Supplemental Material

CBE—Life Sciences Education

Weatherton *et al*.

Supplemental Materials

Is support in the anxiety of the beholder?
How anxiety interacts with perceptions of instructor support in introductory biology classes

Research article

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Table S1: Codebook with descriptions and quotes exemplifying each code for the three main themes of the study: relational, instrumental, and pedagogical.

Code Name / Description	Positive and negative examples of code
Relational (A theme) - support or non-support in a relational way with instructor - how they interact with individual students or the class to convey support or not, instructor's perceived nature.	
A1 - how they feel about interacting (personally) with the instructor	A1+ "it is easy to talk with them" A1- "made me feel dumb when I asked them a question"
A2 – Perceived that the instructor cares about their success / their learning (or doesn't)	A2+ "they make it apparent that they want us to learn" A2- "they do not seem to care about our grades"
A3 - class climate - how instructor feels about the class/makes the class feel	A3+ "creates a very relaxed environment where I feel welcome" A3- "discouraged us, said they were disappointed in test averages"
A4 - Perception about instructor's nature as a person or professor (who they are, how they act)- understanding, caring [person], approachable, attentive, friendly, blunt, sarcastic, Dismissive	A4+ "very kind and understanding" A4- "gets frustrated with the class very easily"
Instrumental (B theme) - Student mentions something instructors DID or PROVIDED that supported them.	
B1 - Office hours (has them, offers them, encourages student attendance)	B1+ "plenty of office hours" B1- "explained that they have office hours but will not take new students after November"
B2 - Encourages and answers questions (INSIDE OR OUTSIDE of class)	B2+ "open to answering questions" B2- "it feels like if I ask [too many questions] it is a burden"
B3 - Responds to emails or doesn't respond (+/-) this is about email response generally	B3+ "fast responses to emails" B3- " I was sick and emailed my teacher about missing assignments and they did not answer"
B4 - Offers materials / resources to help students succeed - study guide, review session (not SI), discussion board, practice questions, extra classes, posting	B4+ "sends us emails about what to study" B4- "doesn't really give us info about why answers are correct
B5 - Flexible due dates or working with students when they have missed a class	B5+ "they took my first worksheet late with no penalty" B5- n/a (nothing negative found)
B6 - Gave them feedback on assignments	B6+ "went over a quiz after class which helped realize the correct answers" B6- "feedback is almost nonexistent"
B7 - Encourages attendance at SI sessions	B7+ "encouraged SI" B7- n/a (nothing negative found)

	B8 - Gave them extra chances / opportunities to improve their grade - bonus points, extra assignments, extra credit, to boost grade, re-dos on quizzes or other	B8+ "has allowed re-takes when things go wrong / the class does not understand things" B8- "hasn't given us any extra credit or bonus things to help our grades"
	B9 - Professor gives (or doesn't give) students updates on due dates and how they are doing in the class; E-mails them with updates and reminders; reminders	B9+ "always keeping us up to date when something changes" B9- n/a (nothing negative found)
	B10 - General catch-all for vague sentiments of helpfulness (generic statement without saying what they did to help or type of help)	B10+ "they offer lots of help" B10- "has not tried to adjust to students needs after they reached out"
Pedagogical (C theme)- Students mention something that happened <u>IN CLASS</u> that made them feel supported / unsupported.		
	C1 - Professor clearly explains things, good examples, makes sure they understand	C1+ "uses good examples" C1- "does not teach well at all"
	C2 - Professor recognizes when they are struggling (good at reading the room)	C2+ "my instructor has recognized areas where the class struggles" C2- "there are a lot of people struggling in the class and they don't seem to care very much"
	C3 - Pace of lecture (how class is)– adjusted for student learning, or too fast/slow,	C3+ "spends a lot of time on slides to allow notes to be taken" C3- "goes over things kind of fast"
	C4 - Organization of professor or class (CUE word: 'organized'/'organization')	C4+ "the overall course is quite easy to follow because of the structure of lecture and canvas" C4- "seems to be disorganized sometimes"
	C5 - Anything to do with the nature of exams EX: difficulty of the exams, format of the exams	C5+ "the exam was good" C5- "formatting for testing in the class is extremely difficult"
	C6 - Other things about class or specifics about how the professor teaches. E.g. worksheets, active learning	C6+ "no pressure on clicker questions" "interactive during class" C6- "most people in the class don't like their teaching style

Table S2: Mean anxiety +/- standard deviation (Likert scale 1-7) for each class and overall at weeks four and 14

Class 1 (N =94)		Class 2 (N =110)		Class 3 (N = 76)		Average	
Week four	Week 14	Week four	Week 14	Week four	Week 14	Week four	Week 14
3.30 ± 1.50	3.7 ± 1.68	2.75 ± 1.28	2.46 ± 1.16	4.99 ± 1.38	5.40 ± 1.44	3.54 ± 1.66	3.68 ± 1.85

Table S3: Mean support +/- standard deviation (scaled 1-10) for each instructor and overall at weeks four and 14

Class 1 (N = 94)		Class 2 (N = 110)		Class 3 (N = 76)		Average	
Week four	Week 14	Week four	Week 14	Week four	Week 14	Week four	Week 14
6.69 ± 2.08	5.63 ± 2.45	9.09 ± 1.19	9.04 ± 1.26	6.41 ± 1.84	5.16 ± 2.37	7.56 ± 2.11	6.83 ± 2.71

Table S4: Comparison of relative prevalence of student comments about instructor support perceptions in each class at week 4 by higher- and lower-anxiety students (based on above and below class median anxiety levels at week 4). Relative prevalence is the number of codes mentioned by students in the lower- or higher-anxiety group, divided by the total number of those students in a class (numbers shown at the top of each column).

	Class 1		Class 2		Class 3	
	WEEK 4 – LOW-ANXIETY STUDENTS (N=48)	WEEK 4 – HIGH-ANXIETY STUDENTS (N=46)	WEEK 4 – LOW-ANXIETY STUDENTS (N=55)	WEEK 4 – HIGH-ANXIETY STUDENTS (N=55)	WEEK 4 – LOW-ANXIETY STUDENTS (N=39)	WEEK 4 – HIGH-ANXIETY STUDENTS (N=37)
+Interactions with students	2.1	2.2	3.6	1.8	5.1	0.0
+Cares for student success	4.2	0.0	9.1	5.5	12.8	8.1
+Class climate	8.3	2.2	7.3	5.5	5.1	5.4
+Instructor personality	25.0	15.2	50.9	50.9	15.4	13.5
+Office hours	18.8	15.2	18.2	14.5	7.7	2.7
+Answering questions	18.8	13.0	21.8	27.3	7.7	2.7
+Responding to emails	2.1	2.2	5.5	7.3	2.6	0.0
+Offering materials	20.8	6.5	10.9	7.3	20.5	18.9
+Flexible due dates	0.0	2.2	9.1	7.3	0.0	0.0
+Feedback on assignments	0.0	4.4	5.5	3.6	2.6	0.0
+Encouraging SI attendance	0.0	0.0	3.6	0.0	0.0	0.0
+Bonus points	0.0	2.2	3.6	1.8	33.3	32.4
+Due date reminders	6.3	2.2	7.3	5.5	5.1	0.0
+Generic help	6.3	4.3	14.5	14.5	0.0	2.7
+Clarity of explanations	18.8	13.0	18.2	9.1	15.4	5.4
+Recognize student struggle	0.0	0.0	0.0	0.0	2.6	5.4
+Pace of lecture	0.0	0.0	5.5	5.5	2.6	0.0
+Organization of class	2.1	0.0	0.0	0.0	0.0	0.0

+Nature of exams	2.1	0.0	0.0	1.8	0.0	0.0
+Other practices	10.4	6.5	10.9	5.5	7.7	2.7
-Interactions with students	0.0	0.0	0.0	0.0	0.0	2.7
-Cares for student success	2.1	0.0	0.0	0.0	7.7	10.8
-Class climate	2.1	4.3	0.0	0.0	5.1	10.8
-Instructor personality	2.1	2.2	0.0	0.0	5.1	10.8
-Office hours	0.0	2.2	0.0	0.0	0.0	0.0
-Answering questions	2.1	2.2	0.0	0.0	0.0	8.1
-Responding to emails	0.0	0.0	0.0	0.0	0.0	2.7
-Offering materials	6.3	8.7	0.0	0.0	2.6	8.1
-Flexible due dates	0.0	0.0	0.0	0.0	0.0	0.0
-Feedback on assignments	0.0	0.0	0.0	0.0	0.0	0.0
-Encouraging SI attendance	0.0	0.0	0.0	0.0	0.0	0.0
-Bonus points	0.0	4.3	0.0	0.0	0.0	0.0
-Due date reminders	0.0	0.0	0.0	0.0	0.0	0.0
-Generic help	0.0	0.0	0.0	0.0	0.0	0.0
-Clarity of explanations	0.0	4.3	0.0	0.0	7.7	24.3
-Recognize student struggle	0.0	0.0	0.0	0.0	0.0	0.0
-Pace of lecture	4.2	8.7	0.0	0.0	2.6	5.4
-Organization of class	0.0	0.0	0.0	0.0	0.0	0.0
-Nature of exams	6.3	0.0	0.0	0.0	0.0	0.0
-Other practices	0.0	0.0	0.0	0.0	0.0	8.1

Table S5: Comparison of relative prevalence of student comments about instructor support perceptions in each class at week 14 by higher- and lower-anxiety students (based on above and below class median anxiety levels at week 14). Relative prevalence is the number of codes mentioned by students in the lower- or higher-anxiety group, divided by the total number of those students in a class (numbers shown at the top of each column).

	Class 1		Class 2		Class 3	
	WEEK 14 – LOW-ANXIETY STUDENTS (N=42)	WEEK 14 – HIGH-ANXIETY STUDENTS (N=52)	WEEK 14 – LOW-ANXIETY STUDENTS (N=65)	WEEK 14 – HIGH-ANXIETY STUDENTS (N=45)	WEEK 14 – LOW-ANXIETY STUDENTS (N=29)	WEEK 14 – HIGH-ANXIETY STUDENTS (N=47)
+Interactions with students	0.0	1.9	1.5	4.4	0.0	0.0
+Cares for student success	2.4	0.0	6.2	8.9	3.4	6.4
+Class climate	4.8	0.0	15.4	6.7	3.4	4.3
+Instructor personality	7.1	3.8	40.0	40.0	0.0	0.0
+Office hours	19.0	15.4	16.9	11.1	13.8	8.5
+Answering questions	33.3	5.8	12.3	22.2	13.8	0.0
+Responding to emails	5.8	9.5	4.6	11.1	13.8	2.1
+Offering materials	16.7	7.7	10.8	4.4	10.3	0.0
+Flexible due dates	0.0	3.8	9.2	8.9	0.0	2.1
+Feedback on assignments	0.0	0.0	3.1	0.0	0.0	0.0
+Encouraging SI attendance	0.0	0.0	1.5	0.0	0.0	0.0
+Bonus points	0.0	0.0	1.5	0.0	13.8	12.8
+Due date reminders	4.8	3.9	3.1	2.2	0.0	0.0
+Generic help	4.8	5.8	7.7	8.9	10.3	4.3
+Clarity of explanations	7.1	5.8	10.8	11.1	3.4	0.0
+Recognize student struggle	0.0	0.0	0.0	0.0	0.0	0.0
+Pace of lecture	2.4	0.0	6.2	4.4	3.4	0.0

+Organization of class	0.0	0.0	1.5	2.2	0.0	0.0
+Nature of exams	2.4	0.0	1.5	2.2	0.0	0.0
+Other practices	2.4	0.0	9.2	26.7	0.0	0.0
-Interactions with students	0.0	0.0	0.0	0.0	0.0	8.5
-Cares for student success	2.4	7.7	0.0	0.0	3.4	12.8
-Class climate	4.8	7.7	0.0	0.0	13.8	36.2
-Instructor personality	0.0	3.8	0.0	0.0	3.4	10.6
-Office hours	0.0	0.0	0.0	0.0	0.0	2.1
-Answering questions	4.8	5.8	0.0	0.0	3.4	8.5
-Responding to emails	2.4	1.9	0.0	0.0	0.0	2.1
-Offering materials	11.9	28.8	0.0	0.0	0.0	0.0
-Flexible due dates	0.0	0.0	0.0	0.0	0.0	0.0
-Feedback on assignments	0.0	1.9	0.0	0.0	0.0	0.0
-Encouraging SI attendance	0.0	0.0	0.0	0.0	0.0	0.0
-Bonus points	0.0	0.0	0.0	0.0	0.0	0.0
-Due date reminders	0.0	0.0	0.0	0.0	0.0	0.0
-Generic help	2.4	3.8	0.0	0.0	3.4	6.4
-Clarity of explanations	4.8	11.5	0.0	0.0	3.4	12.8
-Recognize student struggle	0.0	1.9	0.0	0.0	0.0	0.0
-Pace of lecture	7.1	7.7	1.5	0.0	0.0	4.3
-Organization of class	0.0	0.0	1.5	0.0	0.0	2.1
-Nature of exams	4.8	5.8	1.5	0.0	0.0	4.3
-Other practices	0.0	1.9	0.0	0.0	6.9	8.5