internal consistency (Rolffs & Wilson, 2016).

Trait Cognitive Fusion Questionnaire ([T]CFQ-7):

The Cognitive Fusion Questionnaire (CFQ-7) is a brief measure designed to assess cognitive fusion; a concept related to psychological inflexibility. The *trait* version of the CFQ-7 focuses on how individuals typically relate to their thoughts, while the *state* version of the CFQ-7 focuses on their momentary experiences of cognitive fusion in that specific situation or context. The CFQ-7 consists of seven items that assess the extent to which individuals identify with and believe in the content of their thoughts. Participants rate each item on a Likert-type scale, typically ranging from 1 (strongly disagree) to 7 (strongly agree), indicating the degree to which they experience cognitive fusion. Internal consistency, assessed using Cronbach's alpha coefficient, indicates that values ranged from α = 0.94–0.95, suggesting excellent internal consistency (Gillanders et al., 2014).

Ten-Item Personality Inventory (TIPI):

The Ten-Item Personality Inventory (TIPI) is a brief self-report measure designed to assess the Big Five personality traits (openness to experience, conscientiousness, extraversion, agreeableness, emotional stability). The TIPI consists of two items for each of the five personality traits, resulting in a total of ten items. Respondents rate each item on a Likert scale ranging from 1 (disagree strongly) to 7 (agree strongly), indicating the extent to which each statement describes them. Internal consistency, assessed using Cronbach's alpha coefficient, indicates that values ranged from α = 0.45-0.73, suggesting low to good internal consistency. The lack of internal consistency across the measure s a whole is understandable as one might expect relatively weak correlations between items

assessing five unique aspects of personality and doing so with a limited number of items (2) (Gosling et al., 2003).

Learned Helplessness Scale (LHS):

The Learned Helplessness Scale (LHS) is designed to assess an individual's tendency to perceive themselves as helpless or powerless in the face of adverse situations. The LHS consists of 20 items that describe various situations in which individuals may feel helpless. Respondents are asked to indicate the extent to which they agree or disagree with each statement, using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Internal consistency, assessed using Cronbach's alpha coefficient, indicates a value of $\alpha = .79$, suggesting acceptable internal consistency (Quinless & Nelson, 1988).

Outcome Variables

State Cognitive Fusion Questionnaire ([S]CFQ-7):

The *State* Cognitive Fusion Questionnaire (CFQ-7) is a tool designed to measure the extent to which an individual is currently experiencing cognitive fusion, which is the tendency to become entangled or "fused" with one's thoughts. The *State* CFQ-7 questionnaire consists of seven items that assess the intensity of cognitive fusion in the present moment. The only difference between the *Trait* and *State* Cognitive Fusion Questionnaire is in the instructions. The *Trait* version asks how the participants *typically* feel, whereas the *State* version asks the participants how they feel *right now*. Participants rate each item on a Likert scale, typically ranging from 1 (strongly disagree) to 7 (strongly agree), indicating the degree to which they are currently experiencing cognitive fusion. Internal consistency, assessed using Cronbach's alpha coefficient, indicates a value of $\alpha = .95$, suggesting excellent internal consistency (Bolderston et al., 2019).

Positive and Negative Affect Schedule (PANAS-10):

The Positive and Negative Affect Schedule (PANAS-10) is a self-report measure designed to assess an individual's experience of positive and negative emotions using a concise set of items. The PANAS-10 includes a total of 20 items, divided into two subscales: Positive Affect (PA) and Negative Affect (NA). Each subscale consists of 10 items that measure the intensity of positive and negative emotions experienced by the respondent right now, participants rate the extent to which they are experiencing each emotion described in the items using a Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). The Positive Affect scale assesses positive emotions, such as excitement, enthusiasm, and happiness, while the Negative Affect scale assesses negative emotions, such as sadness, anxiety, and anger. Internal consistency, assessed using Cronbach's alpha coefficient, indicates a value of $\alpha = .85$, suggesting good internal consistency (Watson et al., 1988).

Procedure

All participants underwent the same research protocol. Participation in the study took approximately 60 minutes, with approximately 10 minutes for the consent process, 20 minutes for the survey questions, 5 minutes for the debriefing process, and the rest of the time allocated to the problem-solving tasks. Overall time varied across participants (15 ~ minutes) due to individual differences and questions asked throughout the consent and debriefing process.

1. *Consent Process*

   Participants were given a paper copy of the consent form (see Appendix D) and were asked to follow along as the student researcher read the document. Upon reading completion, the participant was given the chance to ask any questions or express any

concerns prior to signing the document. The consent document is the only document in which the participant's name appeared, and the document was stored in a secure filing cabinet within the principal investigator's locked laboratory, which only members of the research team had access to. The signed consent forms were stored separately from the data in order to protect the confidentiality of the participants. Following the participant's signing of the consent form, the student researcher directed the participant toward the computer that had the experimental platform (Testable) loaded. After orienting the participant to the computer, the researcher left the participant alone in the room and stored the signed document in the laboratory's cabinet.

2. *Anonymity code sheet*

   Once logged into Testable, participants were first asked to create an anonymity code sheet (see Appendix E). The code established anonymity and ensured that the participant's responses to the measures and tasks could be linked without the use of personally identifiable information.

3. *Demographic Questionnaire*

   Upon anonymity code creation, participants were asked a series of demographic questions, which included self-reporting their age in years, gender identification, ethno-racial identification, class standing (first year, second year, third year, or fourth year), and cumulative GPA (see Appendix F for demographic questionnaire, including gender and ethnic-racial identification options). Refer to Table 1 for the sample's demographic characteristics.

4. *Completion of Surveys: Predictor variables*

Following demographic questions, participants were then asked to complete the following surveys: Grit, NCS, Psy-Flex 6, MPFI-SF, TIPI, LH Scale, and the *trait* CFQ.

5. *Learned Helplessness Task (LH Task)*

   After completing the survey questions, participants were presented with the instructional page for the LH task (see Appendix G for instructions), developed by Hooper and McHugh (2013). Participants were told that the task was adopted from a standard intelligence test and that most people respond appropriately with relative ease. Participants were told that they must learn to choose the correct stimuli based on their response consequences, "correct" or "incorrect," in a trial-and-error fashion. Unbeknownst to the participants, there is no pattern to learn, and the task is predetermined to present "correct" and "incorrect" at random with a 60% chance of incorrect. The task contained a total of forty trials, with four blocks of ten trials in each.

6. *Completion of Surveys: Outcome Variables Part 1*

   Following the LH Task, participants then completed the *state* CFQ and the PANAS-10.

7. *Compound Remote Associates Test*

   After completing the *state* CFQ and the PANAS-10, participants were directed to the instructional page for the CRA test (see Appendix H for instructions). This test involves presenting three words that are all related by one connector word. Using the previous example, dew/comb/bee are all connected because of the word "honey"; therefore, when presented with dew/comb/bee, "honey" would be the correct answer. If participants did not know the correct connector word, they were instructed to type "DK" for "Don't Know" in the text box. The task contained a total of twenty trials.

8. *Completion of Surveys: Outcome Variables Part 2*

Following the CRA test, participants then completed the *state* CFQ and the PANAS-10 one additional time.

9. *Debriefing*

Upon completing the last two surveys, participants were directed to the debriefing statement, which described the deception used in the study and the confidentiality surrounding the deception since data collection was ongoing. The debriefing statement is as follows: "In this study we are interested in better understanding the psychological variables that predict responses to, and persistence when, confronted with unpredictably challenging tasks. To gather these data, we needed to deceive you about some aspects of the study. Namely, we told you that the tasks were relatively easy when, in fact, the problem solving tasks were designed such that you would fail. In the first task – the non-verbal problem-solving task -- your responses did not even matter. The feedback was predetermined and had nothing to do with your input. In the second task – the verbal problem-solving task -- the items were selected due to their known difficulty level. We predicted that most of them would be unsolved. As such, please know that the tasks used in this study say nothing about your intelligence, creativity, capabilities, or aptitude in solving practical problems."

10. *Short mood-enhancing video*

Upon reading the debriefing statement, participants were instructed to click a link (https://tstbl.co/383-756) for a concluding non-evaluative activity. The link led to a one-minute funny animal video accompanied by upbeat music intended to induce a positive mood. Following the video, participants were asked to inform the experimenter, who was located in a separate room, once they had completed the task.

Design

A correlational study was conducted using a within-subjects design. All participants were given the same predictor measures, engaged in the same verbal and non-verbal problem-solving tasks, and completed all outcome measures after each task.

Data Analysis

All data were collected by Testable for each individual participant. The raw data were saved into an Excel spreadsheet, with a separate file for each participant's responses saved separately. From the raw data, composite scores were then computed for each predictor and outcome measure and combined into a separate Excel file containing the scores on each measure for all participants. The data were subsequently imported into IBM SPSS Statistics software for analysis. The data were initially examined to make sure their distributions allowed for the planned parametric analysis. Pearson's product-moment correlation coefficients were then calculated to explore relationships between the seven target constructs, or predictor variables (Grit, NFC, Psy-Flex, Psy-Inflex, CFQ-7, TIPI, LHS) and post-task thoughts and emotions, or outcome variables (State CFQ-7 and PANAS-10). Multiple linear regression analyses were then employed to identify which of the predictor variables best predicted the outcome variable following each of the tasks. In multiple linear regression, the predictor variables are examined simultaneously to assess their individual and combined effects, allowing us to determine which variable(s) emerge as the strongest while accounting for the presence of the others in the model. Additionally, an exploratory analysis was conducted to investigate the potential mediation effect of State cognitive fusion between psychological flexibility and overall affect.

Results

Learned Helplessness (LH) Task

Table 2

Left Stimulus Selection and Time Difference Between Blocks 1 and 4 in the LH Task

	Left Stimulus Selection %	**Block 1 time (ms)**	**Block 4 time (ms)**	**Time Difference (Blocks 1 and 4) (ms)**
N = 52				
Mean	51.78	5132.50577	2323.975	2808.5308
Median	50.00	2739.14423	1723.875	1015.26923
Standard Deviation	8.33	7077.42556	1603.67459	5473.7509

Note. LH = Learned Helplessness

Table 2 shows that the left stimulus selection remained equal to its right counterpart (M = 51.78, Median = 50.00); this means that there was no preference selection for either the left or right stimulus in the Learned Helplessness Task. The average time difference between blocks 1 and 4 shows there was an average 2.8-second reduction in time spent between the first 10 problems and the last 10 problems. These results are consistent with what might be expected since participants may have recognized their inability to consistently respond correctly and, therefore, respond more rapidly to complete the task.

Table 3

Pearson's Correlations Between the predictor and outcome variables (SCFQ and PANAS) Following the LH Task

	Outcome Variables			
Predictor Variables	***State* CFQ**	**Positive Affect (P)**	**Negative Affect (N)**	**Affect (P-N)**
Psy-Flex	-.510***	.504***	-.350*	.579***
MPFI (Flex)	-.378**	.470***	.266*	.382**
MPFI (InFlex)	.554***	-.313*	.266*	-.388**
Trait CFQ	*.580***	*-.386***	*.340**	*-.486****

Learned Helplessness Scale	.529***	-.404**	.313*	-.482**
Need For Cognition	-.375**	0.142	-.517***	.410**
Grit	-.582***	.398**	-.388**	.522***
Emotional Stability	-.473***	.476***	-.23	.487**
Conscientiousness	-.424**	.273*	-.283*	.368**
Agreeableness	-.251*	.098	-.100	.131
Openness to Experiences	-.171	.004	-.015	.012
Extraversion	.002	-.028	.108	-.084

Note. SCFQ= *State* Cognitive Fusion Questionnaire; PANAS= Positive and Negative Affect Schedule; Psy-Flex= Psychological Flexibility; MPFI (Flex) = Psychological Flexibility, MPFI (InFlex)= Psychological Inflexibility; LH = Learned Helplessness; *** Correlation is significant at $p < .001$, ** Correlation is significant at $p < .01$, * Correlation is significant at $p < .1$

Table 3 showed that Psy-Flex had a strong negative correlation with *State* CFQ ($r = -0.51$, $p < .001$) and a strong positive correlation with Affect ($r = 0.579$, $p < .001$), suggesting that higher psychological flexibility is associated with lower cognitive fusion and increased affect following a LH task. The MPFI (InFlex) displayed a strong positive correlation with *State* CFQ ($r = 0.554$, $p < .001$) and a negative correlation with Affect ($r = -.388$, $p < .01$), suggesting that higher psychological inflexibility is associated with increased cognitive fusion and a decrease in overall affect following the LH task. Similarly, *Trait* CFQ also reveals a strong positive correlation with *State* CFQ ($r = 0.580$, $p < 0.001$) and a strong negative correlation with Affect ($r = -.486$, $p < 0.001$), indicating that higher *trait* cognitive fusion is associated with increased *state* cognitive fusion and decreased overall affect following the LH task. Furthermore, Learned Helplessness, Need for Cognition, Grit, Emotional Stability, and Conscientiousness also demonstrated significant correlations with both *State* CFQ and Affect.

Table 4

Coefficients for Linear Regression on Affect for LH task

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	-7.977	19.529		-.408	.685
Need For Cognition	.490	.353	.174	1.391	.171
Learned Helplessness Scale	.210	.305	.135	.688	.495
Grit	.665	.376	.281	1.767	.084
Psy-Flex	1.416	.592	.421	2.392	.021
Emotional Stability	.235	.566	.068	.414	.681

Note. Sig.= significance; Psy Flex= Psychological Flexibility; LH= Learned Helplessness; Only the most significant measures for each construct were reported above.

Analysis revealed that Psychological Flexibility (Psy-Flex) emerged as a robust predictor, demonstrating a positive influence on Affect ($\beta = 0.421$, $p = 0.021$). Additionally, while not statistically significant at conventional levels, Grit displayed results that indicate a possible influence on Affect ($\beta = 0.281$, $p = 0.084$) with the p-value trending towards significance.

Table 5

Coefficients for Linear Regression on SCFQ for LH task

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	29.694	19.522		1.488	.144
Need For Cognition	-.539	.349	-.193	-1.544	.129
Learned Helplessness Scale	.107	.266	.069	.402	.690
Grit	-.652	.379	-.278	-1.722	.092
Trait CFQ	.524	.250	.361	2.099	.041

Emotional Stability	.236	.578	.069	.408	.685

Note. Sig.= significance; LH= Learned Helplessness; SCFQ= *State* Cognitive Fusion Questionnaire; Only the most significant measures for each construct were reported above.

Analysis revealed that among all variables, only *Trait* CFQ demonstrated a significant positive association with SCFQ ($\beta = 0.361$, $p = 0.041$). Additionally, while not statistically significant at conventional levels, Grit displayed results that indicate a possible influence on SCFQ ($\beta = -.278$, $p = 0.092$), with the p-value trending towards significance.

Compound Remote Associates (CRA) Task

Participants achieved an average of 1.88 correct responses (Median= 1.00, SD= 2.05) out of 20, highlighting the task's difficulty.

Table 6

Pearson's Correlations Between the predictor and outcome variables (SCFQ and PANAS) Following the CRA Task

Predictor Variables	**Outcome Variables**			
	***State* CFQ**	**Positive Affect (P)**	**Negative Affect (N)**	**Affect (P-N)**
Psy-Flex	-.437**	.390**	-.329*	.516***
MPFI (Flex)	-.281*	.411**	-0.153	.428**
MPFI (InFlex)	.410**	-0.217	0.264	-.336*
Trait CFQ	*.471***	*-.253**	*.327**	*-.403***
Learned Helplessness Scale	.446***	-.335*	0.233	-.414**
Need For Cognition	-.454***	0.188	-.470***	.436**
Grit	-.390**	0.266*	-0.249	.367**
Emotional Stability	-.322*	.361**	-0.135	.376**
Conscientiousness	-0.255*	0.176	-0.198	0.263*

Agreeableness	-0.151	0.127	-0.052	0.135
Openness to Experiences	-0.182	0.046	-0.095	0.094
Extraversion	-0.02	-0.027	0.047	-0.051

Note. SCFQ= *State* Cognitive Fusion Questionnaire; PANAS= Positive and Negative Affect Schedule; Psy-Flex= Psychological Flexibility; MPFI (Flex) = Psychological Flexibility, MPFI (InFlex)= Psychological Inflexibility; LH = Learned Helplessness; *** Correlation is significant at $p < .001$, ** Correlation is significant at $p < .01$, * Correlation is significant at $p < .1$

With similar findings as the previous task, Table 6 shows that Psy-Flex had a negative correlation with *State* CFQ ($r = -.437$, $p < .01$) and a strong positive correlation with Affect ($r = .516$, $p < .001$), suggesting that higher psychological flexibility is associated with lower cognitive fusion and increased overall affect following a CRA task. The MPFI (InFlex) displayed a positive correlation with *State* CFQ ($r = .410$, $p < .01$) and a negative correlation with Affect ($r = -.336$, $p < .01$), suggesting that higher psychological inflexibility is associated with increased cognitive fusion and a decrease in overall affect following a CRA task. Similarly, *Trait* CFQ also reveals a strong positive correlation with *State* CFQ ($r = .471$, $p < 0.001$) and a negative correlation with Affect ($r = -.403$, $p < 0.01$), indicating that higher *trait* cognitive fusion is associated with increased *state* cognitive fusion and decreased overall affect following a CRA task. Furthermore, Learned Helplessness, Need for Cognition, Grit, Emotional Stability, and Conscientiousness demonstrated again significant correlations with both *State* CFQ and Affect.

Table 7

Coefficients for Linear Regression on Affect for CRA Task

	Unstandardized Coefficients		**Standardized Coefficients Beta**	**t**	**Sig.**
	B	Std. Error			
(Constant)	5.062	19.373		2.61	.795
Need For Cognition	.707	.350	.272	2.020	.049
Learned Helplessness Scale	.094	.303	.066	.311	.757

Grit	.200	.373	.092	537	.594
Psy-Flex	1.290	.587	.416	2.195	.033
Emotional Stability	-.019	.562	-.006	-.033	.973

Note. Sig.= significance; Psy-Flex= Psychological Flexibility; CRA= Compound Remote Associates; Only the most significant measures for each construct were reported above.

Analysis revealed that among all predictor variables, Psychological Flexibility or Psy-Flex ($\beta = .416$, $p = .033$) and Need For Cognition ($\beta = .272$, $p = .049$) emerged as the only significant positive predictors of Affect.

Table 8

Coefficients for Linear Regression on SCFQ for CRA Task

	Unstandardized Coefficients		**Standardized Coefficients Beta**	**t**	**Sig.**
	B	Std. Error			
(Constant)	23.635	19.668		1.202	.236
Need For Cognition	-.802	.355	-.309	-2.258	.029
Learned Helplessness Scale	.221	.308	.155	.720	.475
Grit	-.301	.379	-.138	.-793	.432
Psy-Flex	-.618	.596	-.200	-1.036	.305
Emotional Stability	.359	.570	.113	.630	.532

Note. Sig.= significance; Psy-Flex= Psychological Flexibility; CRA= Compound Remote Associates; SCFQ= *State* Cognitive Fusion Questionnaire; Only the most significant measures for each construct were reported above.

Analysis revealed that among all predictor variables, Need For Cognition emerged as the only significant predictor of SCFQ ($\beta = -.309$, $p = .029$).

Exploratory analysis

Given that cognitive fusion involves a rigid and inflexible relationship with thoughts and emotions, it is plausible that it may mediate the relationship between psychological flexibility

and overall affect following a failure or difficult experience. Therefore, a mediational analysis of *State* cognitive fusion was run between the Psychological Flexibility (Psy-Flex) and overall affect for both tasks.

Table 9

Linear Regression for Psy-Flex on Affect following LH Task

	Unstandardized Coefficients		**Standardized Coefficients Beta**	**t**	**Sig.**
	B	Std. Error			
(Constant)	37.036	5.487		6.749	<.001
Psy-Flex	1.948	.388	.579	5.016	<.001

Note. Sig.= significance; Psy-Flex= Psychological Flexibility; LH= Learned Helplessness.

Table 10

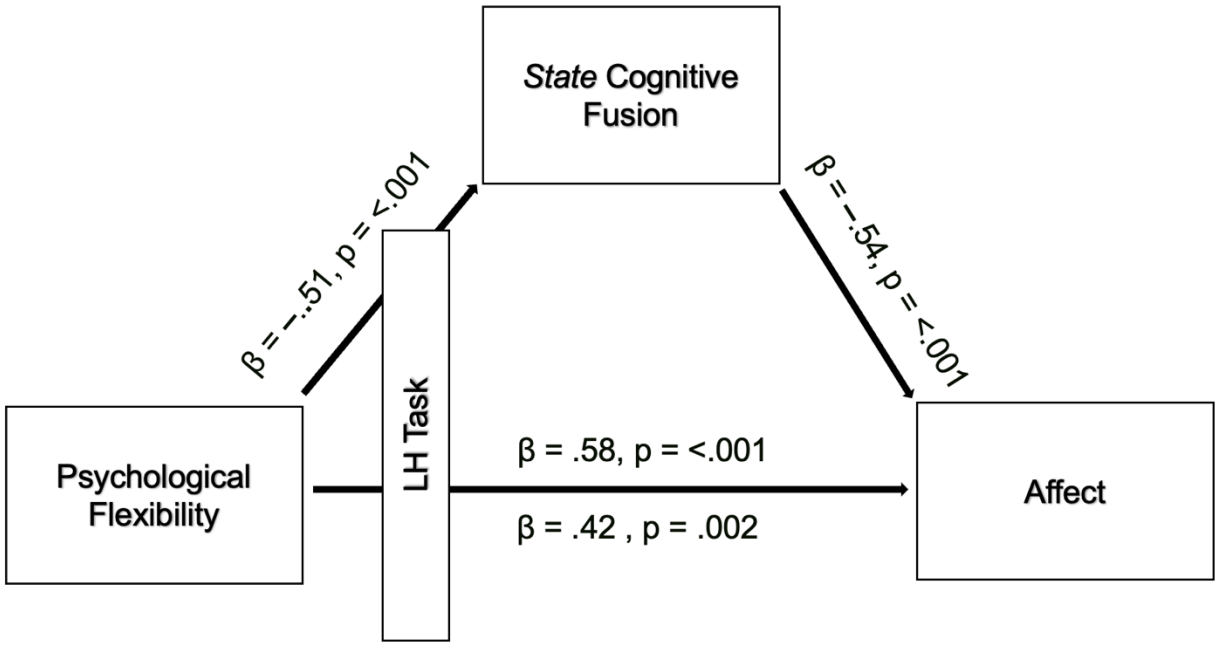
Linear Regression for Psy-Flex and SCFQ on Affect following LH task

	Unstandardized Coefficients		**Standardized Coefficients Beta**	**t**	**Sig.**
	B	Std. Error			
(Constant)	37.173	5.186		7.168	<.001
State CFQ	-.339	.128	-.335	-2.644	.011
Psy-Flex	1.373	.427	.408	3.219	.002

Note. Sig.= significance; Psy-Flex= Psychological Flexibility; SCFQ= *State* Cognitive Fusion Questionnaire; LH= Learned Helplessness.

Table 9 indicates that Psy-Flex significantly predicts Affect ($\beta = .579$, $p < .001$) following the LH task. Subsequent mediational analysis, as presented in Table 10, demonstrates that Psy-Flex remains a significant predictor of affect, albeit with a reduced level of significance and beta weight ($\beta = .408$, $p = .002$). This suggests a partial mediating role of State CFQ between Psychological Flexibility and Affect after a failure experience (see Figure 1 for the Mediation Diagram).

Figure 1



Note. LH= Learned Helplessness; β = Standardized Coefficients Beta.

Table 11

Linear Regression for Psy-Flex on Affect following CRA Task

	Unstandardized Coefficients		**Standardized Coefficients Beta**	**t**	**Sig.**
	B	Std. Error			
(Constant)	32.850	5.306		6.191	<.001
Psy-Flex	1.600	.376	.516	4.261	<.001

Note. Sig.= significance; Psy-Flex= Psychological Flexibility; CRA= Compound Remote Associates.

Table 12

Linear Regression for Psy-Flex and SCFQ on Affect following CRA task

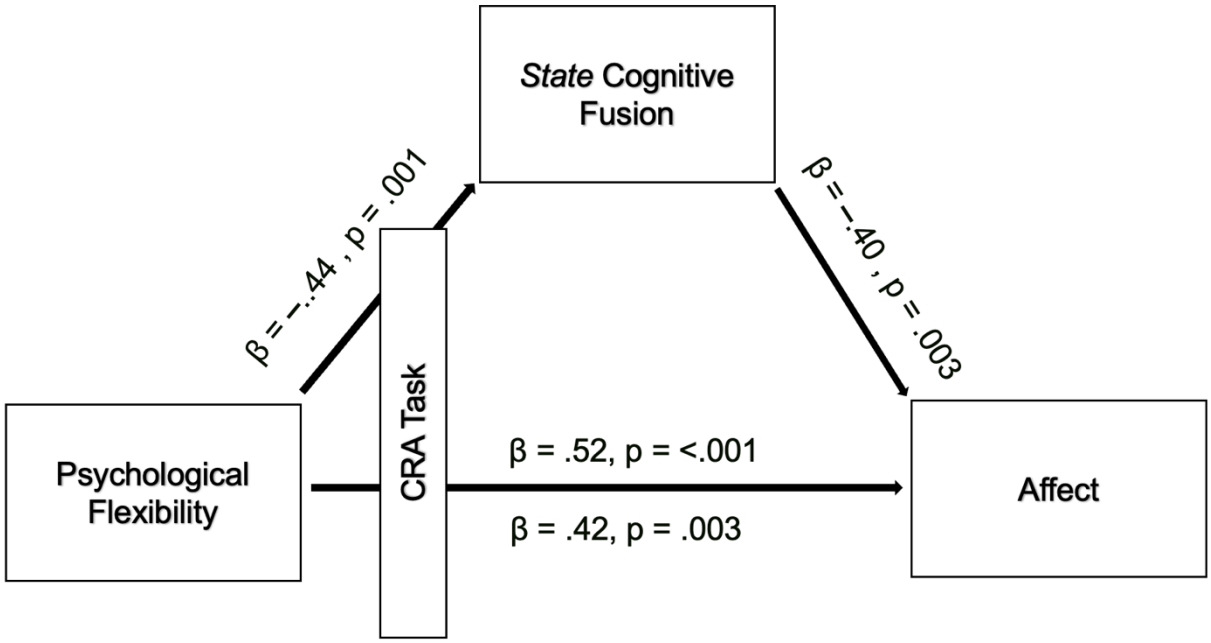
	Unstandardized Coefficients		**Standardized Coefficients Beta**	**t**	**Sig.**
	B	Std. Error			
(Constant)	33.101	5.224		6.336	<.001
State CFQ	-.215	.133	-.215	-1.620	.112

Psy-Flex	1.309	.411	.422	3.186	.003

Note. Sig.= significance; Psy-Flex= Psychological Flexibility; SCFQ= *State* Cognitive Fusion Questionnaire; CRA= Compound Remote Associates.

Similar to the results in the first task, Table 11 indicates that Psy-Flex significantly predicts Affect ($\beta = .516$, $p < .001$) following the CRA task. Subsequent mediational analysis, as presented in Table 12, demonstrates that Psy-Flex remains a significant predictor of affect, albeit with a reduced level of significance and beta weight ($\beta = .422$, $p = .003$). This suggests a partial mediating role of *State* CFQ between Psychological Flexibility and Affect after a difficult task (see Figure 2 for the Mediation Diagram).

Figure 2



Note. CRA= Compound Remote Associates; β = Standardized Coefficients Beta.

Discussion

Psychological flexibility occurs when one is able to pursue goal-directed actions while also maintaining contact with aversive private events (e.g., sensations, thoughts, feelings, and memories; Hayes et al., 2006). Someone who is psychologically flexible has clarity about what is

most important in life, directs their behavior toward what is meaningful to them, is able to continue to do so even when failure experiences arise by staying grounded in the current context, adopts openness and willingness to experience negative private events, all of which is from the perspective of an observing-self who is above the fray and is detached from negative content; (Hayes et al., 2006).

In this study, correlational and linear regression analysis found that Psychological Flexibility, as assessed via the Psy Flex-6, emerged as a central factor predicting emotional reaction after a failure experience and a subsequent difficult verbal learning task, as assessed by measuring overall affect. Following the failure experience, or the LH task, Psy-Flex showed a strong positive correlation and a significant beta weight with Affect ($\beta = 0.421$, $p = 0.021$). Similarly, following the CRA task, Psy-Flex displayed a strong positive correlation and a significant beta weight with affect ($\beta = .416$, $p = .033$), further highlighting the consistent impact that psychological flexibility has on emotional outcomes following a difficult or impossible task. That is, participants who were resolute in being open and willing to experience negative events, clear about their values, adopting a posture of present awareness, detached from negative thoughts, and stayed above the fray of the challenging tasks (e.g., those higher in psychological flexibility) were less impacted than their inflexible counterparts. These results underscore previous literature on Acceptance and Commitment Therapy (ACT), which has consistently demonstrated the effectiveness of enhancing psychological flexibility to improve emotional well-being and resilience in the face of adversity (Hayes et al., 2006).

Moreover, following the LH task, *Trait* Cognitive Fusion emerged as a significant predictor of *State* Cognitive Fusion, with a strong positive correlation and a significant beta weight ($\beta = 0.361$, $p = 0.041$). That is, those who are typically more fused to their thoughts were

found to be more fused to their thoughts in the present moment. Higher levels of *trait* cognitive fusion may predispose individuals to experience cognitive fusion in the present moment as a response to failure.

Following the CRA task, Need for Cognition was found to be a significant predictor of affect and *state* cognitive fusion, with a strong positive correlation and a significant beta weight with affect ($\beta = .272$, $p = .049$) and a negative correlation and a significant beta weight with *State* cognitive fusion ($\beta = -.309$, $p = .029$). This finding aligns with previous research that suggests that individuals with higher levels of need for cognition tend to have a greater inclination toward cognitive engagement (Cacioppo & Petty, 1982). Therefore, these individuals may find more enjoyment in difficult tasks such as the CRA task.

Future Directions

Findings on the exploratory analysis provide intriguing insights into the interplay between psychological flexibility, *state* cognitive fusion, and affect following either a difficult task or a failure experience. As Figure 1 suggests, psychological flexibility significantly predicts Affect following a failure experience, though it is partially mediated by *State* Cognitive Fusion, as seen through the reduced beta weight of $\beta = .58$ to $\beta = .42$. Similarly, figure 2 shows that psychological flexibility also predicts Affect following a difficult task, though it is also partially mediated by *State* Cognitive Fusion; this is evident in the reduced beta weight of $\beta = .58$ to $\beta = .42$. These changes in Beta weights suggest that when *State* Cognitive Fusion is taken into account, the direct influence of psychological flexibility on affect following both the LH and CRA task decreases, implying that *State* Cognitive Fusion acts as a partial mediator.

While psychological flexibility plays a role in how someone responds emotionally to failure or difficulty, part of its impact is explained by the extent to which individuals are fused to

their thoughts in the moment. This highlights the importance of considering both psychological flexibility and cognitive fusion in understanding how individuals cope with failure or difficulties and regulate their emotions. Notably, research suggests strategies like cognitive defusion in Acceptance and Commitment Therapy (ACT) effectively reduce the believability in one's thoughts and, in turn, decrease overall fusion (Larson et al., 2015). Therefore, future research could explore the efficacy of cognitive defusion interventions in decreasing fusion and enhancing affective responses to failure or difficult experiences.

Limitations

The current study contains some limitations that are worth consideration. Firstly, there may be sampling bias due to the exclusivity in participant recruitment, as a sample of convenience was used since all participants must have been Western Michigan University students. This could potentially limit the generalizability of findings to broader populations, as university students may possess unique characteristics that are not representative of the larger population. Additionally, despite efforts to ensure diversity in the sample, certain demographic groups may still be underrepresented, as White participants were highly represented in the sample, which may affect the extent to which findings can be generalized across diverse populations. Additionally, the relatively small sample size of 52 participants may be a limitation. Therefore, future research could benefit from a larger sample size with broader inclusion criteria.

Moreover, social desirability bias must be acknowledged as participants may have been inclined to respond to surveys and tasks in a socially desirable or favorable manner, potentially compromising the validity of the self-reported data, particularly in measures related to personality traits and psychological constructs. While the participants were left alone in the research room to complete the research protocol, there may have been an aspect of demand

characteristics that played a role in answering in a way that they believed the researcher might want them to. Furthermore, the problem-solving tasks utilized in the study may lack realism, which, therefore, may limit the ecological validity of the findings. Similarly, participants' behaviors and responses recorded in the laboratory setting may not accurately mirror their behaviors in real-world scenarios.

Finally, while participants were asked to refrain from disclosing the details of the study to others, especially the study's deception to future participants, there remains a possibility that some participants may have discussed the deception with their peers, threatening internal validity.

Implications

Given the consistent impact of psychological flexibility on affect following challenging tasks, interventions aimed at enhancing psychological flexibility hold significant promise in clinical settings. These interventions can provide valuable support for individuals seeking to cope with real-world challenges and problems. For example, therapists can incorporate mindfulness exercises, acceptance and commitment (ACT) techniques, and cognitive defusion into their sessions to help clients better cope with stressors and improve their overall well-being. Moreover, the same principle can be applied in educational and occupational settings. Teachers and organizations can conduct workshops focused on increasing psychological flexibility, aiming to cultivate a positive response to the challenges and problems commonly encountered in these environments.

As future directions for research suggest, increasing psychological flexibility and specifically reducing cognitive fusion in the workplace or in other similar settings, for that matter, could be beneficial in helping increase overall affect. For instance, if someone has the

thought, "I'm not a hard enough worker," techniques such as cognitive defusion could help mitigate its impact and overall believability of the negative thought. By fostering psychological flexibility, such initiatives may have the potential to enhance work productivity and overall well-being.

Moreover, tailoring educational interventions to accommodate individual differences in need for cognition holds significant promise, particularly considering its positive impact on affect and its negative impact on cognitive fusion following difficult or demanding tasks. For example, students high in NFC may benefit from educational interventions that emphasize opportunities for deep learning, critical thinking, and problem-solving. Conversely, students with low NFC may benefit from educational interventions that focus on providing structured support, scaffolding, and guidance to help them navigate complex academic tasks. This tailored approach may not only enhance student engagement and performance but also increase affective reactions to educational tasks.

Conclusion

The current study aimed to explore the psychological factors and traits that affect individuals' performance and responses when confronted with challenging tasks and failure experiences. Through correlational and regression analyses, we have demonstrated the significant impact of psychological flexibility on post-task affect across both the LH and CRA tasks, while Need For Cognition demonstrated a significant impact on post-task affect and *State* cognitive fusion following the CRA task. These findings demonstrate the importance of enhancing psychological flexibility and need for cognition in promoting emotional resilience and well-being in the face of adversity or challenges, offering valuable insight into clinical, educational, and occupational settings. Interventions designed to enhance psychological

flexibility, and specifically reducing cognitive fusion, hold promise for supporting individuals in coping with real-world challenges, while tailored educational and occupational approaches for those with varying levels of NFC may promote engagement, performance, and well-being for cognitively demanding tasks.

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Build Experiments & Surveys: Recruit participants. Testable. (2023, September 15). https://www.testable.org/

Appendix A
Recruitment Flyer

Research Participants Needed

For a study on Psychological Influences on Nonverbal and Verbal Problem-Solving

Using a computer, participants will:

- Complete a number of brief surveys describing how they think, feel, and act.
- Complete two problem-solving tasks.
  1. A non-verbal task involving learning relationships between stimuli based on patterns in their shape, size, and color.
  2. A verbal problem-solving task involving figuring out relationships between words by identifying a common connector word.

Participation occurs in one experimental session in a private research room in Wood Hall. The time commitment is approximately 60 minutes (exact completion will vary based on individual differences in responding to the problem-solving tasks).

Documentation of participation will be provided to students whose course instructors offer extra credit for research participation.

If you have any questions or are interested, please email Marcus Cunha at Marcus.v.cunha@wmich.edu

WESTERN MICHIGAN UNIVERSITY

IRB Protocol Number: IRB-2022-339
Principal Investigator: Scott T. Gaynor, Ph.D.

Appendix B

Recruitment Email

Hello (insert name),

My name is Marcus Cunha, and I am an undergraduate student who is currently working in Dr. Gaynor's Laboratory. I am sending this email to let you know that I have an ongoing project in which students can participate (I will attach the flyer to this email). The study will take place in our laboratory at Wood Hall 2704 and should take approximately 1 hour to complete. Participants will be asked to complete a number of surveys relating to how they think, feel, act, and complete two problem solving tasks. There is no monetary compensation for completion; however, if the course offers extra credit for research participation, I will be able to provide proof and confirmation of participation for students to obtain their extra credit.

I appreciate your time, and please let me know if you have any questions.

Thank You,

Marcus Cunha

Appendix C

Participation Confirmation Email

Hello (insert name)

My name is Marcus Cunha, and I am doing research with Dr. Gaynor. I am emailing you because (insert name) participated in our research study. (Insert name) completed 1 hour of research. Thank you for your time and for allowing your students to participate in research for extra credit. I am very appreciative!

Thank You,

Marcus Cunha

Appendix D

Consent Form

Principal Investigator: Student Investigator(s): Title of Study:

Western Michigan University Psychology Department

Scott T. Gaynor, Ph.D.
Morgan Palmer and Marcus Cunha
Influences on Non-verbal and Verbal Problem Solving

You are invited to participate in this research project titled "Influences on Non-verbal and Verbal Problem Solving."

STUDY SUMMARY: This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in this study. Participation in this study is completely voluntary. The purpose of the research is to understand psychological influences impacting performance on problem-solving tasks. This project will serve as Marcus Cunha's undergraduate Honors thesis for the requirements of the Bachelor of Science degree. Additionally, this project will serve as part of Morgan Palmer's Master's thesis for the requirements in the Clinical Psychology Doctoral program. If you take part in the research, you will be asked to complete a number of surveys describing how you think, feel, and act. You will also do two problem-solving tasks. The non-verbal problem-solving task involves learning relationships between stimuli based on patterns in their shape, size, and color. The verbal problem-solving task involves figuring out relationships between words by identifying a common connector word. After completing the last problem-solving task there is a short debriefing. Your time in the study will take approximately 60 minutes. Possible risks and costs to you for taking part in the study include the time taken to participate, possible discomfort answering questions about your thoughts, feelings, and actions, and potential frustration when doing the problem-solving tasks. Benefits of taking part may be the opportunity to earn extra credit for research participation in one of your classes. If a class offers extra credit for research participation, alternative options are also provided such that you do not have to take part in the research study to get extra credit.

The following information in this consent form will provide more detail about the research study. Please ask any questions if you need more clarification and to assist you in deciding if you wish to participate in the research study. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form. After all of your questions have been answered and the consent document reviewed, if you decide to participate in this study, you will be asked to sign this consent form.

What are we trying to find out in this study?

We are trying to learn about the psychological variables that best predict problem-solving performance.

Who can participate in this study?

The surveys and problem-solving tasks are written and standardized in English and administered via the computer. Anyone who is 18 years of age or older, able to complete the surveys in English, and sit in front of a computer for approximately 60 minutes is eligible.

Where will this study take place?

The study will take place in individual research rooms (Wood Hall rooms 2706 and 2740) located adjacent to the laboratory of Dr. Gaynor in the 2704 Research Suite in Wood Hall.

What is the time commitment for participating in this study?

Participation is designed to occur in one approximately 60-minute visit. We estimate it will take about 20 minutes to complete study surveys. The remaining time will be doing the problem-solving tasks and a short (~ 5 minute) debriefing at the end. Completion times may vary to some extent (+ about 15 minutes) based on individual differences on the problem-solving tasks or the number of questions asked during debriefing.

What will you be asked to do if you choose to participate in this study?

If you choose to participate you will be asked to complete a number of surveys describing your thoughts, feelings, and actions. You will also complete two problem-solving tasks. The non-verbal problem-solving task involves learning relationships between stimuli based on patterns in their shape, size, and color. The verbal problem-solving task involves figuring out relationships between words by identifying a common connector word. After the problem-solving tasks are done there is a brief debriefing meeting with a researcher to conclude participation (e.g., answer any questions, provide confirmation of participation for extra credit, etc.).

What information is being measured during the study?

The surveys measure a variety of cognitive, behavioral, and emotional characteristics that might be pertinent to understanding problem-solving performance. On the problem-solving tasks we will be measuring your reaction times and responses to the items.

What are the risks of participating in this study and how will these risks be minimized?

One risk is that you might become uncomfortable responding to some of the questions on the surveys asking about your thoughts, feelings, and actions. Similarly, you may find the problem-solving tasks frustrating to do. These risks are minimized by selecting surveys and tasks that have been used in prior psychological research and by collecting the data in a way that does not

link personally identifying information to your responses. In addition, you have the option to not respond to any items and to discontinue participation at any point and move directly to the debriefing.

What are the benefits of participating in this study?

There is no direct benefit to you of participating.

Are there any costs associated with participating in this study?

The cost to participating is the time it will take you to complete the study.

Is there any compensation for participating in this study?

There is no financial compensation for participation in the study. If you are taking a class that provides extra credit for participating in research we will provide you with necessary documentation to confirm your time spent participating.

Who will have access to the information collected during this study?

Access to the data collected in this study will be restricted to Morgan Palmer, Marcus Cunha, and Dr. Gaynor, and other study personnel (e.g., research assistants) approved by the IRB as members of the research team working on this project. The results of the study may be presented at psychological conferences or published in professional journals. None of the data presented will identify you personally. We are collecting the data in way that separates your personally identifying information from your responses. You will not enter personally identifying information into the computer software where the survey and problem-solving responses are collected.

What will happen to my information or biospecimens collected for this research project after the study is over?

After information that could identify you has been removed, de-identified information collected for this research may be used by or distributed to investigators for other research without obtaining additional informed consent from you.

What if you want to stop participating in this study?

You can choose to stop participating in the study at any time for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience NO consequences either academically or personally if you choose to withdraw from this study.

The investigator can also decide to stop your participation in the study without your consent.

Should you have any questions prior to or during the study, you can contact Dr. Scott Gaynor at 269-387-4482 or scott.gaynor@wmich.edu, Morgan Palmer at morgan.a.palmer@wmich.edu, or Marcus Cunha at marcus.v.cunhua@wmich.edu.

You may also contact the Chair, Institutional Review Board at 269-387-8293 or the Vice President for Research and Innovation at 269-387-8298 if questions arise during the course of the study.

Western Michigan University IRB-2022-339 Approved on 1-30-2023

This consent document has been approved for use for one year by the Western Michigan University Institutional Review Board (WMU IRB), as indicated by the IRB approval date stamped in the lower right corner. Do not participate in this study if the stamped date is older than one year.

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

Please Print Your Name

_____ _____ participant's signature Date

Western Michigan University IRB-2022-339 Approved on 1-30-2023

Appendix E

Anonymity Code Sheet

All of your responses to the study-related questionnaires will be anonymous. Your data will only be identified by a 6-digit alphanumeric code that you create by answering the 6 questions that follow. Please put the answer to each question in the box under that question and then in the last box, the responses from top to bottom (1-6) to establish your code. The next page provides an example and the page after that is to be used by vou to determine your code.

Here is an example code for John Smith, son of Jennifer Smith, who was born Dec 10th, graduated from Kalamazoo Central High School, and identifies as a male.

Question	**Code**
1) Last letter of your first name?	N
2) First letter of your mother's first name?	J
3) First letter of the month you were born?	D
4) First letter of the last high school you attended?	K
5) "M" if male; "F" if female; "N" Non-binary/neither	M
6) The number of letters in your first name (enter 0 if greater than 9)?	4
FINAL CODE =	**NJDKM4**

Appendix F

Demographic Questionnaire

1. State your age in years.

2. What is your gender identification?

- 01. Cis Male
- 02. Cis Female
- 03. Trans male
- 04. Trans female
- 05. Non-binary/ third gender
- 06. Other

3. What is your ethno-racial identification?

- 01. White or Euro-American
- 02. Black or African-American
- 03. Hispanic or Latinx, including Mexican-American, Central American, and others
- 04. Asian or Asian-American, including Chinese, Japanese, and others
- 05. American Indian, Native American, or Alaskan Native
- 06. Native Hawaiian or other Pacific islander
- 07. Mixed, from two or more groups
- 08. Other

4. What was your class standing in college at the start of the semester?

- 01. First year
- 02. Second year
- 03. Third year
- 04. Fourth year
- 05. Other

5. What is your cumulative GPA?

Appendix G

Learned Helplessness Task (LH task) Instructions

The following instructions are pulled from

and McHugh's (2013) study:

"In this experiment, you will be looking at a series of computer-presented images. Each image will involve two stimulus patterns on it. One to the left and another to the right. The stimulus patterns are composed of four different dimensions (shape, letter, size of letter, and color of letter), with two values associated with each dimension (square/circle, A/T, big/small, black/red). For each presentation, I have chosen one of the eight values as being correct. For each image, I want you to choose which side contains this value. To do this, you must click on one of the buttons presented underneath the image (left or right). If your choice is incorrect, the word "Incorrect" will appear on the screen. If your choice is correct, the word "Correct" will appear on the screen. Your task is to learn the predetermined value by your response, according to whether or not you chose the correct or incorrect response. The current experiment is adapted from a standard intelligence test. Most people learn to respond appropriately to the task with relative ease. Click "Next" to continue."

Appendix H

Compound Remote Associates Problems (CRAP) Instructions

"On the screen, you will see a list of three words. Your task is to identify a solution word that will link all the others together. For example, if the three words on the screen were dew/comb/bee the solution word would be "honey" and you would type "honey" into the open space below the three words and then press the "Enter" key. Make sure your answer is typed in all lowercase. If you are unable to identify a solution word, you can type "DK" for Don't Know into the space and then press the "Enter" key."