What Do Students Feel in School and How Do We Measure Them?: Examining the Psychometric Properties of the S-AEQ-F

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The objective of this study was to examine the reliability and construct validity of the Short Version of the Academic Emotions Questionnaire for Filipinos (S-AEQ-F) which is an adaptation of the Academic Emotions Questionnaire (AEQ; Pekrun, Goetz, & Perry, 2005). The S-AEQ-F measures eight discrete academic emotions in the learning context: anger, anxiety, boredom, enjoyment, hope, hopelessness, pride, and shame. Filipino high school students (N = 1,121) completed the S-AEQ-F. Responses to this questionnaire were shown to have good internal structure and support was affirmed for its construct validity in terms of its factorial structure and correlations with other educational outcomes. Results of the confirmatory factor analysis supported the original two higher order factor structures with eight underlying discrete emotions. Taken together, this study sustained the utility of the S-AEQ-F for Filipino respondents.

Keywords: academic emotions, construct validity, factor structure, translation

"There can be no knowledge without emotion." This statement by British novelist Arnold Bennett affirmed the intimate link between learning (knowledge) and feeling (emotion). Thus it was surprising that educational researchers have mostly neglected the role that feelings or emotions play in the classroom with most of their attention being devoted to cognitive and motivational constructs (Pekrun & Frese, 1992; Schutz & Lanehart, 2002). There have been a few exceptions, however, in the form of studies on test anxiety (Zeidner, 1998) and research on how attributions affect emotions following success and failure (Weiner, 1985). It was only recently that researchers have become increasingly aware of the role that emotions play in the school settings. In introducing a special issue of the Educational
Psychologist (2010) on emotions in the educational setting, Schutz and Lanehart (2002, p. 67) wrote:

As motivation, cognitive, developmental, and educational psychologists have continued to contextualize their inquiry within the schools, it has become clear that emotions are an integral part of educational activity settings. In the 2000s, researchers interested in teaching, learning, and motivational transactions within the classroom context can no longer ignore emotional issues. Emotions are intimately involved in virtually every aspect of the teaching and learning process and, therefore, an understanding of the nature of emotions within the school context is essential.

Research on emotions in school was imperative given that they exert a large impact on learning and other educational outcomes. For example, emotions could change the level of certain neurotransmitters in the brain thereby affecting memory processes (Ashby, Isen, & Turken, 1999); they could direct attentional processes and influence the use of cognitive resources (Meinhardt & Pekrun, 2003); they could enhance or impede self-regulation of learning (Pekrun, Goetz, Titz, & Perry, 2002); they could predict performance attainment in school (Pekrun, Elliot, & Maier, 2009; Titz, 2001); and they could also mediate the effects of key cognitive-motivational constructs on learning outcomes (Pekrun et al., 2009).

Given the relevance of emotions for student learning, it was important to develop a measure that can be used to assess the degree to which students feel different kinds of emotions in the school setting. The most prominent measure of academic emotions in the school setting was the Achievement Emotions Questionnaire (AEQ), which is a multidimensional self-report instrument originally designed to measure college students’ achievement-related emotions in school (see Pekrun et al., 2002 for a summary). In its current form, the AEQ measures eight discrete emotions: enjoyment, hope, pride, anger, anxiety, shame, hopelessness, and boredom. It is divided into three sections: class-related emotion section, learning-related emotion section, and test-related emotion section. The AEQ has German-language versions (Molfenter, 1999; Titz, 2001). There are also domain-specific variants assessing middle and high school students’ emotions in mathematics and language-related subjects (Achievement Emotions Questionnaire – Mathematics, AEQ-M; Goetz, 2004; Pekrun et al., 2003; Achievement Emotions Questionnaire – Language, AEQ-L). The AEQ-M is available in English, German, and Chinese, while the AEQ-L is available in English and German.

Recently, there has been a call for researchers in the educational setting to be more sensitive to the cultural context (McInerney, 2008; Watkins &
Biggs, 1996). Therefore, there is a need to adapt instruments developed from the West to different cultural contexts. It might be possible that some instruments developed in the West might not work properly in the Asian setting, thus it was imperative to test the construct validity and reliability of any instrument developed in the West before they are used in a new cultural context. In this study, I wanted to develop an instrument that would be useful for secondary school students in the Philippines.

Research on academic emotions on Filipino students is few. The only published study I found was a qualitative study conducted by Bernardo, Ouano, and Salanga (2009). Their study provided support to the validity of the various academic emotions examined quantitatively by the AEQ although they also made a case for expanding the repertoire of academic emotions beyond that examined by the AEQ. Their study indicated that Filipino students identified the following academic emotions: anger, anxiety, boredom, hopelessness, shame, enjoyment, hope, and pride. These emotions were the same emotions investigated quantitatively by the AEQ. Thus, their qualitative research provided tentative support for the viability of the AEQ in the Philippine setting. However, there has been no previous study that examined the psychometric properties of the AEQ among Filipino secondary school students. The original learning-related AEQ comprised of 75 items. My aim in this study was to develop a short version of the learning-related AEQ that can be easily administered to secondary school students in the Philippines. I also wanted to test the reliability and construct validity of this new instrument. It is necessary to develop a short version of the AEQ that can be easily administered to high school students in the Philippines. It might prove helpful to teachers so that they can tailor their pedagogy into “emotionally sound” (Astleitner, 2000) ways.

**METHOD**

**Procedure**

I based the items of the Short Version of the Academic Emotions Questionnaire for Filipinos (S-AEQ-F) from the original learning related scale of the Achievement Emotions Questionnaire (Pekrun et al., 2002). Because I was interested in measuring emotions in a domain general context, I only focused on the learning-related scales of the AEQ. I drew 16 items from the original learning-related AEQ. Two items were used as indicators of each of the eight academic emotions investigated (See Appendix A for the instrument). These two items showed the highest factor loadings in an earlier
pilot study I conducted when the full version of the Achievement Emotions Questionnaire (Pekrun et al., 2002) was administered to Filipino students. English was used for the questionnaire, because it is the medium of instruction and language of work in the Philippines.

Administration

I administered the S-AEQ-F to participants in class groups with the assistance of teachers in each school. The teachers were instructed not to interpret any of the items for students, but to tell students to interpret the items as best as they could or leave it blank if they were unable to understand it. One class period consisting of 40 minutes was devoted to answering the questionnaires. All the students were able to answer the questionnaire within the specified time frame. Students answered the questionnaires individually, and discussions with classmates were not allowed.

Participants

A total of 1,121 secondary school students (608 males and 513 females) from four different schools in Metro Manila, Philippines were included. The mean age was 14.20 (SD = 1.39). The classes were selected based on the discretion of the principal and the school teachers in the various schools.

Measure

The S-AEQ-F was administered to the students. This instrument comprised of 16 items. Two items were designed to measure each of the eight discrete emotions. This instrument measured three positive or pleasant emotions (enjoyment, hope, and pride) and five negative or unpleasant emotions (anger, anxiety, boredom, hopelessness, and shame). Participants responded on a 6-point Likert scale with 6 indicating high endorsement of the relevant item and 1 indicating low endorsement.

To assess construct validity, I also administered the mastery goal, performance goal, and work avoidance goal subscale of the Goal Orientation and Learning Strategies Survey (GOALS-S; Dowson & McInerney, 2004). Previous research has shown that academic emotions are systematically related to different goal orientations (Pekrun et al., 2006, 2009).
Statistical Analysis

To examine the reliability and construct validity of this new instrument among Filipino secondary school students, I first computed for the descriptive statistics and reliability coefficients.

To test for the construct validity of the scale, I conducted a confirmatory factor analysis (CFA) based on the model proposed by Govaerts and Gregoire (2008). More specifically, I tested a two-factor higher order CFA. The two higher order latent constructs were positive or pleasant academic emotions and negative or unpleasant academic emotions. Under the positive or pleasant academic emotions were three first-order latent constructs: enjoyment, hope, and pride. Under the negative or unpleasant academic emotions were five first order latent constructs: anger, anxiety, hopelessness, boredom, and shame. Each of these eight first order latent constructs was measured by two indicator variables. As an additional test of construct validity, I also computed for the zero-order correlations among the first order latent variables. That is, I computed for the correlations among enjoyment, hope, pride, anger, anxiety, hopelessness, boredom, and shame. Evidence for construct validity would be shown if the pleasant emotions are correlated positively with each other and if unpleasant emotions are also correlated positively with each other.

An additional test of construct validity was to compute for the correlations of the eight academic emotions with mastery goals, performance goals, and work avoidance goals. Previous research has shown that emotions are related to goals in a systematic manner (Pekrun et al., 2009). Evidence of construct validity would be shown if the positive academic emotions are correlated positively with mastery goals and if the negative academic emotions are correlated positively with the work avoidance goals (see Pekrun et al., 2006, 2009).

RESULTS

Preliminary Analyses

Cronbach alpha values were calculated for each of the scales of the S-AEQ-F. Reliability estimates were all acceptable and varied from .61 to .88. The complete descriptive statistics were presented in Table 1. The last column of the table showed the Cronbach alphas for the original version of the Learning-related AEQ (Pekrun et al., 2005). In general, the original
This was to be expected given that the original version has a much larger number of items (around 6-11) for each of the subscales. The original learning-related section of the AEQ had 75 items whereas the S-AEQ-F only consisted of 16 items.

Table 1
Descriptive Statistics and Reliability Coefficients

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Cronbach's alpha for the S-AEQ-F</th>
<th>Cronbach's alpha for the original version of the AEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>2.51</td>
<td>1.32</td>
<td>0.88</td>
<td>0.86</td>
</tr>
<tr>
<td>Anxiety</td>
<td>3.17</td>
<td>1.29</td>
<td>0.62</td>
<td>0.84</td>
</tr>
<tr>
<td>Boredom</td>
<td>3.30</td>
<td>1.34</td>
<td>0.83</td>
<td>0.92</td>
</tr>
<tr>
<td>Hopelessness</td>
<td>3.10</td>
<td>1.38</td>
<td>0.74</td>
<td>0.90</td>
</tr>
<tr>
<td>Shame</td>
<td>2.43</td>
<td>1.37</td>
<td>0.68</td>
<td>0.86</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>4.74</td>
<td>0.99</td>
<td>0.75</td>
<td>0.77</td>
</tr>
<tr>
<td>Hope</td>
<td>4.50</td>
<td>1.06</td>
<td>0.83</td>
<td>0.77</td>
</tr>
<tr>
<td>Pride</td>
<td>4.60</td>
<td>1.04</td>
<td>0.61</td>
<td>0.75</td>
</tr>
</tbody>
</table>

*From Pekrun, Goetz, and Perry (2005)*

Establishing Construct Validity through Confirmatory Factor Analyses

As contained in Table 2, the fit indices for the proposed model (Model 1) met the baseline criteria for a well-fitting model ($\chi^2 (95) = 930.085, p < .001$, RMSEA = .089, TLI = .876, CFI = .902, IFI = .902). Although the TLI seemed to be lower than the recommended value of .90, the CFI, IFI, and RMSEA were all within the acceptable range (Byrne, 2001). The chi-square ($\chi^2 (94) = 750.725, p < .001$), however, was not adequate. A significant value of $\chi^2$ suggested that entries for the proposed model deviate from those obtained. On the other hand, a statistically non-significant value of $\chi^2$ suggested that a model may be a reasonably satisfactory representation of the data. As discussed by Anderson & Gerbing (1988), and Huang and
Michael (2000), however, the value of the chi-square likelihood ratio statistic was directly dependent on sample size. Because of this, with the large sample size (N = 1,121), significant values could be obtained even though there are only trivial discrepancies between the model and the data.

Table 2
Goodness of Fit Indices for Model 1 and Model 2

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>CFI</th>
<th>IFI or TLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>930.085</td>
<td>95</td>
<td>9.790</td>
<td>.089</td>
<td>.876</td>
<td>.902</td>
<td>.902</td>
</tr>
<tr>
<td>Model 2</td>
<td>1991.658</td>
<td>96</td>
<td>20.746</td>
<td>.133</td>
<td>.721</td>
<td>.777</td>
<td>.777</td>
</tr>
</tbody>
</table>

Note: df = degrees of freedom; RMSEA = root mean square error approximation; NNFI = non-normed fit index; TLI = Tucker-Lewis index; CFI = comparative fit index; IFI = incremental fit index.

As an additional test of construct validity, I compared Model 1 to Model 2 which was a one-factor higher order model. Unlike Model 1, Model 2 did not posit a distinction between pleasant and unpleasant emotions and just included an undifferentiated higher-order emotions construct. Results indicated that Model 2 was not a good fit to the data. I did a chi-square difference test between Model 1 and Model 2. Results indicated that Model 1 was a better fit to the data compared to Model 2 ($\chi^2$ difference $= 1061.573, p < .001$). This further affirmed the construct validity of the S-AEQ-F.

Further Evidence of Construct Validity: Correlations among the Latent First-order Constructs and Correlations with Goal Orientations

I also obtained the zero-order correlations among the eight discrete academic emotions. Construct validity would be supported if the three kinds of positive emotions are positively correlated with each other, and if the five kinds of negative emotions are positively correlated with each other. The zero-order correlations supported this assumption. The three positive emotions of enjoyment, hope, and pride were moderately positively correlated with each other ($r = .48$ to $r = .65, p < .001$). On the other hand, the negative emotions of anger, anxiety, shame, hopelessness, and boredom were all significantly and positively correlated with each other ($r = .37$ to $r = .70, p < .001$).
Figure 1. Confirmatory factor analysis of the S-AEQ-F
Table 3
Zero-order Correlations among the Eight First-order Latent Variables

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive emotions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Enjoyment</td>
<td>.650***</td>
<td>.483***</td>
<td>-.306***</td>
<td>-.013</td>
<td>.022</td>
<td>-.041</td>
<td>-.291***</td>
</tr>
<tr>
<td>2. Hope</td>
<td>.540***</td>
<td>-.207***</td>
<td>.011</td>
<td>.022</td>
<td>-.034</td>
<td>-.149***</td>
<td></td>
</tr>
<tr>
<td>3. Pride</td>
<td>-.133***</td>
<td>.039</td>
<td>.034</td>
<td>-.032</td>
<td>-.145***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative emotions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Anger</td>
<td>.471***</td>
<td>.370***</td>
<td>.421***</td>
<td>.695***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Anxiety</td>
<td>.586***</td>
<td>.444***</td>
<td>.413***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Shame</td>
<td>.528***</td>
<td>.389***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Hopelessness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Boredom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Note: *** p < .001.
Table 4
Correlations with Mastery, Performance, and Work Avoidance Goals of the Different Academic Emotions

<table>
<thead>
<tr>
<th>Positive Emotions</th>
<th>Mastery Approach</th>
<th>Performance Approach Goals</th>
<th>Work Avoidance Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoyment</td>
<td>.560***</td>
<td>.397***</td>
<td>-.236***</td>
</tr>
<tr>
<td>Hope</td>
<td>.496***</td>
<td>.355***</td>
<td>-.177***</td>
</tr>
<tr>
<td>Pride</td>
<td>.421***</td>
<td>.383***</td>
<td>-.137***</td>
</tr>
<tr>
<td>Negative Emotions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>-.276***</td>
<td>-.118***</td>
<td>.525***</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-.012</td>
<td>.066*</td>
<td>.320***</td>
</tr>
<tr>
<td>Shame</td>
<td>.015</td>
<td>.144***</td>
<td>.326**</td>
</tr>
<tr>
<td>Hopelessness</td>
<td>-.066*</td>
<td>.074*</td>
<td>.336***</td>
</tr>
<tr>
<td>Boredom</td>
<td>-.224***</td>
<td>-.079**</td>
<td>.485***</td>
</tr>
</tbody>
</table>

Note: * p < .05, ** p < .01, *** p < .001

I also decided to correlate the emotions with different kinds of goal orientations. The positive emotions were all positively correlated with both mastery approach goals and performance approach goals and negatively correlated with work avoidance goals. On the other hand, the negative emotions were all positively correlated with work avoidance goals.

DISCUSSION

Taken together, the results of this study provided initial evidence that the S-AEQ-F is reliable and valid in the Filipino setting. The results of the confirmatory factor analyses exhibited good fit indices. The two-factor higher order model (Model 1) which posited a distinction between pleasant and unpleasant emotions also showed better fit compared to the one-factor model (Model 2) which just posited an undifferentiated higher-order factor. In addition, construct validity was further supported through the correlations of the eight discrete emotions with each other. The positive academic emotions
of enjoyment, hope, and pride were all positively correlated with each other. On the other hand, the negative emotions of anger, anxiety, hopelessness, boredom, and shame were also all positively correlated with each other. In addition, different kinds of goal orientations also related systematically to the different academic emotions which provide further evidence of external validity. Pekrun et al.’s (2006, 2009) studies have indicated that mastery approach goals are positively related to pleasant emotions. Results of this study have confirmed their findings. Since work avoidance goals measure disengagement from the schooling process, they should be positively correlated with negative or unpleasant academic emotions. Results of the current study also supported this assumption with all the unpleasant emotions showing positive correlations with work avoidance goals. The pleasant emotions had negative correlations with work avoidance goals.

Currently, the AEQ is available in German and English (Molfenter, 1999; Titz, 2001). There are also domain-specific variants of the AEQ. For example, the AEQ-Mathematics is available in English, Chinese, and German versions (Goetz, 2004; Pekrun et al., 2003), while the AEQ-Language has English and German versions (Goetz, Pekrun, Hall, & Haag, 2006). However, to the best of the author’s knowledge, there was no published study that examined psychometric properties of a shortened version of the AEQ. The whole AEQ could be quite cumbersome to administer because of its length. This study showed that a shortened version of the AEQ can still be given to Filipino students without sacrificing the psychometric properties of the questionnaire too much.

The role of academic emotions has been implicated in important learning outcomes such as academic performance, achievement goals, and self-regulated learning (see Pekrun et al., 2002 for a review). For example, Pekrun et al. (2009) showed that various kinds of academic emotions predict academic performance differently. The pleasant emotions of pride and hope positively predicted academic performance, while the unpleasant emotions of anger, anxiety, hopelessness, and shame negatively predicted academic performance. Another study conducted by Pekrun et al. (2006) has also shown how achievement goals relate to academic emotions. They revealed that mastery goals were positive predictors of enjoyment, hope, and pride and were negative predictors of boredom and anger. Performance approach goals were positive predictors of pride, whereas performance avoidance goals were positive predictors of anxiety, hopelessness, and shame. Titz (2001) showed that pleasant emotions like enjoyment and hope positively predicted cognitive strategies like elaboration and rehearsal. They also
positively predicted the level of self-regulated learning. On the other hand, unpleasant emotions like anger, anxiety, and boredom negatively predicted self-regulated learning and cognitive strategies. These unpleasant emotions functioned as negative predictors of interest in studying and effort in school, while being positive predictors of irrelevant thinking and external regulation.

The bulk of these studies, however, have been conducted in the West. There have been a few studies in the Philippines that also investigated how academic emotions relate to important educational outcomes. Villavicencio (in press) found that academic emotions mediated the effects of critical thinking on academic achievement. More specifically, she showed that the negative emotions of anxiety and hopelessness completely mediated the relationship between critical thinking and achievement. This suggests that when students engage in critical thinking, their cognitive resources are completely engaged by the task at hand, making them less anxious and less hopeless, which, in turn, increases their achievement. Another study conducted by Ouano (in press) has shown that the extrinsic and intrinsic motivation also has important effects on the structure of academic emotions with intrinsic motivation functioning as a positive predictor of positive emotions (enjoyment, hope, and pride) and extrinsic motivation as positive predictors of negative emotions. These studies showed that academic emotions are important constructs to consider in student learning. However, their studies did not specifically look at the validity and reliability of the AEQ, which both studies used for their research. This study contributed to the literature by indicating that a short version of the AEQ is found to be psychometrically sound in the Philippine setting.

**LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH**

A limitation of this study was that only students in Metro Manila area were sampled. The extent to which this sample differed from the general Filipino high school population limits the generalizability of the results. Future research should explore the reliability and validity of S-AEQ-F in a more heterogeneous group of Filipino students. In addition, it might be useful to translate the S-AEQ-F into the Filipino language especially when it will be given to students from more remote areas. Although most of the researchers who administered educational psychological tests to Filipino students retained the English version (e.g., Bernardo, 2008; Dela Rosa, 2010; Ganotice, 2010; Watkins, Mcinerney, & Boholst, 2003), this might not be appropriate for students in faraway provinces where the level of English fluency is not that
high. Improvements might also be made on the instrument considering that
the NNFI or TLI of the current measure is slightly below the acceptable
level.

The context of development of S-AEQ-F was learning in general. Future
studies could focus on developing questionnaires that focus on taking
examinations and studying in class. In addition, studies could also be
conducted to determine how academic emotions relate to other educational
outcomes aside from goals. Future studies in the Philippines, for example,
could investigate how academic emotions are related to cognitive strategies,
self-regulated learning, and academic achievement.

CONCLUSION

To summarize, results of this study indicate that the psychometric
characteristics of the S-AEQ-F justify the use of this questionnaire in future
research in the Philippine setting. This instrument provides a suitable
alternative to the full version of the AEQ which may not be very convenient
to administer in applied settings because of its length. The S-AEQ-F is only
16-item long as opposed to the original 75-item scale for the learning-related
AEQ. The reduction in the number of items makes it an attractive alternative
when researchers or practitioners are interested in measuring the different
emotions that Filipino students feel in the school setting. They can also use
it in conjunction with other psycho-educational instruments. The
measurement of what students feel in the classroom may provide valuable
information for teachers and school administrators, because these emotions
have been shown to have an important impact on classroom-learning
outcomes.

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APPENDIX

Enjoyment
1. I enjoy acquiring new knowledge.
2. I look forward to studying.

Hope
1. I have an optimistic view toward studying.
2. I feel optimistic that I will make good progress in studying.

Pride
1. I think I can be proud of my accomplishments at studying.
2. When I solve a difficult problem at my studying, my heart beats with pride.

Anger
1. I get angry when I have to study.
2. Studying makes me irritated.

Anxiety
1. I get tense and nervous while studying.
2. When I can’t keep up with my studies it makes me feel fearful.

Shame
1. I feel ashamed because I am not as good as others in studying.*
2. I don’t want anybody to know when I haven’t been able to understand something.

Hopelessness
1. I feel so helpless that I can’t give my studies my full efforts.
2. I feel hopeless when I think about studying.

Boredom
1. Because I’m bored I have no desire to learn.
2. Studying is dull and monotonous.

Note: The original item in the AEQ (Pekrun et al., 2002) was “I feel ashamed because I am not as adept as others in studying.” I modified this in order to lessen possible comprehension problems among Filipino bilinguals.