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Anatomy integration: Effective change or change of affect?

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Introduction

Anatomy is fundamental to clinical practice, and is key to professional identity formation. Many US medical schools are integrating anatomy into an organ-based preclinical curricula [1]. This curricular change could affect one or more of the three domains of learning: cognitive, affective and psychomotor, including learner preparation to work in teams [2].

Our previous study prospectively queried the effects of integrating anatomy into the existing organ-based curriculum at the University of New Mexico School of Medicine. Results showed that students with integrated anatomy initially increased content acquisition, but had similar mastery of anatomical concepts at the end of the first year of the pre-clinical curriculum. Interestingly, attitudinal differences towards anatomy dissection, working in teams, reflective practices and professional identity formation were seen between students in the two curricula.

The current study set out to test the hypothesis that the differences in attitudes would persist as students progressed through the pre-clinical curriculum. It also asked if additional changes in the affective domain could be detected that may impact content mastery and patient care.

Methods

To assess knowledge, confidence, and attitudes of three cohorts of medical students, a mixed methods approach used pre, post and follow-up knowledge and confidence surveys, focus groups, internal and AAMC surveys, and USMLE performance metrics. Demographics for all three cohorts were similar in age, mean MCAT score, percent of Hispanics and women. Study participation was between 43-45%, a presentative sample (20-32% completed all assessments for matched comparisons. IRB approval 14-210.

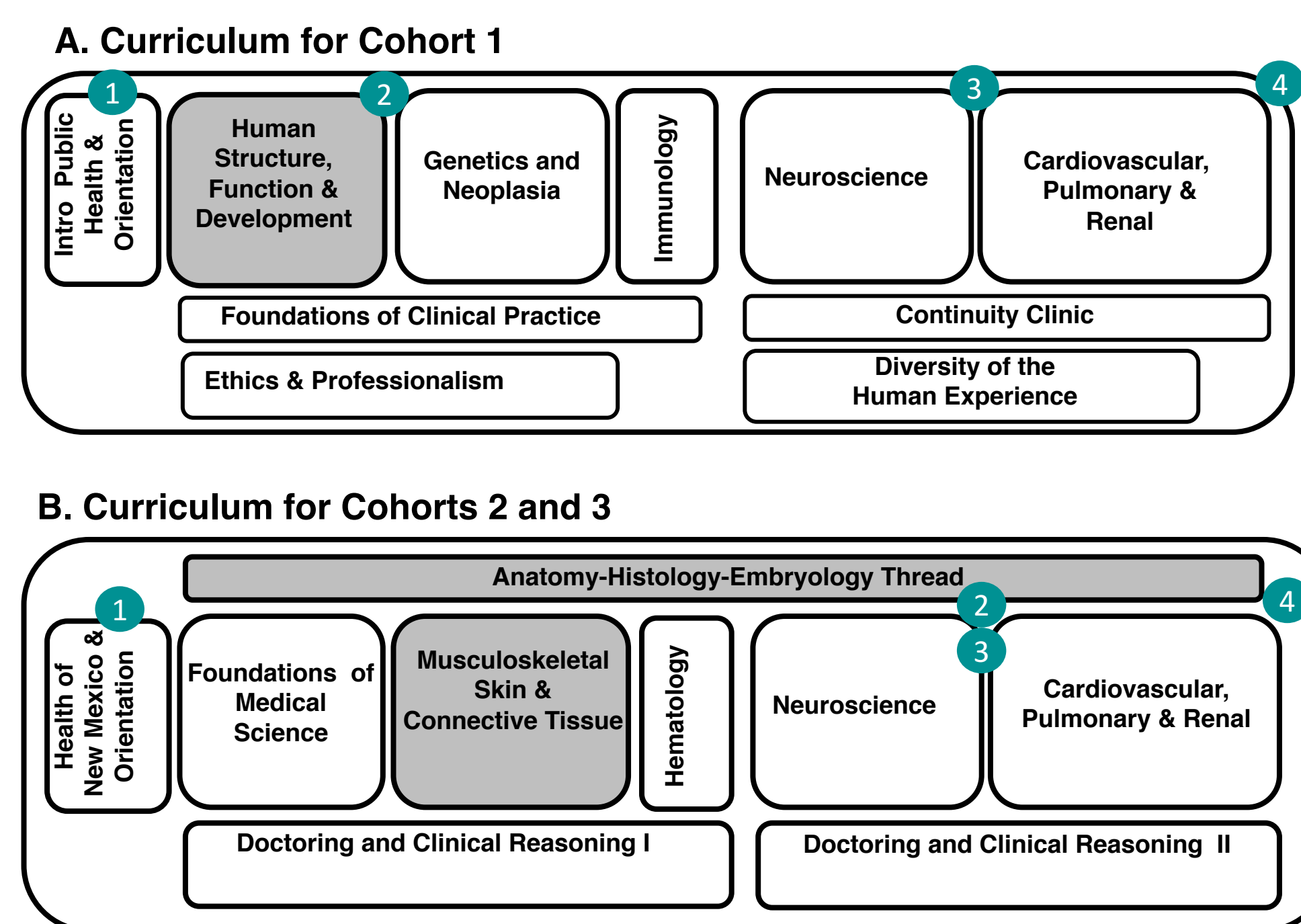


Figure 1: Overview map of the previous first year curriculum (A) and the curriculum with integrated anatomy (B). Data collection time points are represented by numbers as follows: 1 - knowledge and confidence pretest, 2 - knowledge post test, 3 - attitudes survey, 4 - knowledge and confidence follow-up test. (time points for AAMC surveys and USMLE Step 1 performance are not included)

Results

We found an increase in anatomy content mastery and confidence in their mastery for all cohorts, but no change in metacognitive awareness for students in the integrated curriculum. Differences were detected in students' attitudes towards working in teams, reflective practices and professional identity formation between the cohorts [3]. These differences persisted within each cohort as attitudes did not change overtime (data not shown).

There was a decrease in the USMLE Step 1 Gross anatomy sub-score for the first cohort in the integrated curriculum (Cohort 2) compared to previous cohorts, although their perceived preparation for this topic upon completing Step 1 was similar (internal survey). Lastly, data from the AAMC Y2Q showed increased perceived stress in Cohort 2.

Attitudinal Survey Prompts	Percent Agreement			Persistent significant change*
	Cohort 1	Cohort 2	Cohort 3	
Working in teams				
Group/team dissections made me more aware of others' emotional responses	66	54	67	
Anatomy dissection lab helped me to consider needs of the group above my own.	57	38	46	
The AHE thread improved my ability to coordinate with others	71	56	54	✓
The AHE thread increased my respect for my group members	74	46	67	
Reflective practices				
Learning anatomy depends largely on memorization	74	82	71	
Learning anatomy depends on building connections and understanding spatial relationships	91	85	88	
The AHE thread has helped me/ and will continue to help me to be prepared for learning the organ systems.	86	77	50	✓
I anticipate that the AHE thread will help me to be prepared for learning clinical skills	77	69	79	
The AHE thread helped me to be accountable and responsible	80	59	58	✓
The AHE thread prompted me to reflect on my actions and decisions	74	56	54	✓
Professional identity formation				
The AHE thread gave me a taste of my future work as a doctor and how to cope with the workload.	57	44	46	
The AHE thread changed my attitude towards the human body	71	62	88	
Working with the donor influenced my ability to go beyond my comfort zone	77	69	88	
Dissection helped me to confront questions related to mortality	66	54	67	
Exposure to anatomy throughout the medical school curriculum is beneficial to learning the culture of the medical profession/Beginning the medical school curriculum with anatomy is beneficial to learning the culture of the medical profession	74	79	68	
The experience in the AHE thread made me question my career choice and/or my choice of specialty	26	38	25	
The AHE thread taught me to stay concentrated and efficient under mental/physical stress	74	44	42	✓
The AHE thread gave me other insight(s)	46	41	50	
Dissecting a cadaver helps me feel, act, and understand the role of a medical professional**	91	80	80	✓

*Significance was determined by Chi-Square analyses or T-test where appropriate
** This prompt only was given in block evaluations

Figure 2. Knowledge and perceived knowledge (confidence) was similar between cohorts

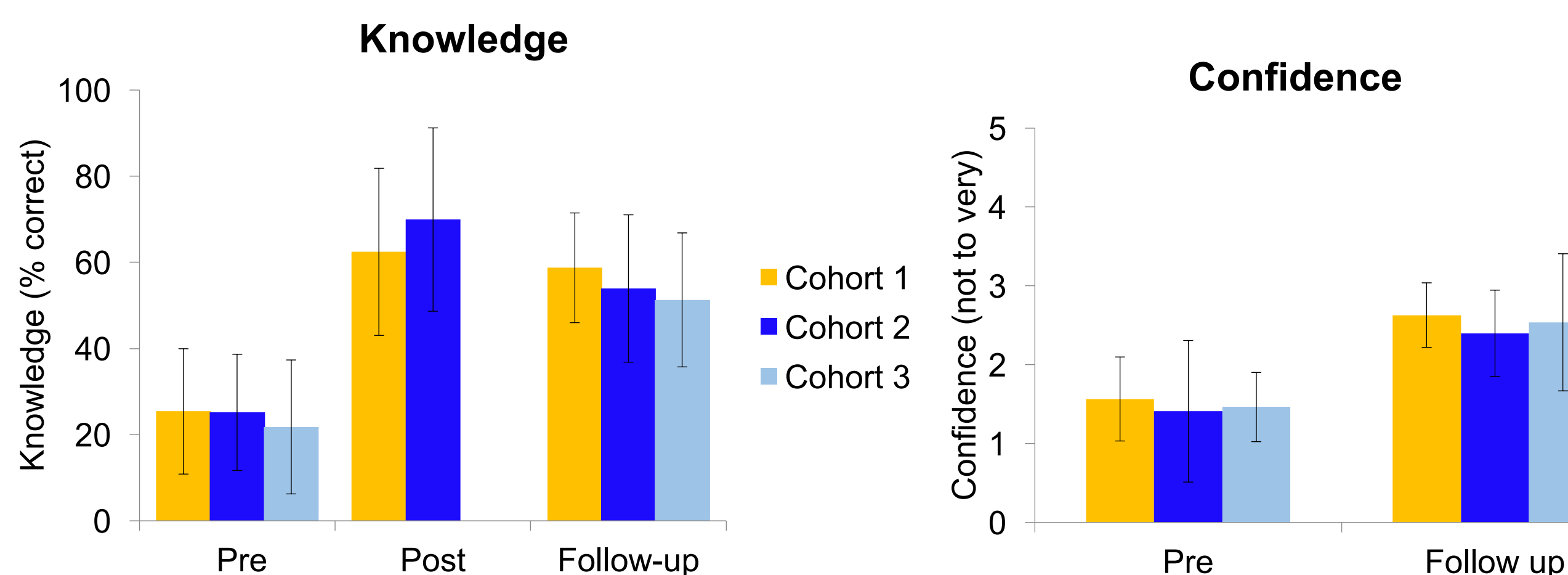


Figure 3. USMLE Step 1 Gross Anatomy Sub-score decreased but not perceived preparation (Cohorts 0 and -1 are the two previous cohorts)

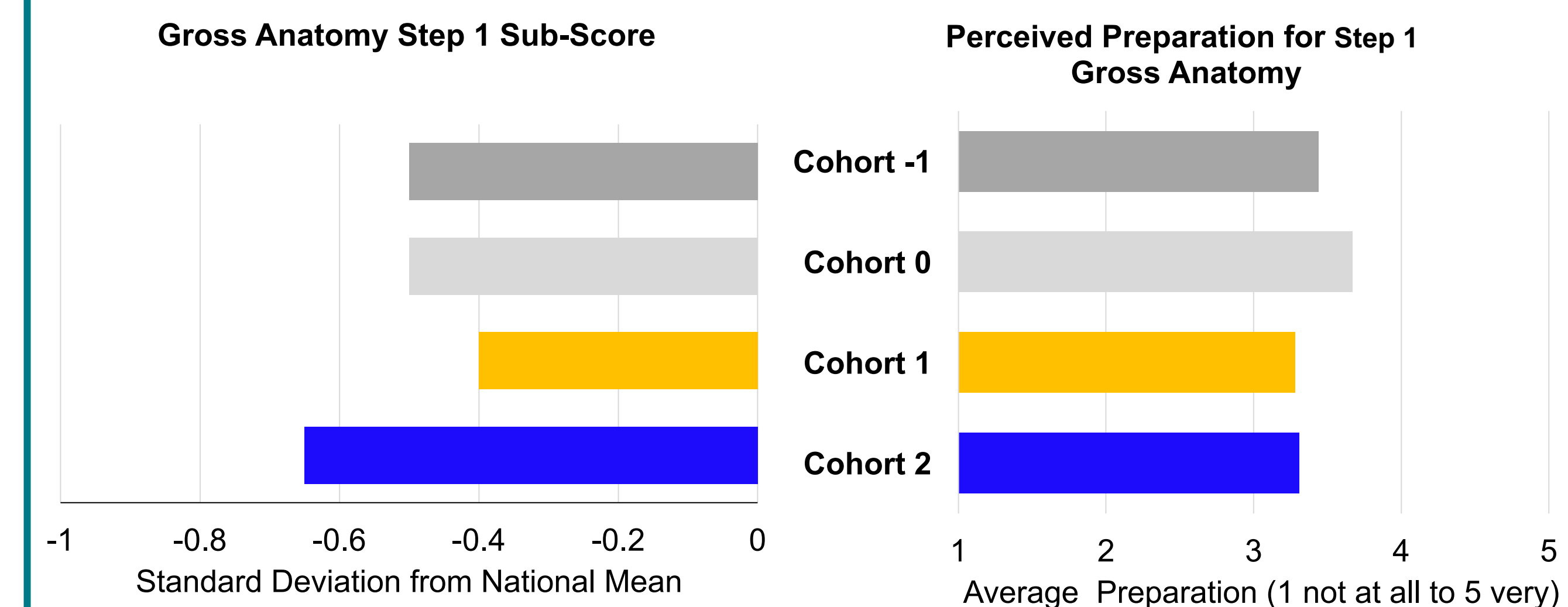
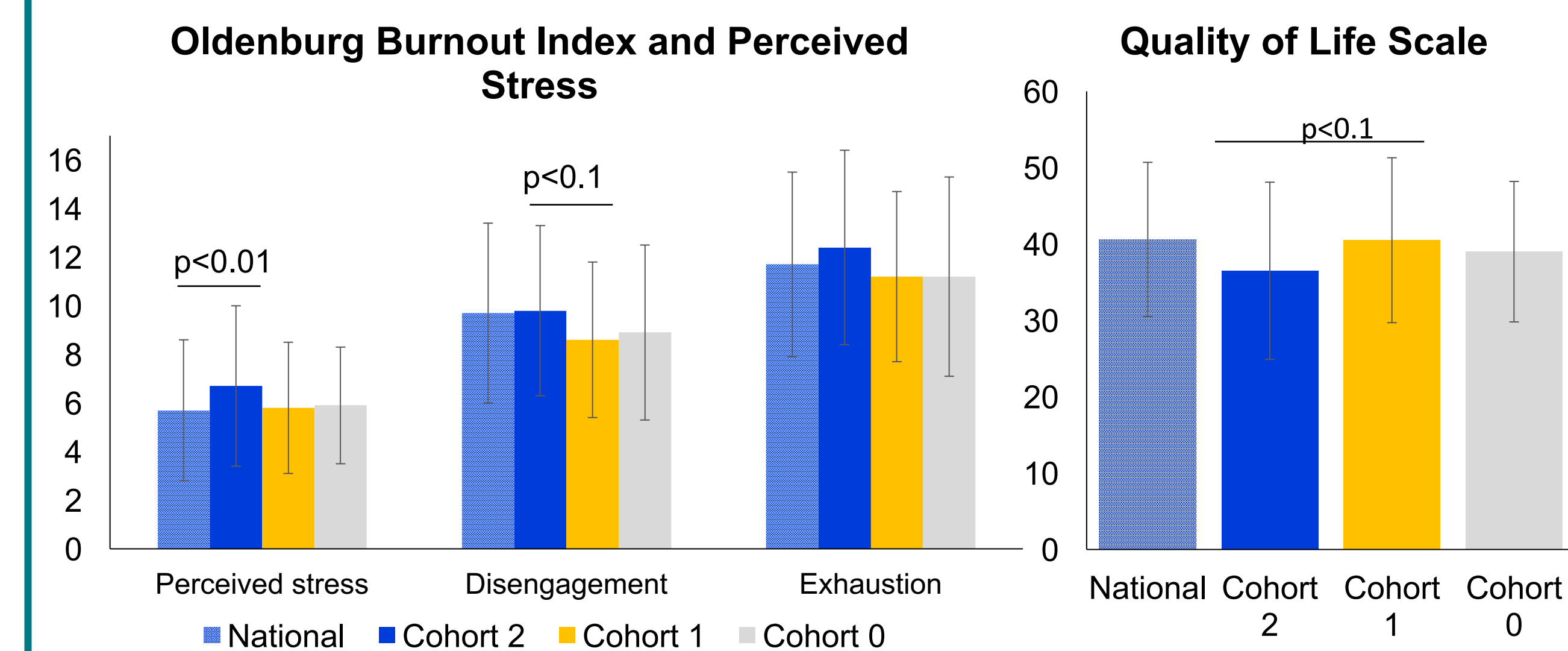


Figure 4. Responses to AAMC Y2Q items point to cohort differences in Quality of life, burnout and perceived stress



Discussion

Anatomy is one of the first medical student experiences with collaborative learning. Our results point to potential effects on the affective domain of learning as a result of curricular adjustments, including attitudes towards working together in teams, reflective practices and professional identity formation.

Limitations include the possibility that other curricular revisions could also have influenced student learning and/or attitudinal differences between cohorts. The small number of concepts included on the knowledge survey may impact the generalizability of the cognitive data; additional questions/concepts could be included in future studies.

Conclusions

The results of this study suggest that attitudinal outcomes should be monitored in assessment of student outcomes and evaluation strategies following curricular change. In light of the importance of non-content skills in patient care, The observed gaps in affect, if persistent, could have a short-term impact on the ability to work in teams and a long-term impact on patient care.

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