

Without reliability, valid score interpretation is meaningless (Thronkike & Thronkike-Christ, 2010). Based on a similar study conducted earlier (Nelson Laird, Korkmaz, & Chen, 2008), this study focuses on assessing the equivalence reliability of the updated FSSE. In particular, the emphasis is on whether two parallel forms or different versions of survey items produce similar results (have equal means, variances, and errors, etc.). Survey researchers often wonder about the meaning of vague quantifiers such as “sometimes” or “often” as employed by surveys. These analyses examined a set of FSSE questions asked in two different ways, first with vague quantifiers and second with a quantifiable time allocation. If the two versions of items were essentially asking for the same information, we would expect much of the following to be true: each response option will have a distinct meaning (*Often* means something different than *Sometimes*, etc.), the intervals between response options would progressively increase in frequency from *Never* to *Very often*, and the intervals would be approximately equal (*Very often* means nine times per week, *Often* means six times per week, and *Sometimes* means three times per week).

### Data

The data from this study come from the 2014 administration of the Faculty Survey of Student Engagement (FSSE) from 143 bachelor’s-granting colleges and universities. Approximately, 18,900 faculty responded, 41% of the faculty that were contacted to respond. The sample for this study consists of the 2,101 faculty from 18 institutions who responded to the additional set of item-testing questions appended to the end of the 2014 FSSE.

Four items from the core FSSE survey and eight items from the item-testing experimental set are included in this study. These questions were items that focused on student-faculty interaction. The faculty members were reminded of their original response to the item (using vague quantifiers) and then asked to quantify their response by indicating how many times they did the activity per day, week, month, academic term, or year. Two different versions of scales were created, the first with the vague quantifier survey items and the second with the quantifiable survey items (Table 1).

Table 1. Items with Vague Quantifiers and Absolute Values

Original question:	
<b>During the current school year, about how often have you done each of the following with the undergraduates students you teach or advise?</b>	
<i>Very often, Often, Sometimes, Never</i>	
a. Talked about their career plans	
b. Worked on activities other than coursework (committees, student groups, etc.)	
c. Discussed course topics, ideas, or concepts outside of class	
d. Discussed their academic performance	
Follow-up question:	
<b>Please specify the number of times you typically did this activity and in what timeframe (unit). Enter a number: (1, 2, 3, etc.)</b>	
Time(s) per unit: <input type="text"/>	<input type="radio"/> Day <input type="radio"/> Week <input type="radio"/> Month <input type="radio"/> Academic tem <input type="radio"/> Academic year

## Methods

First, to examine whether the meaning of vague quantifiers differs by item, median values were computed to identify the meaning of the vague quantifiers for each item (what does *Sometimes* mean for a particular item? Once per week or twice per week? Etc.).

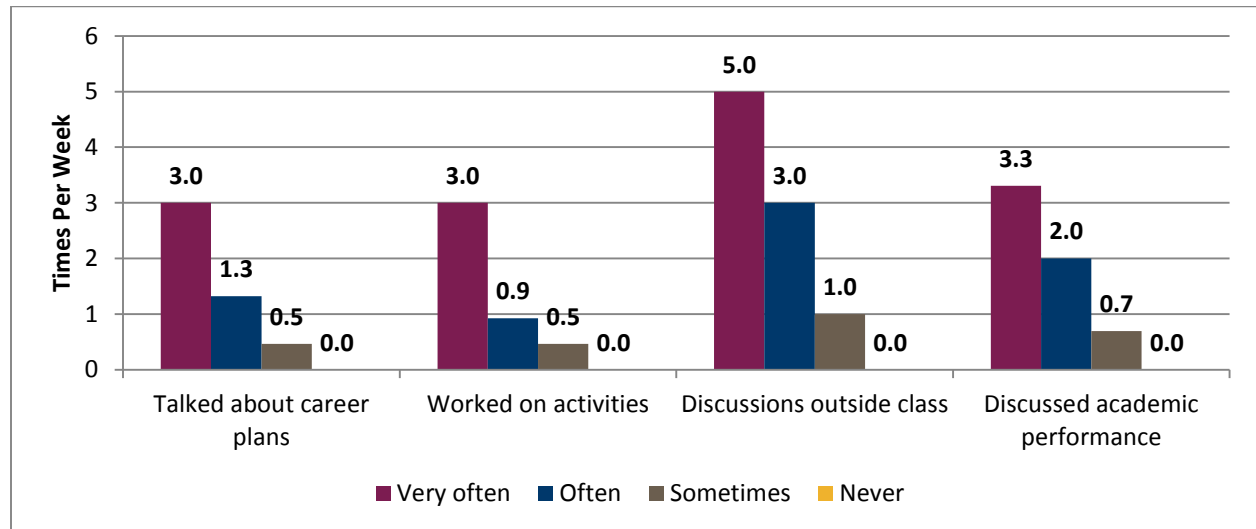
Second, to test the linearity, logarithm and quadraticity assumptions of the response options (i.e., Is the relationship between the vague quantifiers and respondent interpretations of these categories linear, logarithmic or quadratic?), we examined the distribution of specific quantities by each vague quantifier and survey item by regressing the median of quantity on the original coding of the item (*Never* = 1, *Sometimes*=2, *Often*=3, and *Very often* = 4) and estimated linear, logarithmic and quadratic solutions using adjusted R-squared as the indicator of which model fit best.

Finally, we examined whether the meaning of response options varied by faculty and institutional characteristics using multiple regression analysis in order to estimate faculty and institutional effects on each regular and absolute scale for student-faculty interaction. At the faculty level, we controlled for racial/ethnic identification, rank, employment status, gender identity, citizenship, adjunct status, tenure status, discipline, earned doctorate, age and years of teaching experience. At the institution level, we controlled for Carnegie classification and control.

## Results

First, the results in Figure 1 below show that on average faculty assigned distinct and increasing absolute value quantities to *Never*, *Sometimes*, *Often*, and *Very often*. Additionally, for all four items the average score for *Never* was indeed zero. Interestingly, the meaning of vague quantifiers does seem to differ by item. Faculty seem to adapt the meaning of *Sometimes*, *Often*, and *Very often* based on the appropriate reference for the question.

Figure 1. Meaning of Vague Quantifiers by Item



Second, median frequencies associated with the vague quantifiers were very close to linearly related (see Table 2). For most items the intervals between response options are roughly even. The FSSE items used in this study are often used in analyses that assume these ordinal measures are, in fact, close enough to interval to proceed. Our findings show that a linear function fit the median values quite well, though, it is worth noting, other forms also fit the median values at times too (Figure 2).

Table 2. R-square for linearity, logarithm and quadraticity assumptions for responses.

Items	Assumptions	Adj. R-square	Sig.
Talked about career plans with the undergraduate students you teach or advise	Linear	.89	*
	Logarithmic	.70	
	Quadratic	1.00	*
Worked on activities other than coursework with the undergraduate students you teach or advise	Linear	.78	*
	Logarithmic	.56	
	Quadratic	.93	
Discussed course topics, ideas, or concepts outside of class with the undergraduate students you teach or advise	Linear	.97	**
	Logarithmic	.83	
	Quadratic	.99	
Discussed their academic performance with the undergraduate students you teach or advise	Linear	.97	**
	Logarithmic	.84	
	Quadratic	.99	

Figure 2. Relationships between Vague Quantifiers and Absolute Values

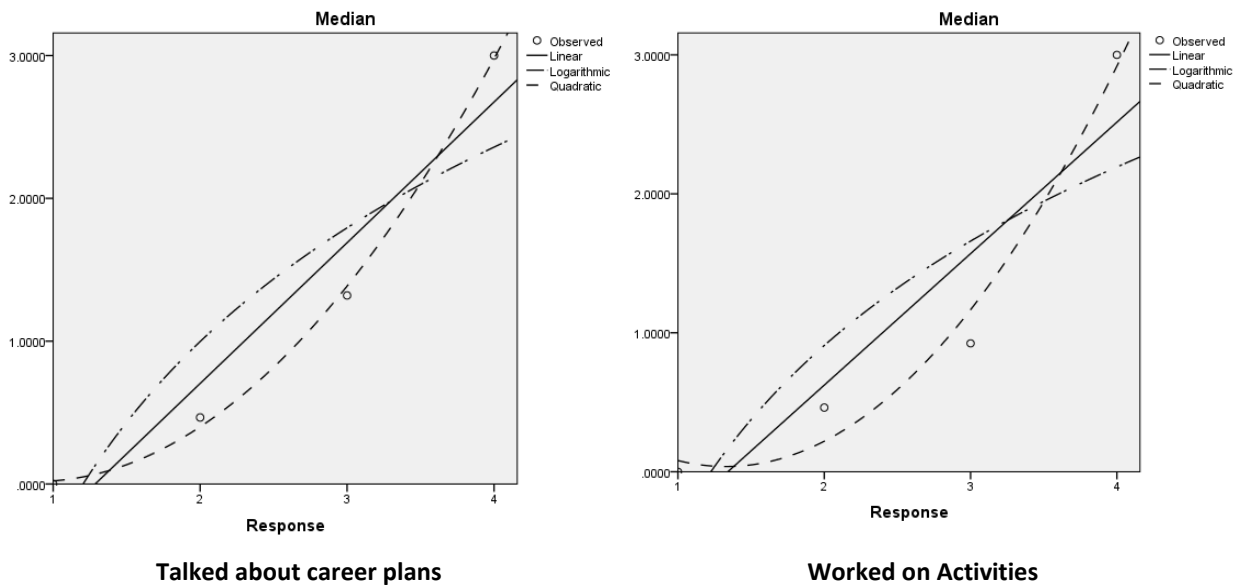
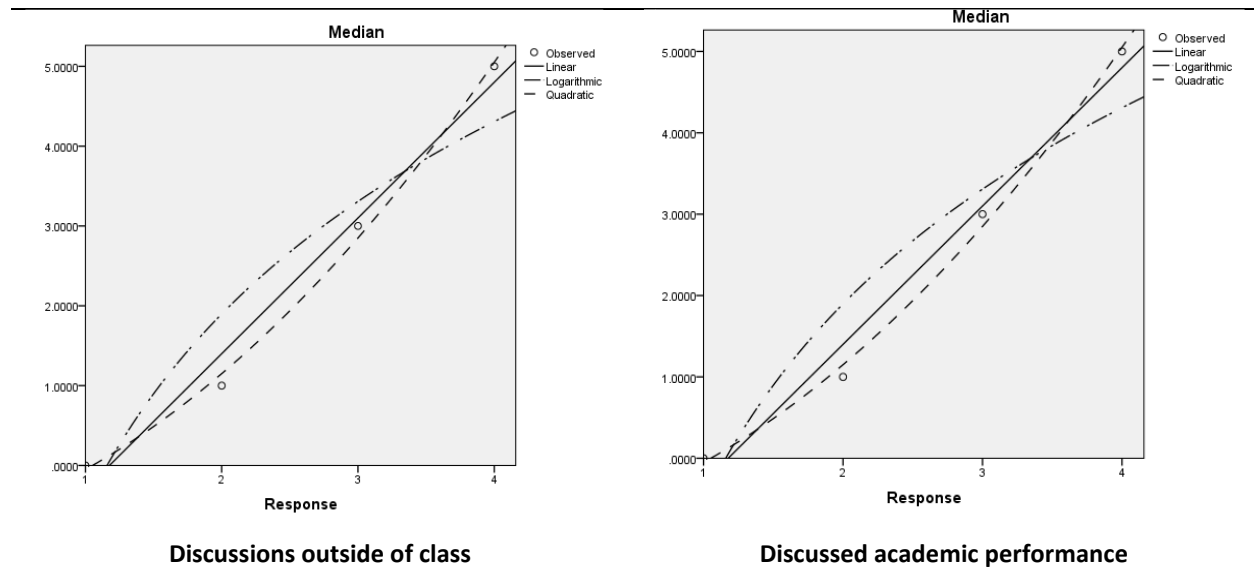


Figure 2. Relationships between Vague Quantifiers and Absolute Values (continued)



Finally, the meaning of the vague quantifiers does seem to differ by some faculty and institutional characteristics, but the differences in those effects on the vague measure and absolute measure are trivial (Table 3). In other words, there are differences by faculty and institutional characteristics (such as race, discipline, and Carnegie classification) in the amount of student-faculty interaction that faculty are reporting, but we see similar differences when using both the vague and the absolute value versions for measuring student-faculty interaction. This study suggests that vague quantifiers, while they might not be precise, might be good proxy measures for more exact absolute value measures.

### References

- Nelson Laird, T. F., Korkmaz, A., & Chen, P. D. (April 15, 2008). How often is “often” revisited: The meaning and linearity of vague quantifiers used on the National Survey of Student Engagement. Paper presented at the Annual Meeting of the American Educational Research Association. San Diego, CA.
- Thorndike, R. M., & Thorndike-Christ, T. (2010). Measurement and evaluation in psychology and education (8<sup>th</sup> Ed). New York: Pearson.

Table 3. Regression coefficients for student-faculty scale

		Student-Faculty Interaction (regular)		Student-Faculty Interaction (absolute)	
		Coef(SE)	Sig.	Coef(SE)	Sig.
	Intercept	-.24(.34)		-.05(.37)	
Racial/Ethnic identification (White as reference)	Asian, Native Hawaiian or Other Pacific Islander	.25(.13)		.05(.14)	
	Black or African American	.79(.12)	**	.54(.13)	**
	Hispanic or Latino	.15(.18)		-.11(.20)	
	American Indian or Alaska Native, Other or Multiracial	.21(.13)		-.03(.15)	
	I prefer not to respond	.49(.13)	**	.14(.14)	
Rank	Associate professor	-.07(.09)		-.00(.10)	
	Assistant professor	.04(.11)		.02(.12)	
	Full-time lecturer	-.28(.13)		.07(.00)	
	Part-time lecturer	-.37(.17)		.06(.19)	
	Full-time	.34(.19)		.33(.20)	
Gender identity (Man as reference)	Woman	.19(.06)	**	-.01(.07)	
	I prefer not to respond	-.02(.22)		.08(.23)	
	U.S. citizen	.19(.21)		.01(.22)	
	Adjunct	-.03(.14)		.10(.15)	
	Tenured	.11(.10)		.09(.11)	
Discipline	Biological Sciences, Agriculture & Natural Resources	-.04(.12)		-.04(.13)	
	Physical Sciences, Agriculture & Natural Resources	-.35(.10)	**	-.12(.11)	
	Social Sciences	.03(.10)		.02(.11)	
	Business	-.03(.12)		.28(.13)	*
	Communications, Media & Public Relations	.29(.18)		.06(.19)	
	Education	.15(.12)		-.04(.13)	
	Engineering	-.06(.32)		-.02(.35)	
	Health Professions	.21(.11)		.38(.12)	**
	Social Service Professions	.13(.22)		.07(.23)	
	Other	-.08(.12)		-.13(.13)	
	Earned doctorate	-.05(.08)		-.06(.08)	
	Age	-.01(.00)		-.01(.00)	**
	Years of teaching	.00(.00)		.01(.00)	
Carnegie classification	Doctoral universities	.00(.26)		.08(.28)	
	Baccalaureate Colleges	.15(.10)		.25(.10)	*
	Other	.06(.10)		.32(.10)	**
	Private control	.20(.09)	*	.03(.10)	
	R square	.16		.07	

\* p<.05, \*\* p<.01, \*\*\* p<.001