Development of an Electronic Future-Thinking Task: A Pilot Study

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Abstract

The future-thinking task was developed to assess specific thoughts about the future. Positive future-thinking is negatively correlated to depression and negative future-thinking is positively related to anxiety. The original task is in a paper-and-pencil form that is time consuming to give and score. Given the possible and important implications for this task for suicide risk assessment, it is important to develop a more time efficient task. In the current study, we synthesized an electronic version of the future-thinking task by aggregating domains for future events based on the future-thinking and worry literature. We hypothesized that we would replicate the original future-thinking task's previous findings; specifically undergraduate students (n =19) were recruited to test the effectiveness of this new future-thinking task in relation to the original task and measures of anxiety and depression. The measures used were the CES-D for depression, ASI-3 for anxiety sensitivity, and positive and negative mood scales. The results partially replicated previous findings with the original task. The electronic positive future-thinking task significantly predicted CES-D scores and the electronic negative future-thinking task significantly predicted ASI-3 scores. However, the researchers did not replicate the findings for the original task. The original positive future-thinking task did not predict CES-D scores and the original negative future-thinking task did not predict ASI-3 scores. Findings for future development and research for this task are discussed.

Development of an Electronic Future-Thinking Task: A Pilot Study

Future thinking is defined as an individual's specific expectancies for the future. The Future Thinking Task (FTT) was initially designed as an alternative to hopelessness measures to address an individual's direct thoughts about the future (MacLeod, Rose, & Williams, 1993). Hopelessness about the future is an important factor in some mental disorders (e.g., depression) and in suicidal behavior (MacLeod, Rose, & Williams, 1993). However, global hopelessness measures do not measure one's expectancy that negative or positive future events will occur and do not measure one's ability to generate positive and negative events. The FTT examines short-term and long-term thoughts about the future and the respondent's belief of said events occurring is also considered.

The FTT contains prompts for thinking about both positive and negative future events, and responses to each of these prompts are associated with different findings. Future thinking research has found that negative future thinking (NFT) is positively correlated with anxiety (MacLeod & Byrne, 1996). In a study by MacLeod and Byrne (1996), anxious and mixed (anxiety and depression) participants generated more future thoughts than the control condition. However, only anxious participant's number of positive future-thinking (PFT) did not differ from the control group, indicating that anxiety causes an increase in negative thoughts but a normal amount of positive thoughts about the future. A study by Conaghan and Davidson (2002) assessed PFT and NFT in older adults with depression and past suicide attempts showed similar results; specifically, participants demonstrated a nonsignificant difference in NFT, but they did show a decrease in PFT in comparison to the control group.

Consistent with its original conceptualization as a proxy of hopelessness, researchers found that baseline hopelessness was negatively correlated with PFT (O'Connor, Fraser, Whyte, MacHale, Masterton, 2008). PFT is also related to depression and poor well-being (MacLeod &

Conway, 2007). MacLeod and Salaminiou (2001) found that the depressed group had fewer positive future expectancies and rated their potential pleasure for those events as lower than the control group. In addition, depressed participants did not significantly differ in the number of NFTs generated. Moreover, recent PFT research has examined possible ways PFT and suicidal ideation are related. MacLeod and Conway (2007) found that PFT was inversely related to suicidal ideation. Participants who were experiencing suicidal ideation were unable to generate as many PFTs as the control condition. Additional research has been conducted to explore the possibility of PFT to be a predictive measure for continuous suicidal ideation after an initial suicide attempt. O'Connor, Smyth, and Williams (2015) examined the relationship between PFT and suicide ideation two to three months after a suicide attempt. They found that the number of PFT thoughts generated was related to subsequent suicide attempts. However, it is important to note that the study was conducted with clinical samples for suicidal ideation, thus the task's ability to assess suicide risk in a clinically healthy population is uncertain.

Personal future thoughts are a better assessment for well-being than future thoughts about others. MacLeod and Conway (2007) indicated that certain types of PFT (i.e., self-only) was positively associated with subjective well-being and psychological well-being. Intrapersonal future thoughts may also be connected to the suicidal process. Patients with past suicide attempts had fewer positive future thoughts for themselves than the control condition (MacLeod & Conway, 2007). O'Connor, Smyth, and Williams (2015) examined the categories of thought that are present in PFT. They found some intrapersonal PFT was correlated to the prediction of repeated suicide attempts fifteen months after the first documented attempt. Because of the greater importance of intrapersonal future thoughts in research findings, future studies adjusted the FTT task to ask participants to generate personal future thoughts.

Despite its promise as a potential predictor of psychopathology and suicide risk, the FFT has some limitations that need to be addressed in order to further the research on future thinking. One limitation is the time demands of the task. The most commonly used version of the FTT takes approximately one hour to complete if an additional measure is included (e.g., hopelessness, depression, anxiety; MacLeod, Pankhania, Lee, & Mitchell, 1997). The FTT requires a researcher to write down the PFT and NFT that are generated across three different time valences. Furthermore, the task requires extensive scoring procedures. Because of time constraints for researchers and burdensome nature of this task, there is need for more time efficient measure. Currently, the only future-thinking tasks in the clinical literature are the implicit future thinking task (Kosnes, Whelan, O'Donovan, & McHugh, 2013) and the paper version of the future thinking task (MacLeod, Pankhania, Lee, &Mitchell, 1997). Indeed, influential researchers in the field of future-thinking have voiced a need for a variety of measures for future thinking (O'Connor, Connery, & Cheyne, 2000).

Online measures are becoming more common in psychopathology research for several reasons. Firstly, studies of online measures indicate that they have similar psychometric properties to in-person measures. Van Ballegooijen, Riper, Cuijpers, van Oppen, and Smit, (2016) examined the validity of online questionnaires for anxiety and depression and found that several online versions (e.g., CES-D, MADRS-S, and HADS) were comparable to the paper version. The online version of CES-D was found to have internal consistency ($\propto$ = .89 - .93), similar means scores, convergent validity, and criterion validity (.84 -.90) to the paper version. The online version of the HADS was found to have comparable mean scores to the paper version. Secondly, electronic versions of measures may use automatic scoring that is time efficient for health care and research environments. An online measure further allows an immediate assessment of a client's symptoms.

Current Study

In the current study, an electronic version of the FTT was developed and the psychometric properties of the electronic version were compared with the original task. One important difference in the newly developed electronic version is the use of a fixed response set. A fixed response set could reduce the variability of future event responses while also eliminating the task of manually recording responses.

In order to develop content areas for the fixed response set, the literature for worry domains and future thoughts were examined. Worry is an important construct of future thinking that is related to anxiety and depression. Worry has also been included in future thinking studies. MacLeod and Byrne (1996) included a self-report measure of worry, in addition to the future thinking task, in order to fully assess all the factors that contribute to anxiety and depression. Furthermore, worry is conceptually future-oriented and it is prevalent among disorders associated with future thinking (5th ed.; DSM-5; American Psychiatric Association, 2013). Diedenbach et al. (2001) examined the worry content of individuals with anxiety and depression and found that worry content for both anxiety and depression contained future-oriented content (e.g., aimless future). The inclusion of worry as an important cognitive process in anxiety and depression indicates that worry is an important future-oriented domain that should be assessed.

Worry is negatively valanced, and worry-related topics are finite. However, the domains for worry can serve as a guide for important domains in people's lives. If the negative valence is removed, the worry domains can serve as general future content domains. By making the content neutral, the participants can choose the valence. The contents of worry served as the basis for a comprehensive set of future thinking domains for the development of a closed-set questionnaire.

We hypothesize that the electronic PFT and NFT composite scores will strongly correlate to the PFT and NFT composite scores generated by the original FTT. We hypothesize that the

study will replicate the findings found in previous studies for the original future-thinking task (MacLeod & Salaminiou, 2001; MacLeod & Byrne, 1996) to depression (CES-D scores). We also hypothesize that PFT would have convergent validity with CES-D scores and discriminant validity with ASI-3 scores. We hypothesize that NFT will have convergent validity with ASI-3 scores and discriminant validity with CES-D scores based off the findings of previous studies (MacLeod & Byrne, 1996).

Method

Participants

Undergraduate college-aged students (n = 19; 4 males, 15 females) at Appalachian State University were recruited through the Psychology Department's online research participation system. All of the participants were non-Hispanic/Latino, one participant was African American, and 18 participants were Caucasian. The majority (42%) of the participants completed less than one year of college, 37% completed one year, 11% completed two years, 5% completed 3 years, and 5% completed four years of college. Participants signed up for two one-hour appointment slot. Inclusion criteria included that the participants be at least 18 years-old and a current student at Appalachian State University. Exclusion criteria included participants that scored two standard deviations below the mean verbal fluency scores were excluded from the data set; all participants in the sample were found to be within two standard deviations of the mean upon analysis. Participants received class credit for their participation in the study.

Measures

Controlled Oral Word Association Test. This is a verbal fluency task that tests the number of words participants can generate that begin with three different letters in a limited time span (Benton, Hamsher & Sivan, 1983).. Participants are given one minute for each letter to generate as many words as they can. Repeated words, pronouns, or different grammatical

versions of the words (e.g., tense and plurality) were not be included in the score (Ross, Calhoun, Cox, Wenner, Kono, & Pleasant, 2007). In line with MacLeod and Byrne's (1996) findings, there was not a large variation in verbal fluency among the participants.

Future thinking task. This task was created to assess one's specific thoughts about the future (MacLeod et al., 1993). For the task, participants are asked to think of potential intrapersonal future events or experiences across three different time periods: next week (including today), next year, and the next 5-10 years (MacLeod & Byrne, 1996). This task can be used to assess positive and negative future thoughts depending on the researcher's interests. Participants are asked to rate each future thought on how likely they thought it would happen (likelihood) and if it did happen, how would they feel at the time (value) on 7-point scales (MacLeod et al., 1998). The likelihood scale ranges from 1 = *not at all likely* to 7 = *extremely likely.* The value rating ranges from -3 = *very negative* to +3 = *very positive* (Macleod, Tata, Tyrer, Schmidt, Davidson, & Tompson, 2005). Composite scores were made by multiplying the number of items across time periods by mean likelihood ratings by mean value ratings. Previous future-thinking research did not find differences for time period composite scores in comparison to an overall composite score without time periods (MacLeod et al., 2005). NFT and PFT have separate composite scores. Negative value ratings are reversed for easier data analysis; therefore PFT higher scores indicate higher rates of positive thinking and higher NFT scores indicate higher rates of negative thinking. (MacLeod et al., 2005). The score range for NFT for the sample was 6 to 233. The score range for PFT was 177 to 567, suggesting that the sample endorsed positive future-thinking more so than negative future-thinking.

Electronic future thinking task (EFTT). In order to create the basis for designing a fixed response set for positive and negative future thinking, the we conceptually aggregated models on worry content and FT domains. Rather than focus on emotion content, we focused on

action content. On further discussion, the researchers combined potential future-event domains from worry and FT that were related to each other. Five domains were identified that were common to both conceptualizations of worry content and past studies of content in future thinking: Relationships/Family, Financial/Housing, Professional Development (Academic and Career), Health, and General Future Outlook. General Future Outlook was added as a domain because it pertained to the key future-related component or hopelessness. Table 1 illustrates the representation four domains across these conceptual models. General Future Outlook was not included in the table because all of the other domains relate to the domain. Specific questions for each domain were created. The negatively valanced worry domains were given a positive valance to ensure a similar and equal amount of positive and negative items. Events for each domain were selected and the assessment was created using Qualtrics. In line with MacLeod and Byrne's (1996) FFT, participants were first given the verbal fluency task (FAS) before taking the EFTT. For the purpose of counterbalancing the tasks, NFT and PFT were split-up into two separate tests. Each task asks participants to rate how likely the event is to happen to them on a Likert scale that ranged from 0 (*Not Likely*) to 10 (*Very Likely*). The NFTT has 24 questions while the PFTT task has 21 questions. The task took approximately 10 minutes to complete. A composite score for both EPFT and ENFT were calculated by adding the likelihood ratings across time periods for each respective valence (positive and negative; possible range 0-210 and 0-240, respectively). The sample's score range for the EPFT was 32.67 to 68.33 with a higher score indicating more positive future-thinking. The scores for the ENFT could range from 0-240. The sample's score range was 1.67 to 43.67 with a higher score indicating more negative future-thinking.

CES-D. The Center for Epidemiological Studies-Depression Scale (CES-D) is a 20-item question measurement that rates the symptoms of depression (Radloff, 1997). The questionnaire

asks the individual how often they experience a symptom in a week with a range of *Rarely or none of the time (less than one day)* to *Most or all of the time (5-7 days)*. Items are scored by a point system where the first box receives zero points and the 4th box receives 3 points. Previous research has found the scale to have high internal consistency (∝=.85, .90) and acceptable test-retest reliability (*r* = .54). The score ranges for the CES-D is 0-60 with a score of 16 or more indicating depression. The sample's scores ranged from 33.0 to 56.5.

ASI-3. The Anxiety Sensitivity Index-3 (ASI-3) is a 18-item measure that assess an individual's cognitive, social, and bodily reactions of anxiety symptoms (ASI-3; Taylor et al., 2007). Anxiety sensitivity aids in the maintenance of anxiety disorders because it measures one's disposition towards fear (Peterson & Heilbronner, 1987). The ASI can predict fearfulness levels better than other anxiety measures and is a reliable measure for personality variables that contribute to anxiety. ASI has an internal validity of ∝ > .78. The scores for the ASI-3 can range from 0 to 72, with a higher score indicating anxiety sensitivity (Taylor et al., 2007). The sample's scores ranged from 21.0 to 71.5 indicating low anxiety sensitivity to high anxiety sensitivity.

Positive and negative mood ratings. In line with previous research on future-thinking (O'Connor, Smyth, & Williams, 2015) and a study that found FT to be malleable to mood induction (O'Connor & Williams, 2014), we controlled for baseline mood. The positive mood rating asked participants to rate their current positive mood on a 1 (*not positive at all*) to 10 (*extremely positive*) Likert scale. The negative mood rating scale asked participants to rate their current negative mood on a 1 (*not negative at all*) to 10 (*extremely negative*) scale.

Procedure

The Institutional Review Board at Appalachian State University approved all study procedures. On the Psychology Department's online participant recruitment page, the study was

advertised a comparison study that was examining "The Development of the New Electronic Future-Thinking Task." The study was advertised as two sessions occurring one week apart that would take approximately one hour each to complete. Students received class credit for their participation. Both sessions took place in the same research lab room and all online questionnaires were given on the same lab computer.

The order of completing the future-thinking tasks were counter-balanced. For session one, participants began by taking the Controlled Oral Word Association Test for verbal fluency. Participants were asked to generate as many words as they could for three letters (F, A, S). Participants were given one minute for each letter. This task was timed using Google Timer and took approximately five minutes. Due to the high test-retest reliability of this task, this task was only administered once at the beginning of session one regardless of the FTT version assigned. Participants then completed a version of the FFT. After completing each FTT, participants were asked to complete two questionnaires (ASI-3 and CES-D) via Qualtrics on the lab computer. This questionnaire took approximately 5 minutes to complete.

The electronic future thinking task was conducted in the same setting format as the paper version in order to ensure the validity of comparison. For the paper FTT, participants began with a SISE and mood ratings on paper. Participants then completed the FTT. This task was also timed using Google Timer. Participants were asked to think of potential intrapersonal future events or experiences across three different time periods: next week (including today), the next year, and the next 5-10 years. This task was completed separately for negative and positive thoughts, which were counterbalanced. Participants received one minute for each time interval. At the end of the separate positive and negative FTT participants were asked to rate each future thought on how likely they thought it would happen (likelihood) and if it did happen, how would they feel at the time (value) on a 7-point scale. This task took approximately 20 minutes. For the

electronic FTT, participants were first asked to complete the single-item mood and self-esteem rating on paper. Participants were then directed to the computer to take the electronic FTT. There were 45 questions and the task took approximately 10 minutes.

Analysis Plan

To account for missing data, item-mean replacement was employed in cases where more than 50% of the items of a measure were completed; cases were excluded from analyses where more than 50% of items were missing from a measure. A correlation matrix was conducted to explore significant relationships among the variables. PFT was found to be decreased in depressed patients (MacLeod et al., 2005) so the Center for Epidemiologic Depression Scale (CES-D; Eaton, Smith, Ybarra, Muntaner, & Tien, 2004) was used to check the convergent validity for the EPFTT. We expect that PFT will be negatively correlated with the CES-D score. NFT is implicated in individuals with anxiety symptoms, so the ASI-3 was used to test the convergent validity for the ENFTT. We expect that NFT will be positively correlated with the ASI-3 score. Because PFT has been found to be uncorrelated with anxiety (MacLeod & Byrne, 1996), the ASI-3 was used as discriminant validity for PFT. We hypothesized that there will be no correlation between PFT and the ASI-3 score. NFT is uncorrelated with depression so the CES-D was used as discriminant validity for NFT. We hypothesized to find no correlation between NFT and the CES-D score. To test these hypotheses, I conducted a series of simultaneous multiple regression analysis. To control for mood for both future-thinking tasks, positive and negative mood ratings were averaged across two sessions and were entered into the regression model as covariates. Due to the small sample size, both statistical significance and effect size were considered in the interpretation of the results.

Results

The approximate session time was recorded for both conditions. This recorded time included the consent form, Oral Word Association task, and the online questionnaires (CES-D and ASI-3). The original FTT took an average of 24 minutes to complete and the EFTT took an average of 14 minutes to complete.

A correlation matrix of the variables for the study was constructed. As may be seen in Table 2, the negative future-thinking tasks were more strongly related to each other than the positive future-thinking tasks. The electronic and original negative tasks were significantly related to each other and strongly correlated to the ASI-3 and CES-D. In contrast, the positive tasks were unassociated with each other. The OPFTT was not correlated with the measure of depression. However, the EPFTT had a strong negative correlation to the CES-D. The ENFTT and the EPFTT had a strong negative relationship with each other as well.

To test the whether there was a significant relationship between the original and electronic positive and negative future-thinking tasks, simultaneous multiple linear regressions, were conducted controlling for positive and negative mood ratings. The first model did not support the hypothesis that the ENFTT would significantly predict original NFTT scores. A significant regression equation was not found, F (3, 12) = 1.60, p = .24, R^2 = .29. Paper NFT scores increased 3.51 for each one unit increase of ENFT. The ENFTT was not a significant predictor of the ONFTT once mood was controlled. However, beta showed a large effect size in the expected direction (ß = .54, p = .09). The second model did not support the hypothesis that the EPFTT would significantly predict original PFTT scores. A significant regression equation was not found, F (3, 14) = .28, p = .84, R^2 = .06. OPFT scores decreased 2.34 for each unit increase of EPFT. The EPFTT was not a significant predictor of the original PFTT scores with beta showing a small effect size that was not in the expected direction (ß = -.24, p = .54).

To test whether past relationships between the original FFT measures and measures of psychopathology were replicated in the current study, two simultaneous multiple linear regression models were conducted controlling for positive and negative mood. The first model examined whether the original NFTT would significantly predict participants' ASI-3 scores. The model did not support the hypothesis that the original NFTT would predict participants' ASI-3 scores, F (3,12) = 1.63, p = 0.24, R^2 = .29. ASI-3 scores increased .110 for each one unit increase of NFT. NFT was not a significant predictor of ASI-3 scores, but beta indicated a large effect size in the expected direction (ß = .55, p = .051). The second model examined the relationship between the original PFTT and CES-D. The model did not replicate past findings that the original PFTT would significantly predict participants' CES-D scores, F (3, 14) = 3.11, p = .06, R^2 = .40. CES-D scores increased .01 for each one unit increase of PFT. PFT was not a significant predictor of ASI-3 scores. Beta indicated a small effect size that was not in the expected direction (ß = .16, p = .45).

To examine the hypotheses that the electronic FTTs would demonstrate convergent validity with other measures of psychopathology, two additional simultaneous multiple regressions were conducted, one examining the expected relationship between EPFTT and CES-D and the other examining the expected relationship between ENFTT and ASI-3. Both models again controlled for positive and negative mood ratings. The relationship between EPFTT and CES-D supported the hypothesis that the EPFTT would significantly predict CES-D scores. A significant regression equation was found, F (3, 14) = 8.17, $p < .01$, R^2 = .64. CES-D scores decreased .53 for each one unit increase of PFT. EPFT was a significant predictor of CES-D scores with a beta indicating a large effect size in the expected direction (ß = -.75, $p < .01$). The second model examined the relationship between the ENFTT and ASI-3. The model did not support the hypothesis that the ENFTT would significantly predict participants' ASI-3 scores, as

the regression equation was not statistically significant, F (3, 12) = 1.89, p = .19, R^2 = .32. ASI-3 scores increased .84 for each one unit increase of NFT. However, ENFT was a significant predictor of ASI-3 scores with a beta indicating a large effect size in the expected direction (ß = .65, $p < .05$).

To examine the hypotheses that the electronic FTTs would demonstrate discriminant validity with the previously mentioned CES-D and ASI-3, two simultaneous multiple regressions were conducted in order to examine the relationship between EPFTT and ASI-3, as well as the relationship between the ENFTT and CES-D. Negative and Positive mood ratings were controlled for in both models. The first model did not support the hypothesis that the ENFTT would not predict CES-D scores. A significant regression equation was found (F (3, 13) = 5.63, p = .01), R^2 = .565. CES-D scores increased .31 for each one unit increase of ENFT. The ENFTT was a significant predictor of CES-D scores with a beta indicating a strong effect size in a positive direction (ß = .50, $p < .05$). The second model supported the hypothesis that the EPFTT would not predict ASI-3 scores. A significant regression equation was not found (F (3, 13) = .80, p = .52), R^2 = .156. ASI-3 scores decreased .84 for each unit increase of EPFT. Beta indicated a large effect size opposite of the hypothesized direction (ß = -.57, p = .15).

Discussion

This was a pilot study to investigate the development of an electronic future-thinking task. Results were mixed regarding its ability to predict the original version of the task and anxiety and depression. The hypothesis that there would be a significant relationship between the original and electronic version was not supported. Both EPFTT and ENFTT did not predict the original PFTT and NFTT. However, the ENFTT and the original NFTT had a significant strong correlation with each other and the relationship between the two had a strong effect size in the expected direction. The lack of significance for the ENFTT and original NFTT regression model

may have been due to the small sample size. Conversely, EPFTT and the original PFTT were not significantly related to each other and they did not have a significant relationship in the expected direction. While a small sample could have contributed this, more research is likely needed to explore the differences between the electronic and original PFTTs.

The hypothesis that past future-thinking results would be replicated for the original task was not supported. NFT was not significantly related to ASI-3 scores and PFT was not significantly related to CES-D scores. One possible explanation for this finding may be that a composite score was created by aggregating time periods. Another possible composite score for the FTT is an time period composite score where each time period (one week, one year, and 5-10 years) has its own composite score. While future-thinking researchers (e.g., MacLeod & Byrne, 1996) found no difference in the significance of results for time period composite scores and the composite score that aggregates the time periods (MacLeod, Rose, & Williams, 1993), the small sample size of this study may find that time period composite scores are significant. Further statistical analysis is needed to explore this possibility. It is also important to note that we did not intend to recruit a clinical sample, but the CES-D and ASI-3 revealed that the sample had unusually high levels of depressive and anxious symptoms. Eisenberg, Gollust, Golberstein, and Hefner (2007) conducted an epidemiological study at a college university to estimate the prevalence of anxiety and depression among undergraduate students. The prevalence for any depressive or anxiety disorder among undergraduate students was 15.6%. Given this prevalence rate, the sample presented with anxiety and depression symptoms greater than what would be expected for the general population of college-aged adults.

Future-thinking researchers have also considered high rates of comorbid depression and anxiety as a potential confound. MacLeod and Byrne (1996) enco1untered this difficulty when trying to recruit college students with anxiety and depression. Anxiety and depression are highly

comorbid. In a 12-month prevalence rate, 50% of those with depression also have an anxiety disorder (Hirschfeld, 2001). Given the strong correlation between our measures of depression and anxiety, the same appears to be true in the current study. MacLeod and Byrne (1996) attempted to recruit a purely anxious and depressive sample, but they could not find people with depression who did not also have anxiety. A mixed group (anxiety and depression) and an anxiety group were created as a result. They found that the mixed group had increased NFT and decreased PFT. Because the mixed group consisted of individuals with both depression and anxiety, associations for depression and future-thinking independent of anxiety could not be made. The presence of comorbid anxiety and depression in the current population sample may have similarly confounded the current study's results for the relationships of future-thinking and psychopathology.

The hypotheses that the electronic FTT tasks would show convergent validity with ASI-3 for NFT and CES-D for PFT was partially supported. EPFTT significantly predicted CES-D scores and the two were strongly correlated. ENFT and ASI-3 were not significantly related after controlling for mood, but ENFT was a strong predictor of ASI-3. ENFT and the ASI-3 were also strongly correlated. The small sample size likely explains why a significant regression equation was not found.

A future direction may be to further develop the ENFT to include a value scale. MacLeod et al., (2005) found that the value ratings for NFT was related to hopelessness. The value scale was excluded for the EFTT because it was assumed that if the participant selected the event as likely to happen then the even was valuable to them. The relationship between value and likelihood ratings may not be linear upon further analysis. The needs to be more exploration for the importance of value or likelihood for negative and positive FT. Future research should be

directed towards examining how important this value scale is for all different types of psychopathology as well.

The hypotheses that the electronic FTTs would have discriminant validity with the selected measures of psychopathology was partially supported. The EPFTT did have discriminant validity with ASI-3, but the ENFTT did not have discriminant validity with the CES-D. The EPFTT also had a stronger effect size than what previous research reported (e.g., MacLeod et al., 2005). This is an important finding because PFT is implicated in suicide research. A future direction for the EPFTT would be to determine its predictive value for suicide ideation. The second discriminant validity hypothesis was not supported. The ENFTT and the CES-D were strongly related and the ENFTT significantly predicted the CES-D. This unexpected relationship may be due to the previously mentioned issue of having a clinical sample. MacLeod and Byrne (1996) found that their anxious and mixed group (depression and anxiety) did not differ in the amount of NFTs generated. Since the sample was a mixed group with anxiety and depression symptomology, the ENFTT results may have been confounded. Future research would need examine these groups separately. The electronic future-thinking task was also more time efficient than the original task because it took less time to score and less time for the user to complete.

Positive and negative mood ratings were controlled for, but upon analysis, the models did not appear to be mood-dependent. This was interesting because O'Connor and Williams (2014) found that PFT could be impacted by negative mood induction. A future study should be conducted to explore the effects positive and negative mood have on future-thinking. Also related to mood is the test-retest reliability of the FTT. An interesting exploration of future-thinking may include an examination of how mood affects the test-retest reliability of the task.

Limitations

A major limitation was the small sample size and the composition of the sample. Future research would need a larger sample size and a more inclusive sample that would increase the generalizability of the results. The majority of the sample were young Caucasian college students. The results may not generalizable to other races, ethnicities, or age ranges. Future research would need to expand the sample to include these groups. Another limitation was the measures used to assess for depression and anxiety. The CES-D and ASI-3 were used as screening tests that measured symptoms of anxiety and depression. A clinically significant score on the ASI-3 and CES-D does not mean that the participants had a diagnosis of anxiety or depression. The use of just these two assessments limits the clinical applicability of the results. Furthermore, the ASI-3 and CES-D were self-report measures. Self-report measures could be subject to response bias and a validity check was not included in the online measures; both of these could jeopardize the validity of the results. One of the findings of the study was that the EFTT was more time effective than the OFTT. However, the time taken to complete tasks was roughly recorded by the researcher and researcher assistants. In order to establish that a significant time difference between the two future-thinking tasks exists, a method to record the time in a more controlled method is needed.

Conclusions

This was pilot study that examined the effectiveness of newly developed EFTT. Given the possible implications of future thinking being involved in suicide and psychopathology such as anxiety and depression, it was important to make the task more time efficient and less burdensome for researchers. An electronic version of the original paper task was developed in order to meet those needs. Despite having limitations, this pilot study has several possible implications for future-thinking research and areas for future growth. While the EFTT has questionable predictive value for the original task, it did predict two measures of psychopathy

(anxiety and depression) and it took less time to complete and score than the original task. The ENFTT replicated previous findings that high NFT is related high levels of anxiety (MacLeod & Byrne, 1996).

The EPFTT was found to be the most promising aspect of the EFTT. The results replicated previous findings that EPFT is a significant predictor of a depression and that high levels of PFT was related to low levels of depression symptoms (MacLeod & Salaminiou, 2001). The majority of current future-thinking research is focusing mainly on positive future-thinking. PFT has a greater correlation with hopelessness than with depression (MacLeod et al., 2005). This is particularly important given that hopelessness is an important factor in relationship between depression and suicidal intent. PFT has been found to be decreased in those who have attempted suicide or who have suicidal ideation (MacLeod, Pankhania, Lee, Mitchell, 1997; Hunter & O'Connor, 2003), and PFT may have a future as a predictor for repeat suicide attempts as well (O'Connor, Smyth, & Williams, 2015). However, more research and development of the EFTT is needed before it can become applicable to clinical research.

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Table 1

Worry and Future-Thinking Domains

Student Worry Content Davey, Hampton, Farrell, & Davidson (1992)	**Worry Domains** Diefenbach et al., (2001)	**PFE** Kosnes, Whelan, O'Donovan, & McHugh (2013)[1]	**NFE** Kosnes, Whelan, O'Donovan, & McHugh (2013)[1]	**Future Cognitions** Godley, Tchanturia, MacLeod, & Schmidt (2001)	**Domains**
Personal Relationship	Relationships	Friendship, Love	Loneliness	Social/interpersonal	Relationships/ Family
Financial Concerns/Accommodation	Financial	Wealth	Failure	Financial and Home	Financial/Housing
Job prospects	Work Incompetence	Success	Failure	Achievement/ Failure	Professional Development
Academic demands	Aimless Future	Happiness/Enjoyment	Failure/Stress	Leisure/Pleasure	
Health Worries	--	--	Illness	Own Health	Health

1. Kosnes, Whelan, O'Donovan, and McHugh (2013) indicated personal correspondence on February 2006 with Dr. Andrew MacLeod to collect data from his research on future thinking domains.

Table 2

Scale Correlations

Measure	1	2	3	4	5	6
1. ASI-3						
2. CES-D	.57*					
3. ONFTT	.50*	.52*				
4. OPFTT	.24	.24	.01			
5. ENFTT	.51*	.68**	.53*	.14		
6. EPFTT	-.32	-.74**	-.47	-.16	-.75**	

Note. Anxiety Sensitivity Index (ASI-3); Center for Epidemiologic Depression Scale (CES-D); Original Negative Future-Thinking Task (PNFT); Electronic Negative Future Thinking Task (ENFTT); Electronic Positive Future-Thinking Task (EPFTT); Original Positive Future-Thinking Task (OPFTT)

*. Correlation is significant at the 0.05 level.

**. Correlation is significant at the 0.01 level.

Appendix A

NFT

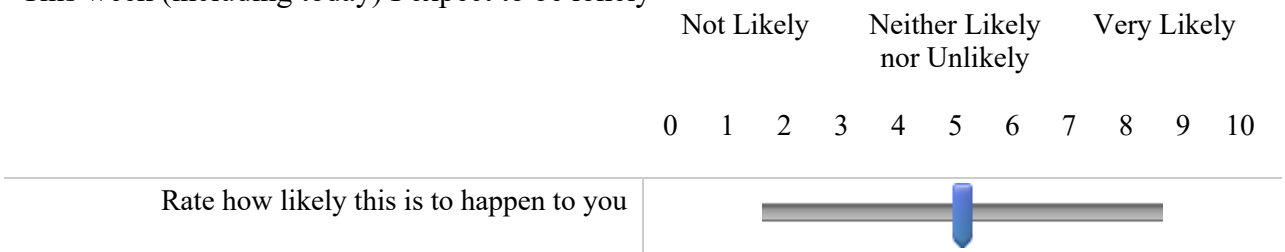
Start of Block: Negative Future Thoughts

Subject Number

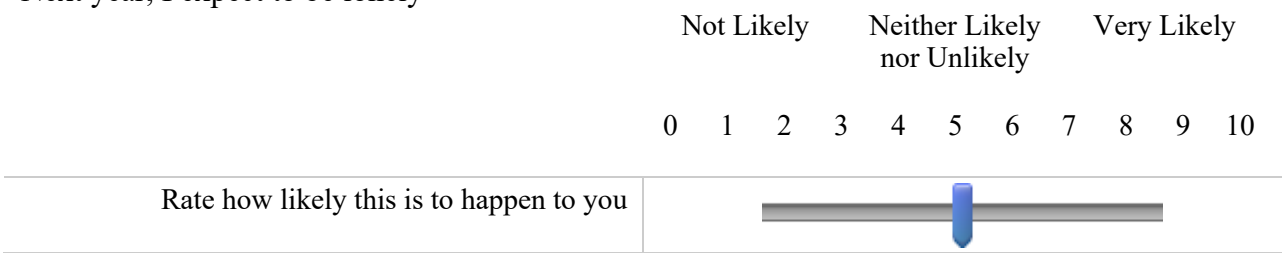
_____

Page Break

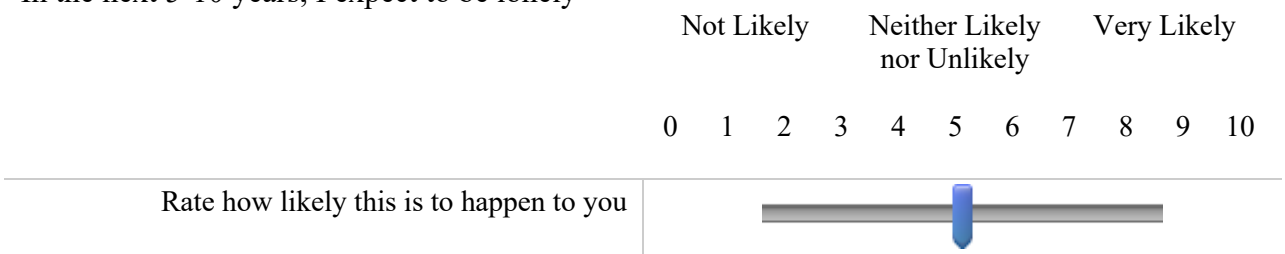
This week (including today) I expect to be lonely



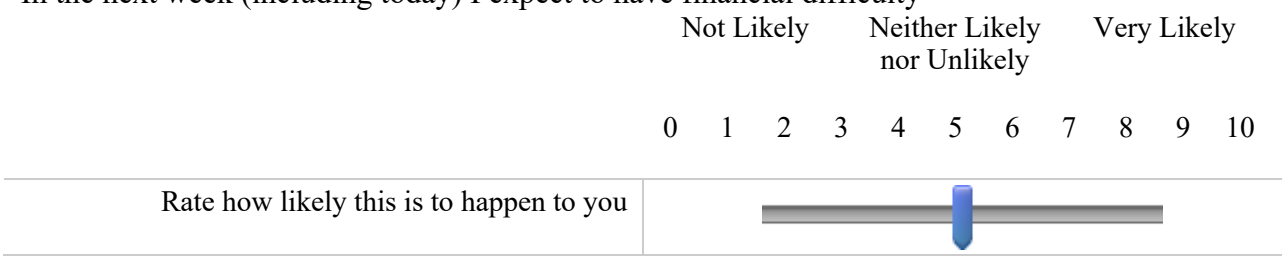
Next year, I expect to be lonely



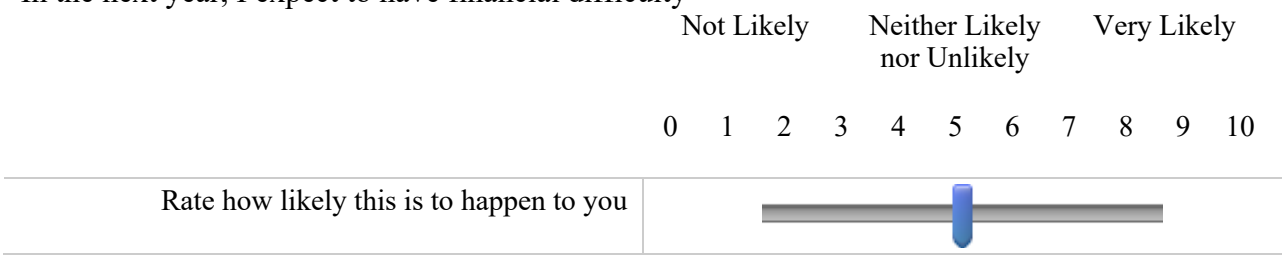
In the next 5-10 years, I expect to be lonely



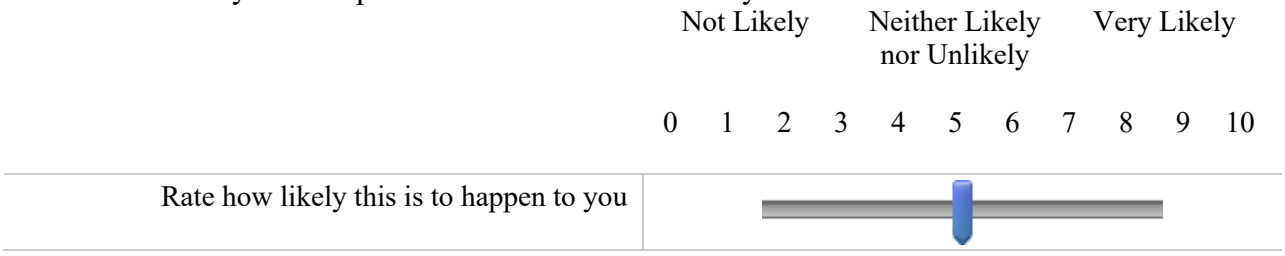
In the next week (including today) I expect to have financial difficulty



In the next year, I expect to have financial difficulty

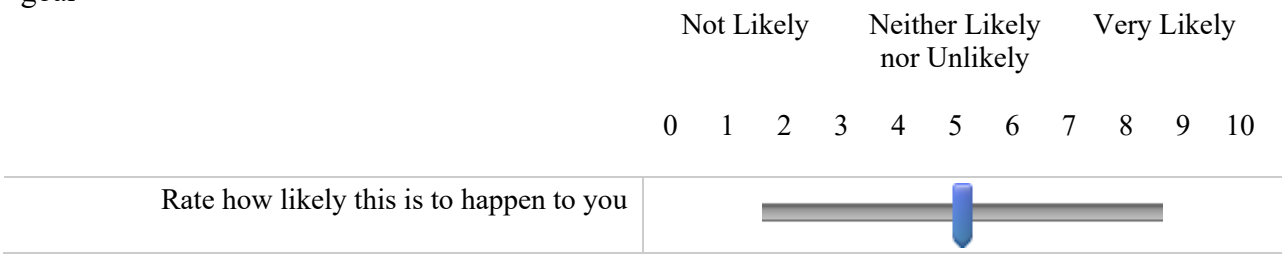


In the next 5-10 years I expect to have financial difficulty

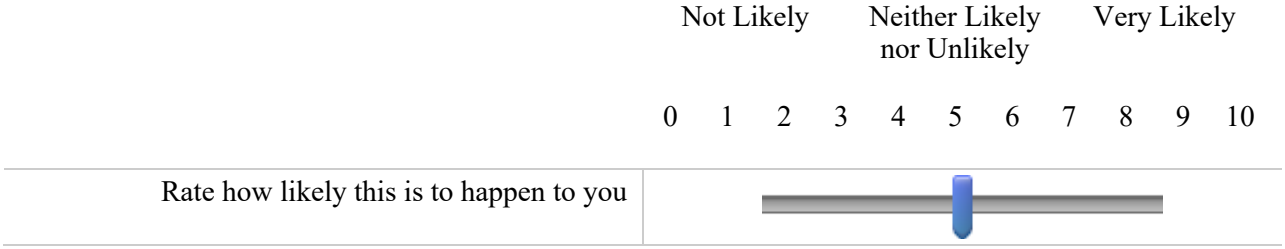


Page Break

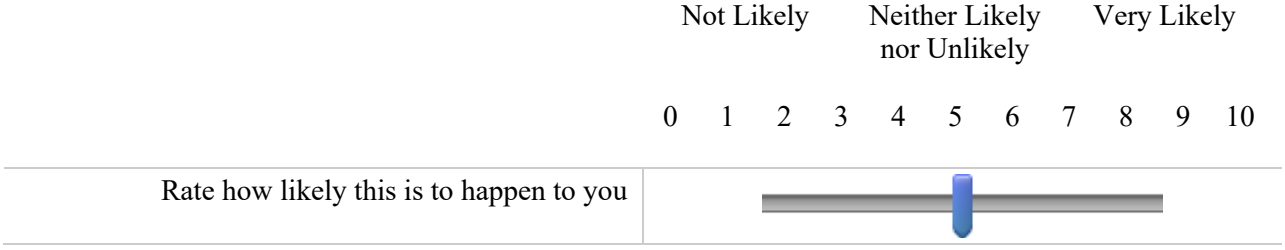
In the next week (including today) I expect that I will not make acceptable progress on my career goal



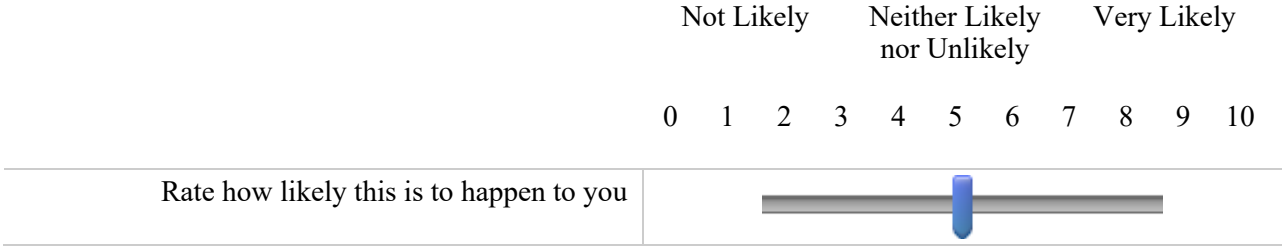
In the next year I expect that I will not make acceptable progress on my career goal



In the next 5-10 years I expect that I will not make acceptable progress on my career goal



In the next week (including today) I expect that I will be unsatisfied with my job/career



In the next year I expect that I will be unsatisfied with my job/career

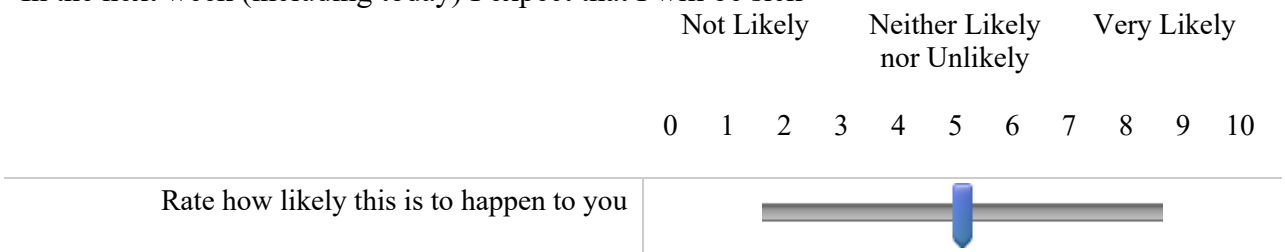
	Not Likely			Neither Likely nor Unlikely					Very Likely	
	0	1	2	3	4	5	6	7	8	9	10
Rate how likely this is to happen to you											

In the next 5-10 years I expect that I will be unsatisfied with my job/career

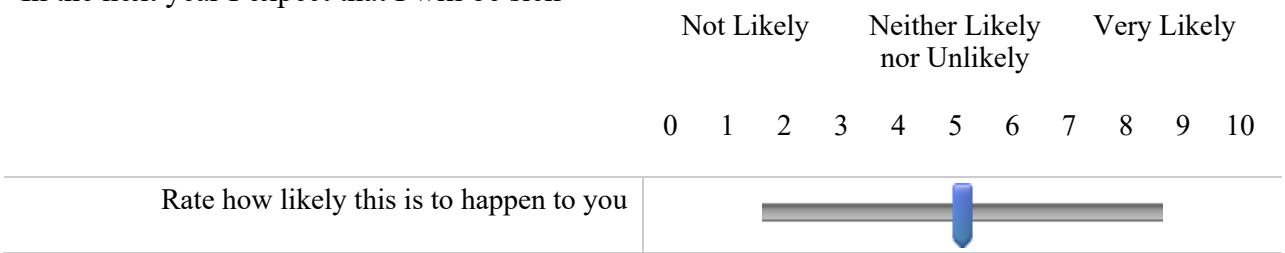
	Not Likely			Neither Likely nor Unlikely					Very Likely	
	0	1	2	3	4	5	6	7	8	9	10
Rate how likely this is to happen to you											

Page Break

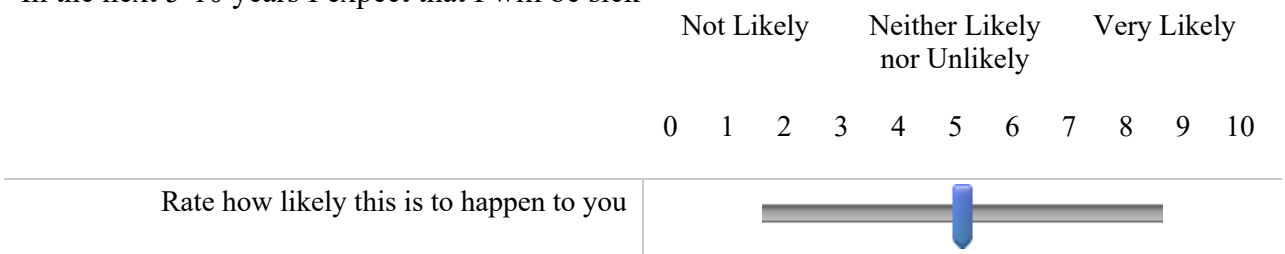
In the next week (including today) I expect that I will be sick



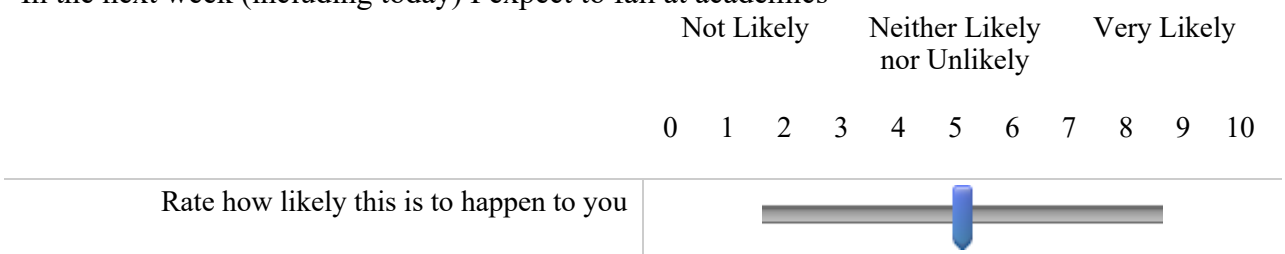
In the next year I expect that I will be sick



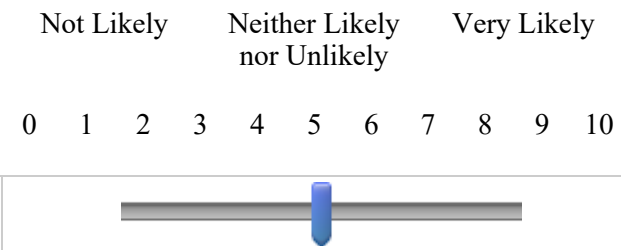
In the next 5-10 years I expect that I will be sick



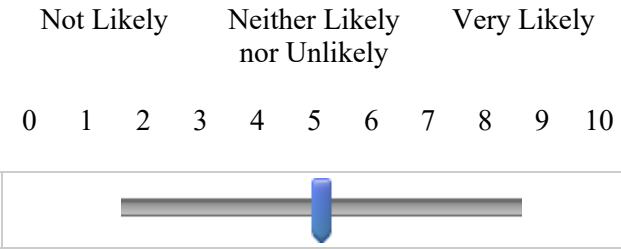
In the next week (including today) I expect to fail at academics



In the next year I expect to fail at academics

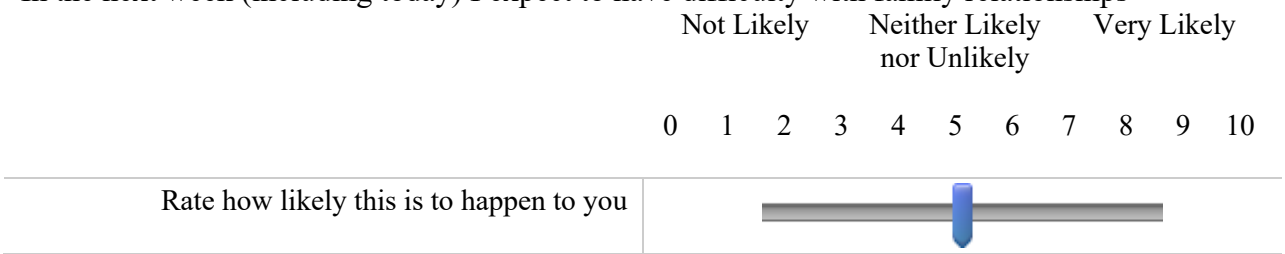


In the next 5-10 years I expect to fail at academics

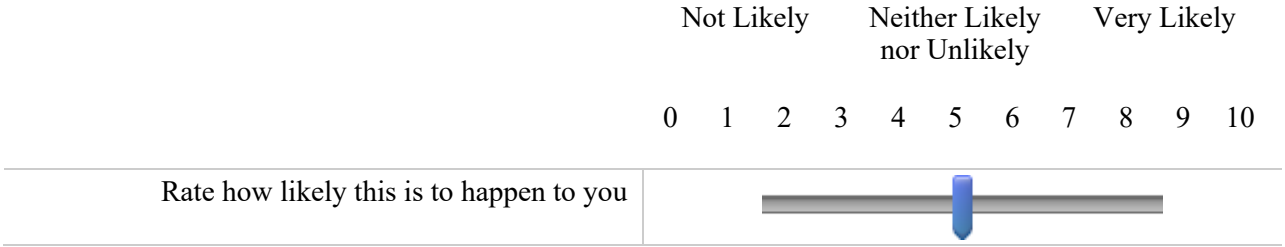


Page Break

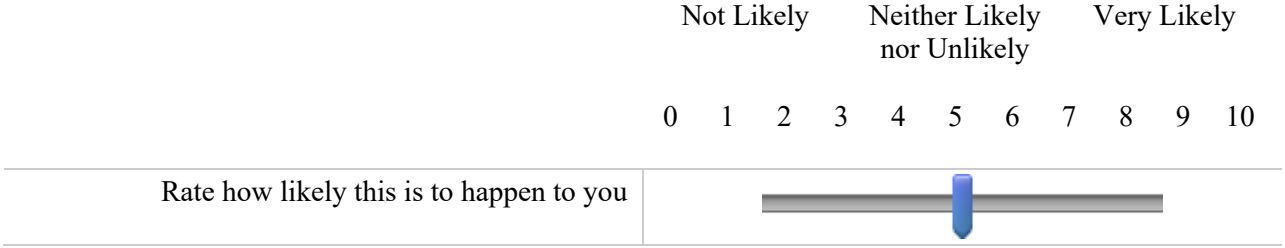
In the next week (including today) I expect to have difficulty with family relationships



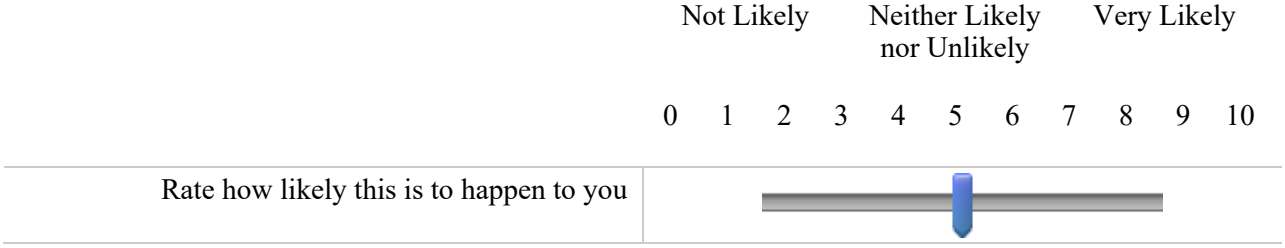
In the next year I expect to have difficulty with family relationships



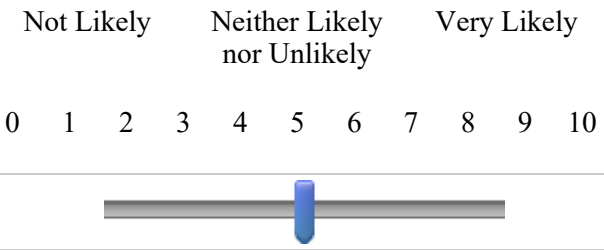
In the next 5-10 years I expect to have difficulty with family relationships



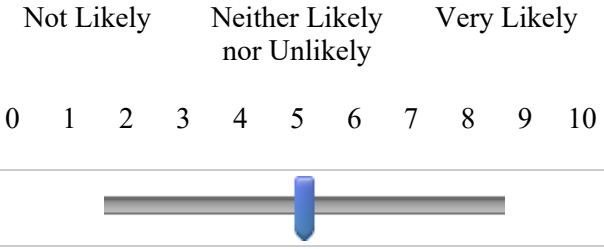
In the next week (including today) I expect to have a unhappy future



In the next year I expect to have a unhappy future



In the next 5-10 years I expect to have a unhappy future



End of Block: Negative Future Thoughts

Appendix B

PFT

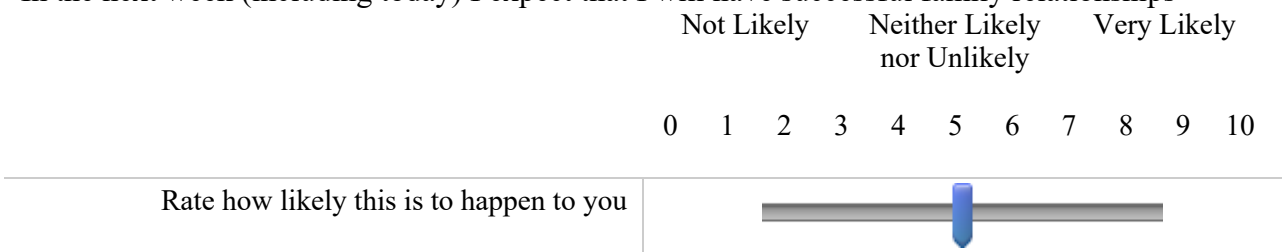
Start of Block: Positive Future Thoughts

Subject Number

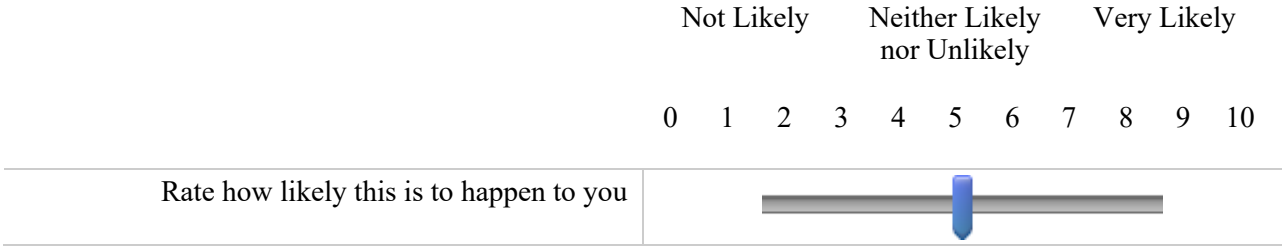
_____

Page Break

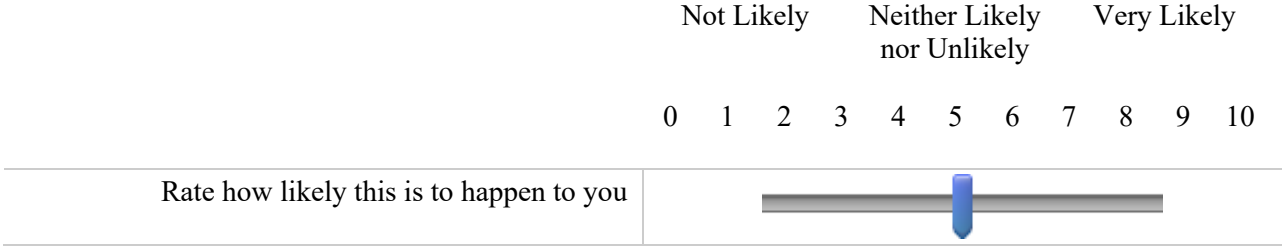
In the next week (including today) I expect that I will have successful family relationships



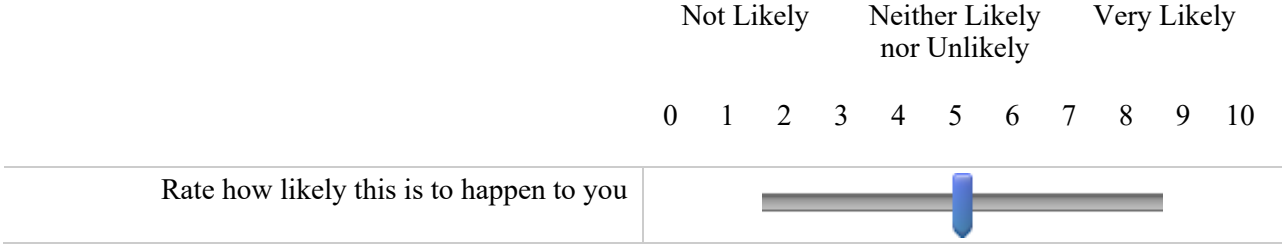
In the next year I expect that I will have successful family relationships



In the next 5-10 years I expect that I will have successful family relationships



In the next week (including today) I expect that I will be satisfied with my job/career



In the next year I expect that I will be satisfied with my job/career

Not Likely | Neither Likely nor Unlikely | Very Likely

0 1 2 3 4 5 6 7 8 9 10

Rate how likely this is to happen to you

In the next 5-10 years I expect that I will be satisfied with my job/career

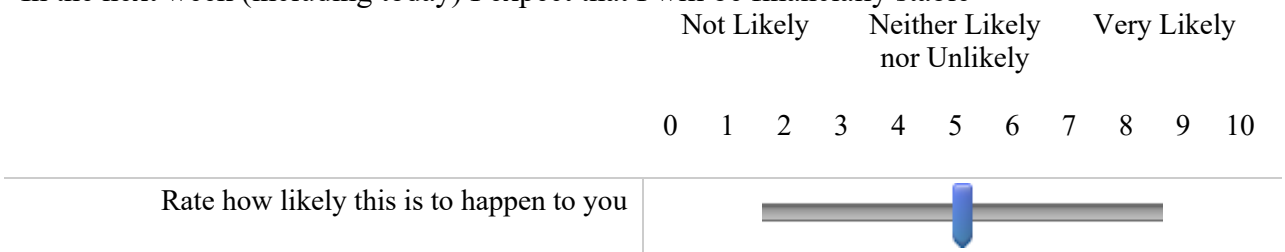
Not Likely | Neither Likely nor Unlikely | Very Likely

0 1 2 3 4 5 6 7 8 9 10

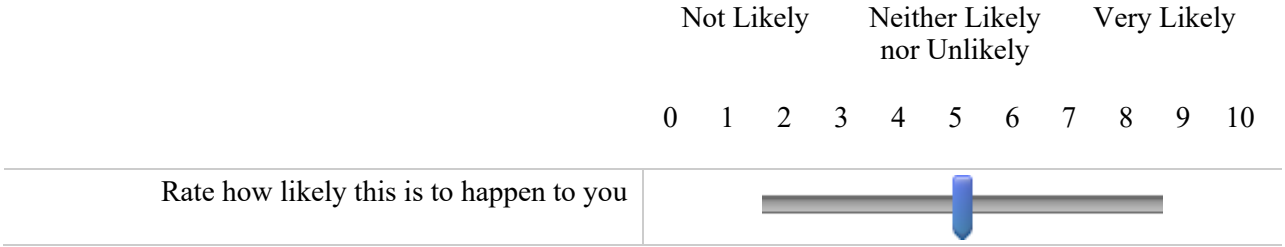
Rate how likely this is to happen to you

Page Break

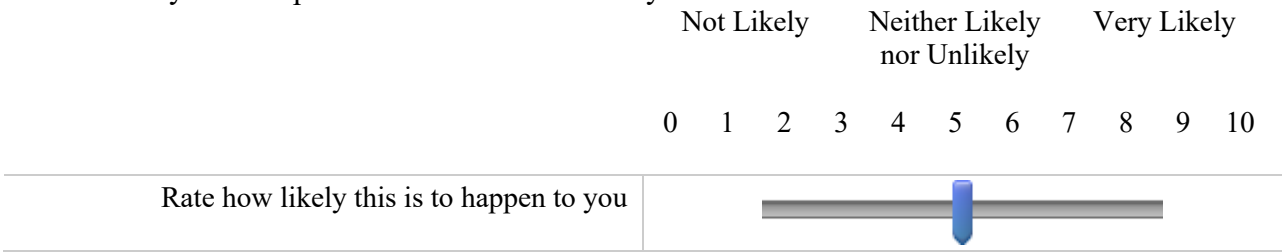
In the next week (including today) I expect that I will be financially stable



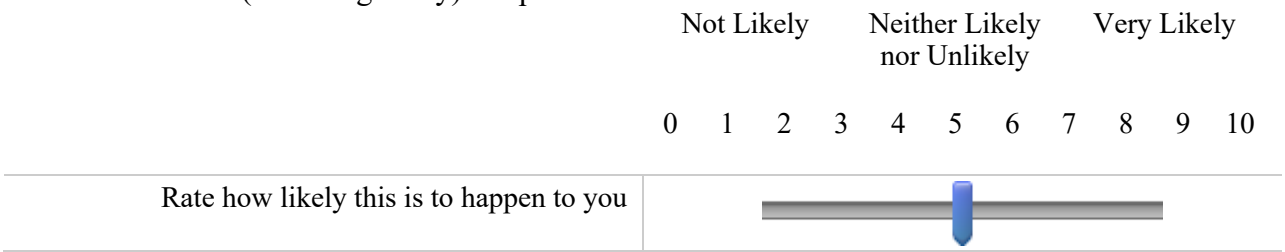
In the next year I expect that I will be financially stable



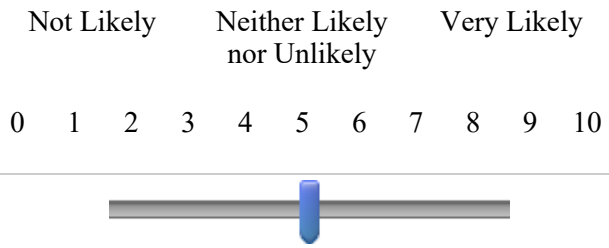
In the 5-10 years I expect that I will be financially stable



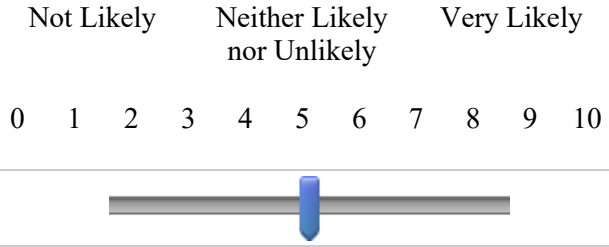
In the next week (including today) I expect that I will be successful in academics



In the next year I expect that I will be successful in academics

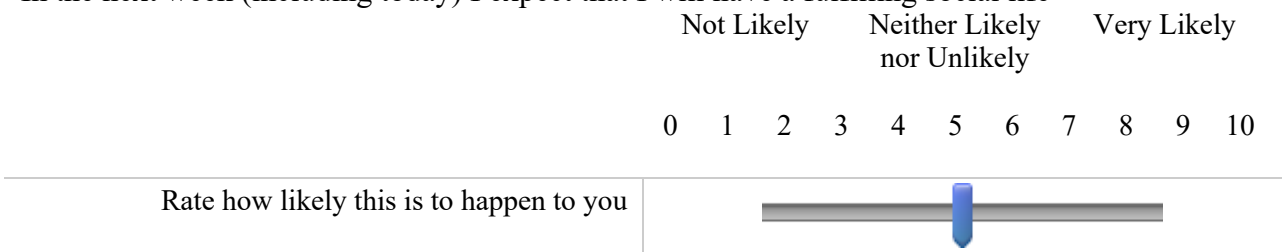


In the next 5-10 years I expect that I will be successful in academics

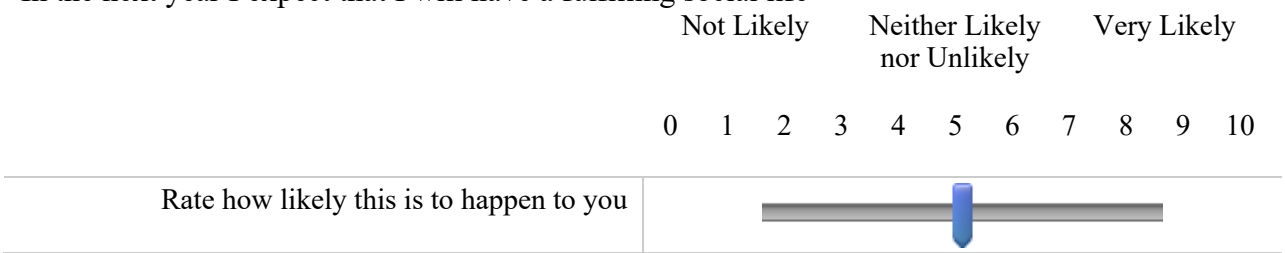


Page Break

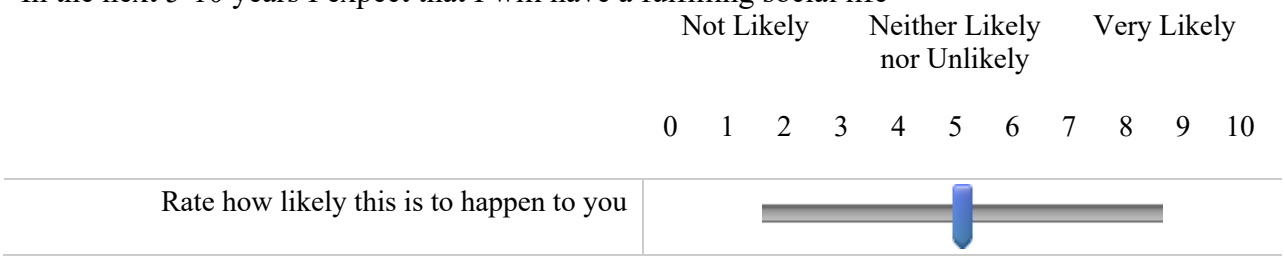
In the next week (including today) I expect that I will have a fulfilling social life



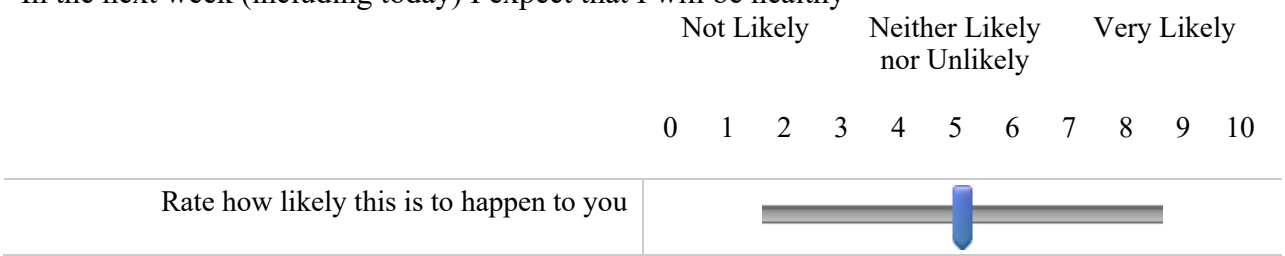
In the next year I expect that I will have a fulfilling social life



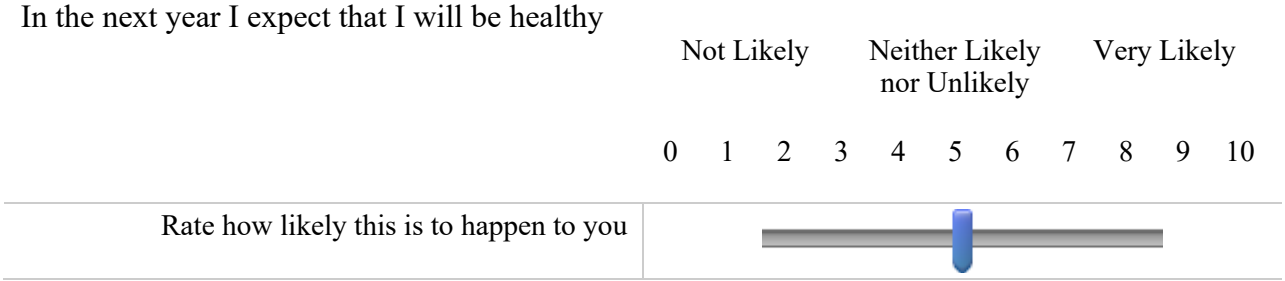
In the next 5-10 years I expect that I will have a fulfilling social life



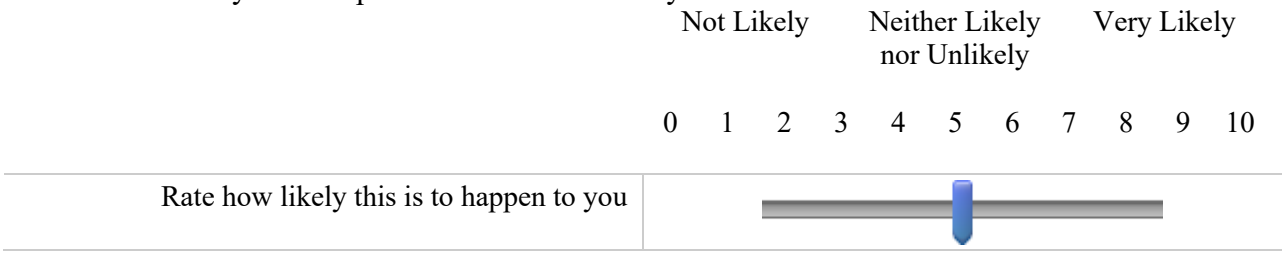
In the next week (including today) I expect that I will be healthy



In the next year I expect that I will be healthy

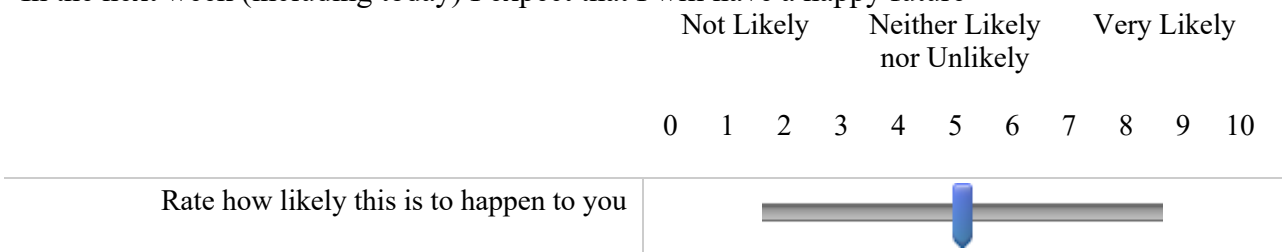


In the next 5-10 years I expect that I will be healthy

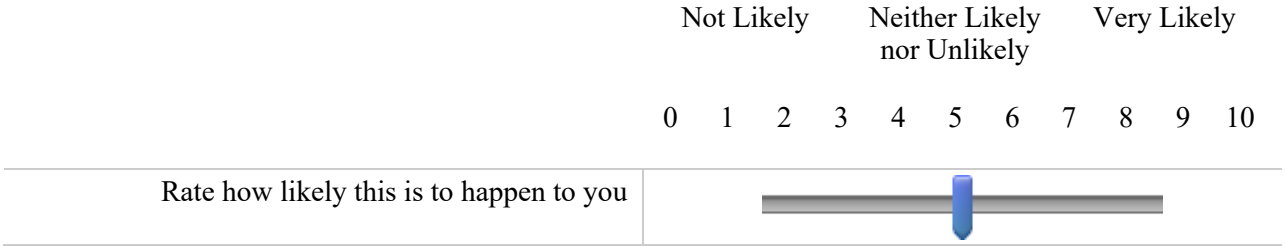


Page Break

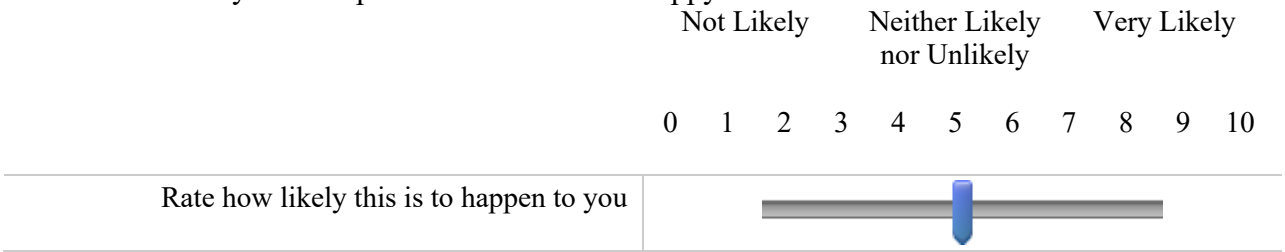
In the next week (including today) I expect that I will have a happy future



In the next year I expect that I will have a happy future



In the next 5-10 years I expect that I will have a happy future



End of Block: Positive Future Thoughts

Appendix C

Online Questionnaires

Start of Block: ASI-3

Subject Number

_____

Page Break

Please select the answer that best corresponds to how much you agree with each item. If any items concern something that you have never experienced (e.g., fainting in public) answer on the basis of how you think you might feel if you had such an experience. Otherwise, answer all items on the basis of your own experience.

	Very Little	A Little	Some	Much	Very Much
It is important for me not to appear nervous.	○	○	○	○	○
When I cannot keep my mind on task, I worry that I might be going crazy.	○	○	○	○	○
It scares me when my heart beats rapidly.	○	○	○	○	○
When my stomach is upset, I worry that I might be seriously ill.	○	○	○	○	○
It scares me when I am unable to keep my mind on a task.	○	○	○	○	○
When I tremble in the presence of others, I fear what people might think of me.	○	○	○	○	○
When my chest feels tight, I get scared that I won't be able to breathe properly.	○	○	○	○	○

When I feel pain in my chest, I worry that I am going to have a heart attack.	○	○	○	○	○
I worry that other people will notice my anxiety.	○	○	○	○	○
When I feel "spacey" or spaced out I worry that I may be mentally ill.	○	○	○	○	○
It scares me when I blush in front of people.	○	○	○	○	○
When I notice my heart skipping a beat, I worry that there is something seriously wrong with me.	○	○	○	○	○
When I begin to sweat in a social situation, I fear people will think negatively of me.	○	○	○	○	○
When my thoughts seem to speed up, I worry that I might be going crazy.	○	○	○	○	○
When my throat feels tight, I worry that I could choke to death.	○	○	○	○	○

When I have trouble thinking clearly, I worry that there is something wrong with me.	○	○	○	○	○
I think it would be horrible for me to faint in public.	○	○	○	○	○
When my mind goes blank, I worry there is something terribly wrong with me.	○	○	○	○	○

End of Block: ASI-3

Start of Block: CES-D

The following items may be ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
I was bothered by things that usually don't bother me.	○	○	○	○
I did not feel like eating; my appetite was poor.	○	○	○	○
I felt that I could not shake off the blues even with help from my family or friends.	○	○	○	○
I felt I was just as good as other people.	○	○	○	○
I had trouble keeping my mind on what I was doing.	○	○	○	○
I felt depressed.	○	○	○	○
I felt that everything I did was an effort.	○	○	○	○
I felt hopeful about the future.	○	○	○	○
I thought my life had been a failure.	○	○	○	○
I felt fearful.	○	○	○	○
My sleep was restless.	○	○	○	○

I was happy.	○	○	○	○
I talked less than usual.	○	○	○	○
I felt lonely.	○	○	○	○
People were unfriendly.	○	○	○	○
I enjoyed life.	○	○	○	○
I had crying spells.	○	○	○	○
I felt sad.	○	○	○	○
I felt that people dislike me.	○	○	○	○
I could not get "going."	○	○	○	○

Appendix D

SISE & MR

Please rate how true this statement is for you.

I have high self-esteem.

1	2	3	4	5
Not very True of Me				Very True of Me

Please rate your current positive mood

1	2	3	4	5	6	7	8	9	10
Not Positive at All									Extremely Positive

Please rate your current negative mood

1	2	3	4	5	6	7	8	9	10
Not Negative at All									Extremely Negative

Appendix E

Demographic Questionnaire

Start of Block: Default Question Block

Start of Block: Block 1

Subject Number

Please select the age range that your age falls under.

- ○ 18-60
- ○ 60+

What is your gender?

- ○ Male
- ○ Female
- ○ Other
- ○ Prefer not to answer

Please select your ethnicity.

- ○ Hispanic or Latino
- ○ Not Hispanic or Latino

What do you consider your race to be? Check all that apply.

- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Native Hawaiian or Pacific Islander
- ☐ Other

Please select the current number of college years you have completed.

- ○ Less than 1
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6+

End of Block: Block 1

Appendix F

Consent to Participate in Research

Information to Consider About this Research

Title of Study: *Development of an Electronic Future-Thinking Task*

Principal Investigator: Brittany Foster
Department: Psychology
Faculty Supervisor: JP Jameson, Associate Professor, Department of Psychology
Contact Information:
(828) 262-8950
jamesonjp@appstate.edu

You are being invited to take part in a research study about a new computer-based future-thinking task. If you take part in this study, you will be one of about 40 people to do so. By doing this study we hope to learn about the effectiveness of the new future-thinking task in comparison to the formerly used task.

The research procedures will be conducted at Appalachian State University. The duration of your participation will be two hours.

You will be asked to participate in two one-hour sessions. In each session, you will be asked to complete a survey with questions about yourself and your mood, an oral word association test, and the future-thinking task. In one visit, you will complete the future-thinking task on a computer. In the other visit, you will complete a paper-based version. For the paper future-thinking task, you will be asked to rate how likely each event is to happen and if it did happen how you would feel. You will be asked to complete the single-item mood and self-esteem questions on paper and the rest of the questionnaires on Qualtrics.

You cannot volunteer for this study if are under 18 years of age.

What are possible harms or discomforts that I might experience during the research?

To the best of our knowledge, the risk of harm for participating in this research study is no more than you would experience in everyday life.

What are the possible benefits of this research?

There may be no personal benefit from your participation but the information gained by doing this research may help others in the future by providing researchers with an alternative form of measuring future thoughts which would be more time effective and make the task more easily administered by a variety of health professionals if the new measure were effective.

Will I be paid for taking part in the research?

You will not be paid for your participation in this study. However, you can earn up to 4 ELCS for your participation. There are other research options and non-research options for obtaining extra credit or ELCs. One non-research option to receive 1 ELC is to read an article and write a 1-2 page paper summarizing the article and your reaction to the article. More information about

this option can be found at: psych.appstate.edu/research. You may also wish to consult your professor to see if other non-research options are available.

How will you keep my private information confidential?

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information or what that information is. All data storage meets the "Standard Security" recommendations from the IT security office. At the beginning of the study, you will be assigned a randomized ID number that will be used to link your responses between the two sessions. This ID number will be stored in a password-protected file that is separate from your study responses, and this file will be destroyed at the conclusion of the study. Consent forms also will be stored separately the paper measures. All paper data and forms will be stored and locked in a file cabinet in a locked office in Smith-Wright Hall. All paper copies related to the study (consent forms, questionnaires) will be destroyed five years after the conclusion of the study; anonymous electronic data will be stored indefinitely.

Who can I contact if I have questions?

The people conducting this study will be available to answer any questions concerning this research, now or in the future. You may contact the Faculty Advisor, Dr. JP Jameson, at 828-262-8950 or jamesonjp@appstate.edu. If you have questions about your rights as someone taking part in research, contact the Appalachian Institutional Review Board Administrator at 828-262-2692, through email at irb@appstate.edu or at Appalachian State University, Office of Research and Sponsored Programs, IRB Administrator, Boone, NC 28608.

Do I have to participate? What else should I know?

Your participation in this research is completely voluntary. If you choose not to volunteer, there will be no penalty and you will not lose any benefits or rights you would normally have. If you decide to take part in the study you still have the right to decide at any time that you no longer want to continue. There will be no penalty and no loss of benefits or rights if you decide at any time to stop participating in the study. If you decide to participate in this study, let the research personnel know. A copy of this consent form is yours to keep.

Participant's Name (PRINT) Signature Date

Appendix G

Appalachian STATE UNIVERSITY

INSTITUTIONAL REVIEW BOARD
Office of Research Protections
ASU Box 32068
Boone, NC 28608
828.262.2692
Web site: http://researchprotections.appstate.edu
Email: irb@appstate.edu
Federalwide Assurance (FWA) #00001076

To: Brittany Foster
Psychology
CAMPUS EMAIL

From: Robin Tyndall, IRB Administrator
Date: 2/11/2019
RE: Notice of IRB Exemption

STUDY #: 19-0206
STUDY TITLE: Development of a New Electronic Future-Thinking Task

Exemption Category: 2.Survey, interview, public observation

This study involves minimal risk and meets the exemption category cited above. In accordance with 45 CFR 46.101(b) and University policy and procedures, the research activities described in the study materials are exempt from further IRB review.

All approved documents for this study, including consent forms, can be accessed by logging into IRBIS. Use the following directions to access approved study documents.

1. Log into IRBIS
2. Click "Home" on the top toolbar
3. Click "My Studies" under the heading "All My Studies"
4. Click on the IRB number for the study you wish to access
5. Click on the reference ID for your submission
6. Click "Attachments" on the left-hand side toolbar
7. Click on the appropriate documents you wish to download

Study Change: Proposed changes to the study require further IRB review when the change involves:

- an external funding source,
- the potential for a conflict of interest,
- a change in location of the research (i.e., country, school system, off site location),
- the contact information for the Principal Investigator,
- the addition of non-Appalachian State University faculty, staff, or students to the research
- team, or
- the basis for the determination of exemption. Standard Operating Procedure #9 cites examples of changes which affect the basis of the determination of exemption on page 3.

Investigator Responsibilities: All individuals engaged in research with human participants are responsible for compliance with University policies and procedures, and IRB determinations. The Principal Investigator (PI), or Faculty Advisor if the PI is a student, is ultimately responsible for ensuring the protection of research participants; conducting sound ethical research that complies with federal regulations, University policy and procedures; and maintaining study records. The PI should review the IRB's list of PI responsibilities.

To Close the Study: When research procedures with human participants are completed, please send the Request for Closure of IRB Review form to irb@appstate.edu.

If you have any questions, please contact the Research Protections Office at (828) 262-2692 (Robin).

Best wishes with your research.

Websites for Information Cited Above

Note: If the link does not work, please copy and paste into your browser, or visit https://researchprotections.appstate.edu/human-subjects.

1. Standard Operating Procedure #9:http://researchprotections.appstate.edu/sites/researchprotections.appstate.edu/files/IRB20SOP920Exempt%20Review%20Determination.pdf

2. PI responsibilities: http://researchprotections.appstate.edu/sites/researchprotections.appstate.edu/files/PI20Responsibilities.pdf

3. IRB forms: http://researchprotections.appstate.edu/human-subjects/irb-forms

CC:
Lisa Emery, Psychology