

THE EFFECTS OF METACOGNITION AND STANDARDS-BASED GRADING ON STUDENT ACHIEVEMENT AND PERCEPTION IN HIGH SCHOOL CHEMISTRY

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Research Question: Will active instruction of metacognitive strategies, coupled with standards-based grading (SBG) policies, enhance student achievement in chemistry classes and modify student perceptions of these strategies and practices?

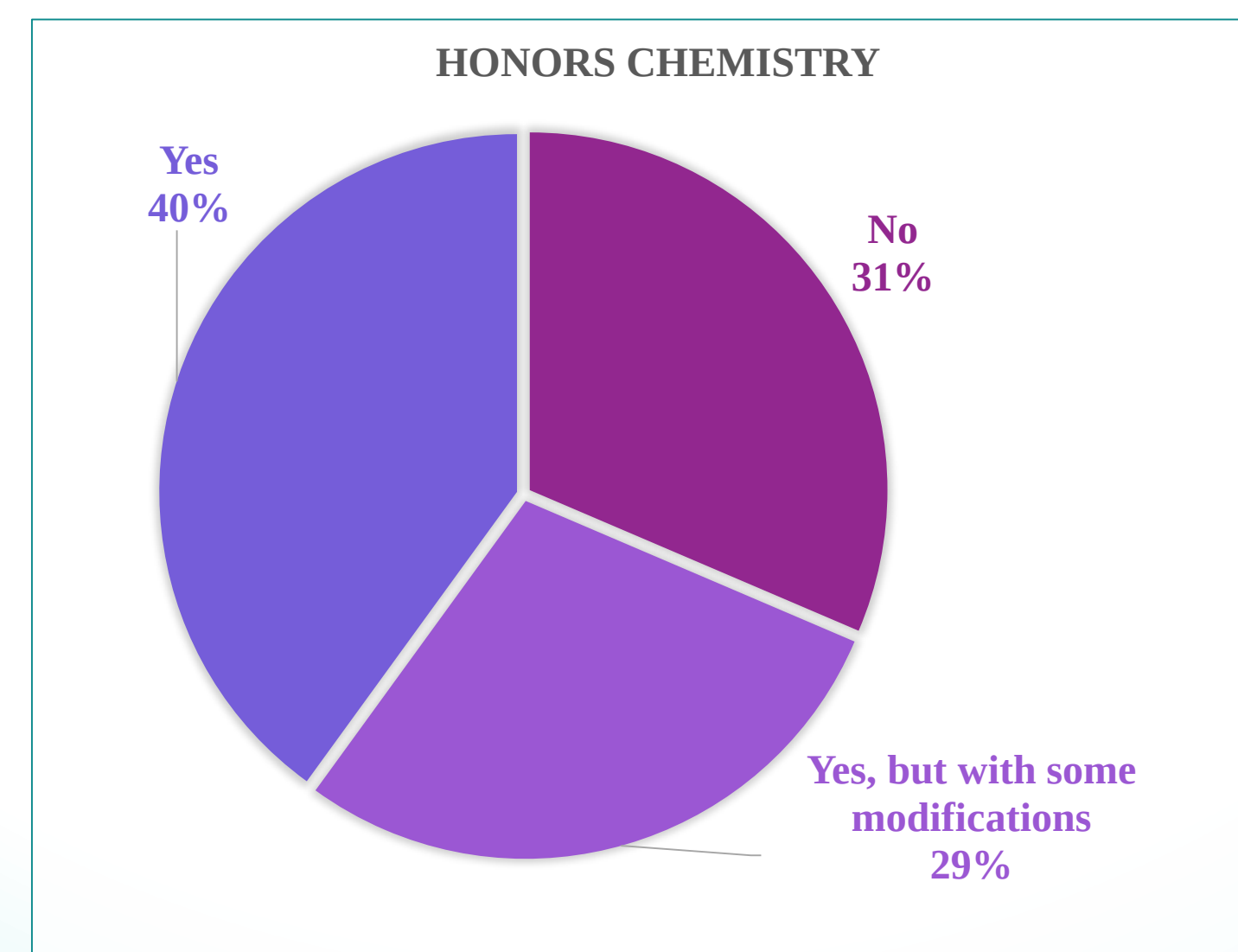
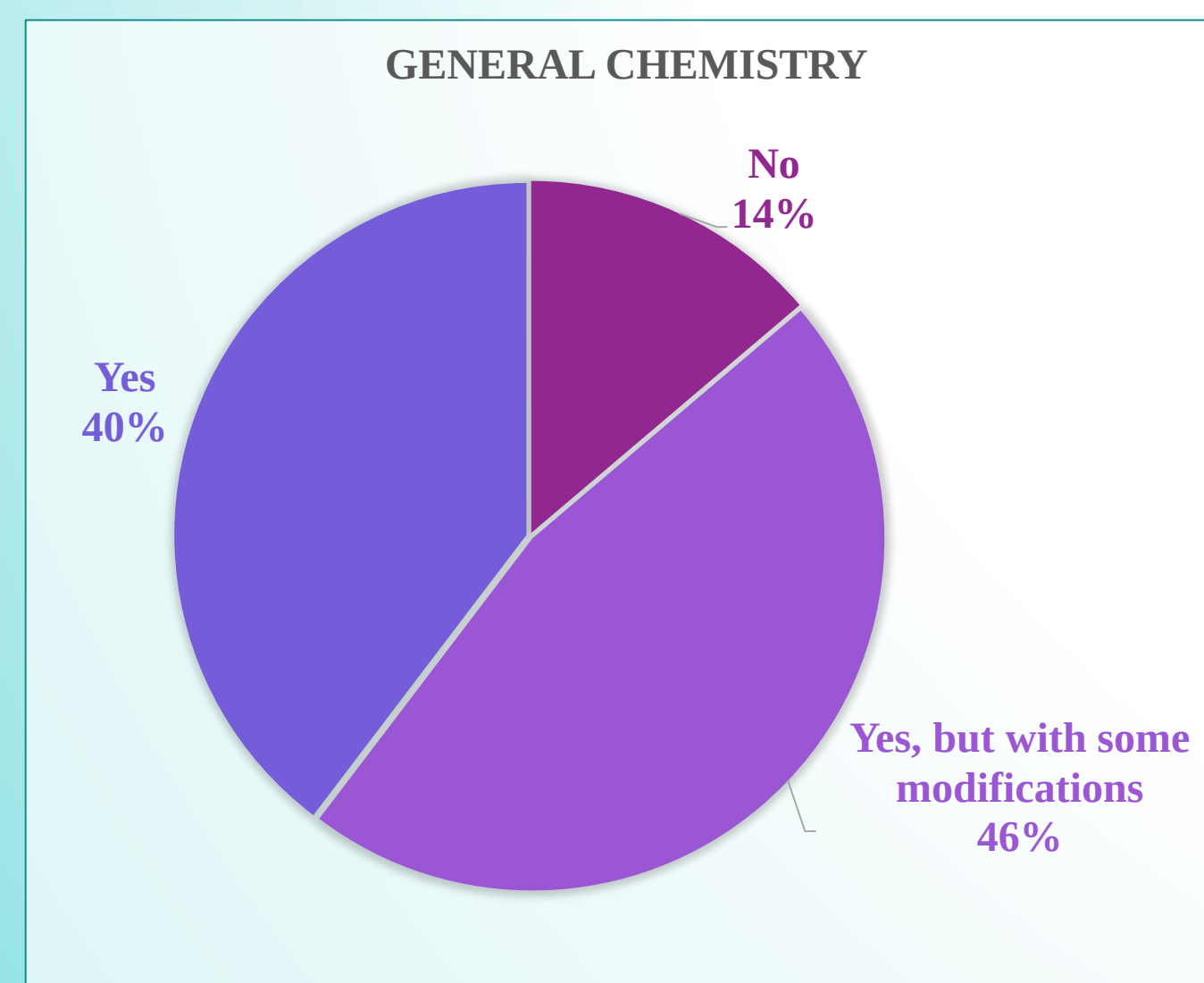
Student Sample

- ~140 high school chemistry students
- 3 general chemistry classes
- 2 honors chemistry classes
- Predominantly Caucasian
- Strong parent involvement
- School population: ~3,100

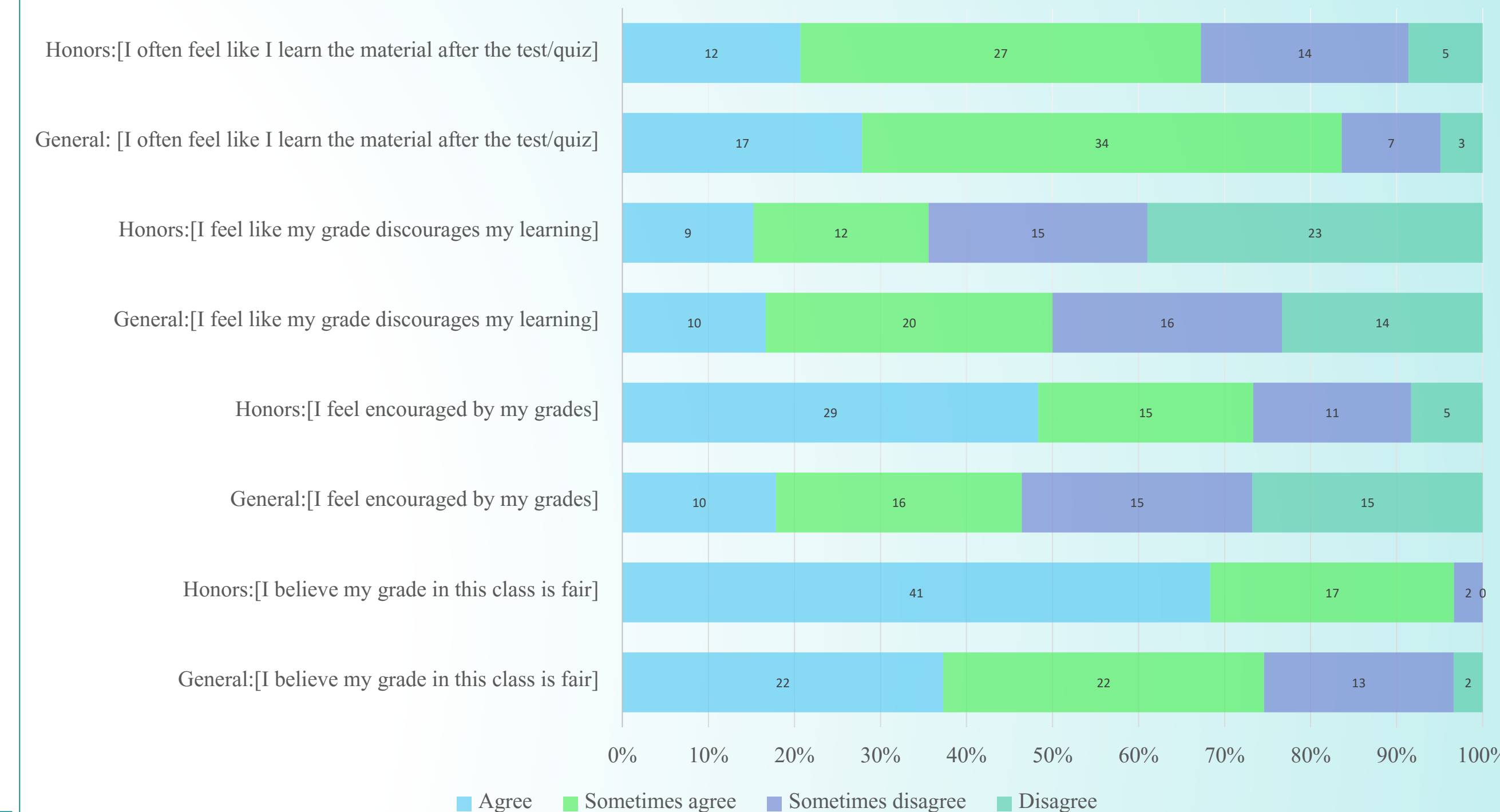
Pre-treatment Insights

- General and honors students perceive their grades differently
- More than 80% of students agreed that test retakes are valuable
- Students felt more confident after tests and students acknowledged they had study deficiencies

Post Treatment Prompt: I would like SBG in more of my classes/future.



PRE-TREATMENT SBG DATA BY CLASS LEVEL



Post-treatment Insights

- Hundreds of opportunities to demonstrate learning
- Students learned the value of reflection and requested more/continued time to practice in class
- Exemplary students reported feelings of finally being challenged
- Many honors students were disgruntled with the change, but were able to set and meet goals within new system
- Many students reported a shift in focus, from grades to understanding
- Students were able to reassess as they needed - this meant that students did not find themselves 'stuck' with a grade
- Increased and sustained efforts up until the end of the semester

"The SBG grading system is effective for my learning, but the stress with each initial assessment as having a major impact on my grade is difficult to get used to."

"The SBG helps me see what I do and do not understand."

References Cited

- Chekwa, E., McFadden, M., Divine, A., & Dorius, T. (2015). Metacognition: transforming the learning experience. *Journal of Learning in Higher Education*. 11(1), 109-112. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1141767.pdf>



Background

- Traditional testing structures do not allow for dynamic student learning
- Test retake policies vary greatly from classroom to classroom
- Many retake policies tax teacher and student time
- 'I thought I did so well on this!' is commonly heard from students after assessment
- Current research shows the best practice we can develop in our students to increase their success is one of metacognition (Chekwa, McFadden, Divine, & Dorius, 2015)

Methodology

- Pre and post Likert surveys
- All grades converted to SBG using a 0-4 scale of achievement
- Increased metacognitive strategies integrated throughout the course
- Student interviews