Georgia State University
ScholarWorks @ Georgia State University

Psychology Honors Theses | Department of Psychology

2-15-2007

Gender Bias in Observer Ratings of Pediatric Procedural Pain

Jeff Sims

Follow this and additional works at: http://scholarworks.gsu.edu/psych_hontheses

Recommended Citation
Sims, Jeff, "Gender Bias in Observer Ratings of Pediatric Procedural Pain." Thesis, Georgia State University, 2007.
http://scholarworks.gsu.edu/psych_hontheses/3

This Thesis is brought to you for free and open access by the Department of Psychology at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Psychology Honors Theses by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact scholarworks@gsu.edu.

GENDER BIAS IN OBSERVER RATINGS OF PEDIATRIC PROCEDURAL PAIN RATINGS

by

JEFFREY MICHAEL SIMS

Under the Direction of Lindsey Cohen and Jean E. Mennuti-Washburn

ABSTRACT

The current study attempted to discern the extent to which a gender bias influences the adult ratings of observed childhood pain. While gender differences in pain sensation are well documented in physiologically mature individuals, there seems to be no such difference in children. The effect of manipulating gender on the procedural pain ratings of 201 university undergraduate and nursing students was examined via a deceptive pain observation task. Results demonstrated no significant difference between gender conditions; however a strong link was established between prior exposure to painful pediatric medical procedures and lower pain ratings. The results suggest that, while a gender bias failed to alter pain ratings, desensitization to viewing painful procedures could alter how much pain healthcare professionals believe a patient is experiencing.

INDEX WORDS: Gender Bias, Pain, Pediatric Psychology, Observer Ratings, Desensitization

GENDER BIAS IN OBSERVER RATINGS OF PEDIATRIC PROCEDURAL PAIN RATINGS

by

JEFFREY MICHAEL SIMS

An Honors Thesis Submitted in Partial Fulfillment of the

Requirements for Graduation with Undergraduate Research Honors

in the College of Arts and Sciences

Georgia State University

2006

GENDER BIAS IN OBSERVER RATINGS OF PEDIATRIC PROCEDURAL PAIN RATINGS

by

JEFFREY MICHAEL SIMS

Honors Thesis Director: Lindsey Cohen
Honors Program Director: Robert Sattelmeyer

Electronic Version Approved:

Honors Program
College of Arts and Sciences
Georgia State University
May 2007

Copyright by
Jeffrey Michael Sims
2006

TABLE OF CONTENTS

INTRODUCTION	1
METHOD	4
RESULTS	6
DISCUSSION	8
REFERENCES	13
APPENDICIES	16

Pediatric Procedural Pain

From circumcisions to catheterizations, procedural pain is a common experience for children throughout the course of their development (Blount, Piira, Cohen, & Cheng, 2006). One of the most common types of painful pediatric procedures is immunizations. In fact, the Center of Disease Control and Prevention (CDC) now recommends that children receive approximately 28 immunizations before the age of six (CDC, 2006). It is vital for clinicians and researchers alike to recognize the importance of pediatric pain management, as there is a growing body of evidence indicating that untreated pain in childhood can lead to increased pain sensitivity, physiological changes, and negative healthcare attitudes in adulthood (for a review, see Blount, Piira, Cohen, & Roberts, 2003). However, in order to advance the field of pediatric pain management, it is critical that empirically valid and reliable pediatric pain assessments are used (Cohen, Greca, Blount, Kazak, Holmbeck & Lemanek, 2006). Given that the majority of pediatric pain is assessed through adult observation, typically by parents or health care providers, it is important to understand the accuracy of these observers' rating of children's pain. One area of observers' pain reporting that has received little attention is gender differences and biases.

Gender Differences in Adult's and Children's Experience of Pain

Research on adults suggests that women report a more intense experience of pain than men when subjected to similar painful stimuli (Unruh, 1996; Ochroch, Gottschalk, Troxel, & Farrar, 2006; Rosseland & Stubhaug, 2004; Ge, Madeleine, & Arendt-Nielsen, 2005; Robinson, Riley, Myers, & Fillingim, 2000; Arendt-Nielsen, Bajaj, & Mohr

Drewes, 2004). Although gender socialization may play an important role, researchers have also found biological corollaries to gender differences in pain experience (Komiyama, Wang, Svensson, Arendt-Nielsen, & De Laat, 2005; Lee, Lee, Kim, Kim, & Chung 1994; Jensen & Peterson, 2006). For example, differences have included a lower feminine pain reflex threshold in the Central Nervous System and throughout the muscles of the human neck (Komiyama, 2005; Lee, 1994). Although these gender differences in reflexive thresholds are important observations, they tend to be mild in scope and are unlikely to be the sole determinants of gender differences in pain sensation.

Although gender differences have been found in adult populations, it has not been supported in pediatric populations. In fact, research with children suggests that the difference between young boys' and girls' pain is negligible or nonexistent. For example, infants do not show differences in behavioral response to painful stimuli based on gender (Fuller, 2002; Rosmus, Johnston, Chan-Yip, Yang, 2000). The lack of gender differences in pain expression for infants appears to remain consistent into childhood. For instance, studies have shown that postoperative pain in pediatric and young adult samples aged from 8-21 fails to elicit significantly different levels of self-reported pain in females relative to males (Kotzer, 2000). This gender equality in pediatric pain self-report and behavior has also shown in chronic illness-related pain, such as children with sickle cell anemia (Conner-Warren, 1996). In summary, there appear to be no differences in self-reported or behavioral pain between male and female children. However, adults' subjective ratings of children's pain might demonstrate a difference across gender. If this were the case, it is important given that parents and medical staff typically make brief, subjective pain evaluations of children to guide diagnostic and intervention decisions.

Purpose and Hypotheses

The purpose of this study was two-fold. First, the study examined implicit adult gender biases around children's medical pain and anxiety. Second, participants included nursing and non-nursing students to examine the impact of medical training on pediatric pain gender biases. Although not yet supported in the literature, questions have been raised as to the reliability of nurse ratings of pain over extended periods of time (Weiner, Rudy, 2002). For example desensitization over time to patients with chronic pain has been observed and documented as a potential problem in nursing homes where a large change in "normal" pain levels are required for seasoned medical staff to take notice. If desensitization occurs with regards to observation of an individual patient's condition, then it could also occur with regards to a procedure. It seems common sense that it would take an significantly abnormal reaction in an individual's pain response to a routine procedure for a veteran medical professional to take special notice and this could cause an under evaluation of patient pain.

Based on gender specific self-pain reports that show adult males report lower levels of pain than women report, it was hypothesized that adults would rate boys as experiencing more pain than girls given similar pain behavior. It was also predicted that child pain ratings of participants with more clinical pediatric nursing experience would show less gender biases in pain ratings. It was expected that regardless of the gender stimulus presented, more experienced nursing students would rate pain and anxiety lower than less experienced nursing students and undergraduates.

Method

Participants

Two hundred and one students at a large southeastern university participated in the study. One hundred of the students were undergraduates, 87 were beginning nursing students (less than half of their program completed), and 14 were advanced nursing students (half or more than half of their nursing program completed). The sample ranged in age from 17 to 49 years of age (M=24.18, SD=6.58) and was ethnically diverse (57.2% White, 22.4% African American/Black, 10.4% Asian, 4.5% Hispanic/Latino, .5% Native American, .5% Hawaiian/Pacific Islander, 3.5% Other, 1% Missing Data).

The undergraduate participants were enrolled in an introductory psychology course and received partial class credit for their involvement in the study. The nursing students were not compensated for their participation. The selected sample had a disproportionate number of females (n= 171) to males (n= 29).

Measures

Background information. A demographics questionnaire was administered to describe the sample and allow for testing of any variation due to factors not controlled for in the study. The measure assessed the participants' age, ethnicity, gender, and previous experience working with children (Appendix A).

Child anxiety and pain. Participants were asked to indicate how much anxiety they thought the child was experiencing before the finger stick, during the procedure itself, and after the finger stick was complete using visual analog scales (VAS) (Appendix B). The VAS consisted of a 100 mm line with anchors such as 'no pain' and 'extreme pain'. Participants marked the line to indicate their response to the questions.

VAS's are frequently utilized in pain research and are a valid and reliable measure (Varni, Walco, & Wilcox 1990).

Validity of deception. A validity question, administered at the end of the experiment, assessed whether the gender deception of the study was successful. Participants answered whether they thought the child in the video was a male or female. Participants who indicated that they did not believe the gender of the child was consistent with what they were told were not included in the analyses (Appendix D).

Procedure

The study was approved by the Georgia State University Institutional Review Board and all participants provided informed consent. Undergraduate students enrolled in an introductory psychology course were each interviewed in small groups of two or three in a laboratory setting. Nursing students participated in a group classroom setting during scheduled class time. Nursing students that chose not to participate were permitted to leave the class early. Participants were randomly assigned to experimental groups prior to arriving for the procedure; however, they were manipulated to keep experimental conditions similar in magnitude.

Each participant viewed a short video of a five-year-old child receiving a finger stick blood test. The child was dressed in gender neutral clothing, consisting of a red t-shirt and shorts. The child's hair partially covered her face, which made determining her gender more difficult. The parent and nurse in the video were careful not to mention the child's name or treat the child in gender specific ways to reduce the chance of gender cues to the viewer.

Half of the participants were told that the child's name was Samantha and that she was female and half were told that the child was a boy named Samuel. Immediately after viewing the video, the participants completed a set of visual analog scale questionnaires designed to measure their perception of the child's procedural pain and anxiety in the video. Participants then filled out the demographics questionnaire. Once the measures were complete, the validity questionnaire was administered to determine the effectiveness of the procedure's deception. After all questionnaires were completed, a debriefing statement was provided to all participants to inform them that that the child was actually a little girl and they may have been deceived.

Results

Eighteen participants (8.5%) indicated that they did not believe the gender deception in the study design, and their data was included in subsequent analysis.

Gender Bias Tasks

Child Pain. 203 participants' responses (n=91%) were included in this analysis. A multivariate 3 by 2 ANOVA was used to examine all responses. The reported pain scores ranged from 4 to 100 on a Visual Analog Scale of 100mm, with 0mm indicating an absence of pain and 100 indicating severe pain. The analysis revealed no significant difference in the pain ratings of participants viewing the female stimulus (M=58.75; SD=20.83) condition and the male condition (M=62.44; SD=21.13), f (1) = -.488, p = .486.

The 68 nursing students that had previously undergone their pediatric rotation (M=54.72; SD=21.36) rated the child as experiencing significantly less pain than the 64

nursing students that had not yet undergone their pediatric rotation (n=36; M=64.72 ;SD=17.81), t(102)=-2.40, p=.018.

The responses of undergraduate students (n=96), beginning nursing students (n=73) and advanced nursing students (n=34) were then compared. A significant interaction was revealed between groups with respect to the amount of pain they reported the child as experiencing during the procedure (F(2)=2.94, p=.055). Post Hoc tests revealed that the undergraduate participants(M=63.71, SD=21.11) rated the child as experiencing significantly more pain than the advanced nursing students(M=53.38, SD=20.98) p<.013. Further analysis uncovered no other such significant interactions between the student classifications on the pain item.

Anxiety Levels. A multivariate 3 by 2 ANOVA was used to examine all responses. How much anxiety the male stimulus reported observing (n=104, M=81.36, SD=20.77) and how much anxiety the female stimulus reported observing (n=99, M=84.15, SD=17.24) was compared and the results did not significantly differ F(1)=3.65, p=.057.

The responses of undergraduate students (n=96), beginning nursing students (n=73) and advanced nursing students (n=34) were also compared. A significant interaction was found with regards to how much anxiety participants thought the child experienced during the procedure when the experimental condition of the participant was also taken into account (F(2)= 4.03, p=.019). Post hoc t-tests revealed that advanced nursing students in the female condition (M=90.64, SD=7.67) rated the child as experiencing significantly more anxiety than advanced nursing students in the male condition (M=71.90, SD=25.13) t(32)=2.69, p=.011. No other such individually

significant interactions between undergraduate or beginning nursing and gender condition students were found.

Discussion

The current study attempted to distinguish whether gender biases influenced observers' ratings of pediatric pain. Contrary to the hypothesis, participants in the male condition failed to rate the child as experiencing a significantly higher level of anxiety or pain than did participants in the female condition. This is likely due to either a genuine lack of gender bias in the participants or procedural deficiencies.

The young age of the observed child may have served to inhibit the projection of the adult pain gender stereotypes that could have occurred if an older child had been observed. As young children have not developed enough physically to display the traditional gender differences that typify adult life, they may be viewed as greatly more similar across genders with regards to pain sensation and display.

It is also possible that the validity questionnaire was an insufficient method for verifying the extent to which male condition participants questioned the deception. Participants that saw feminine characteristics in the child and answered as such could have still indicated that the child was a male simply because male pronouns were used in referring to the child. This suggests that as gender specific social factors influence pain report, gender specific physical characteristics may influence how much pain people perceive a child experiences. This line of inquiry should be addressed in future studies of this kind.

The significant differences between the pain ratings of nursing students who had undergone their pediatric rotation relative to nursing students that had not undergone their

pediatric rotation confirmed the authors' hypothesis. It is likely that exposure to painful pediatric procedures and nursing education desensitizes medical professionals in a similar fashion as chronic conditions existing in a certain patient. Further, advanced nursing students rated the child as experiencing significantly less pain than medically untrained undergraduate students. This lends further credence to a relative desensitization mechanism as it was likely the time advanced nursing students had spent in dealing with pain management that led to a lower sensitivity to viewing the child undergoing a painful procedure. Further evidence is provided for a desensitization-due-to-experience model by the beginning nursing students. While the pain scores of this group were not significantly different from the undergraduate or advanced nursing students, they did fall in between the two.

While significant differences in perceived anxiety scores of the child did not significantly differ as a sole function of education status, they did when combined with experimental condition. This finding was statistically due to the large difference in scores between advanced nursing students in the male and female conditions. Further, the samples of the female and male conditions were relatively small (n=14, n=20 respectively), which could have skewed the results significantly. While the small sample size prevents further conjecture as to the cause, the greatly significant result warrants further exploration into the possibility that advanced nursing students are more susceptible to having a pediatric procedural anxiety bias.

Limitations and Future Directions

The most significant limitation to this study is that the observed child did not provide a pain and anxiety self-report to allow for a judgment on the accuracy of the reported observation by undergraduates, beginning nursing students and advanced nursing students. Future studies should take this into account.

The current study relied on ratings and questionnaires as the sole source of data. As it is well documented that different situations can cause significantly different pain ratings, it is possible that utilizing interviews or other methodologies might result in different findings.

Another major limitation is that the current sample relied exclusively on university students from a single institution. Evaluations of gender biases using actual health care professionals or students from multiple institutions would be invaluable as data from these participants would more readily generalize to health care settings. As all the participants attend the same institution, there is a vivid possibility that later groups of participants suffered from contamination. Further, the sample grouping was skewed significantly with only 34 advanced nursing students while there were 96 and 73 in the undergraduate and beginning nursing groups respectively.

It is also possible that the video contained subtle gender cues about the true gender of the child or that the research assistant subtly belied the gender of the child. Using a counterbalance approach with a male stimulus that appears gender-neutral might be helpful in future studies of this sort. An important consideration in addition to the counterbalance approach is that if an older child is used in future studies with similar designs it will become increasingly more difficult to effectively disguise the child in such

a way as to create a valid deception while also allowing the child to keep his or her actual gender characteristics for the control group.

Lastly, as there might have been a ceiling effect with most ratings of anxiety being high, future studies should be careful to select a child that expresses a more moderate or mild level of anxiety.

Summary and Conclusions

The current study failed to show that there was any significant difference in pain or anxiety ratings of children by adults as a function of gender or prior experience with pediatric procedural pain. Although this particular sample failed to demonstrate significant biases in pain ratings solely due to manipulation of the observed gender, the phenomenon still requires further investigation utilizing a bevy of diverse methodologies that might serve to ameliorate any skewing of data due to methodology. Justification for continued review of a bias in anxiety ratings stems from the finding that significant differences were found in anxiety ratings between the undergraduate, beginning nursing and advanced nursing groups when experimental condition was taken into account.

Results did show that advanced nursing students consistently rated the child as experiencing a lower level of pain than did undergraduate students. While the responses of beginning nursing students did not differ significantly from either the undergraduate or advanced nursing scores, they helped to provide mild support for a negative correlation between prior experience with pain management education and higher ratings of pain.

While there were limitations to the current study, the findings that suggest a desensitization to pediatric pain observation have implications for all health care professionals. If these results are verified in future studies, it is vital that this phenomenon

be compensated for by veteran medical professionals in order to provide effective pain management care and allow for more accurate diagnoses of pain levels in patients.

References

Arendt-Nielsen, L., Bajaj, P., & Mohr Drewes, A. (2004). Visceral pain: Gender differences in response to experimental and clinical pain. *European Journal of Pain, 8,* 465-472.

Blount, R., Piira, T., Cohen, L. L., & Cheng, P. S. (2006). Pediatric Procedural Pain. *Behavior Modification, 30,* 24-49.

Blount, R. L., Piira, T., Cohen, L. L., & Roberts, M. C. (2003). Management of pediatric pain and distress due to medical procedures. *Handbook of pediatric psychology (3rd ed.)* (pp. 216-233). Guilford Press.

Center for Disease Control and Prevention (2004). Recommended childhood and adolescent immunization schedule. *Morbidity and Mortality Weekly Report, 53* (16), Q1-Q3.

Center for Disease Control and Prevention (2004). Recommended Childhood and Adolescent Immunization Schedule. *Morbidity and Mortality Weekly Report, 54* (52), Q1-Q4.

Conner-Warren, R. L. (1996). Pain intensity and home pain management of children with sickle cell disease. *Issues in Comprehensive Pediatric Nursing, 19,* 183-195.

Cohen, L. L., La Greca, A. M., Blount, R. L., Kazak, A. E., Holmbeck, G. N., Lemanek, K. L. (in press). Introduction to Special Issue: Evidence-Based Assessment in Pediatric Psychology. *Journal of Pediatric Psychology*.

Fuller, B. F. (2002). Infant gender differences regarding acute established pain. *Clinical Nursing Research, 11,* 190-203.

Ge, H.-Y., Madeleine, P., & Arendt-Nielsen, L. (2005). Gender differences in pain modulation evoked by repeated injections of glutamate into the human trapezius muscle. *Pain, 113,* 134-140.

Gijsbers, K., & Nicholson, F. (2005). Experimental pain thresholds influenced by sex of experimenter. *Perceptual and Motor Skills, 101,* 803-807.

Jensen, M. T., & Petersen, K. L. (2006). Gender Differences in pain and secondary hyperalgesia after heat/capsaicin sensitization in healthy volunteers. *Journal of Pain, 7,* 211-217.

Ka¡llai, I., Barke, A., & Voss, U. (2004). The effects of experimenter characteristics on pain reports in women and men. *Pain, 112,* 142-147.

Komiyama, O., Wang, K., Svensson, P., Arendt-Nielsen, L., & De Laat, A. (2005). Gender difference in masseteric exteroceptive suppression period and pain perception. *Clinical Neurophysiology, 116,* 2599-2605.

Kotzer, A. M. (2000). Factors predicting postoperative pain in children and adolescents following spine fusion. *Issues in Comprehensive Pediatric Nursing, 23,* 83-102.

Lee, K.-H., Lee, M.-H., Kim, H.-S., Kim, J.-H., & Chung, S.-C. (1994). Pressure pain thresholds [PPT] of head and neck muscles in a normal population. *Journal of Musculoskeletal Pain 2,* 67-69.

Levine, F. M. & de Simone, L. L. (1991). The effects of experimenter gender on pain report in male and female subjects. *Pain, 44,* 69-72.

Ochroch, E. A., Gottschalk, A., Troxel, A. B., & Farrar, J. T. (2006). Women suffer more short and long-term pain than men after major thoracotomy. *Clinical Journal of Pain, 22,* 491-498.

Robinson, M. E., Riley, J. L. III, Myers, C. D., & Fillingim, R. B. (2000). Psychosocial contributions to sex-related differences in pain responses. In, *Sex, gender, and pain* (pp. 41-68). IASP Press.

Robinson, M. E., & E. A. Wise (2004). Prior pain experience: Influence on the observation of experimental pain in men and women. *Journal of Pain*, *5,* 264-269.

Rosmus, C., Johnston, C. C. L., Chan-Yip, A., & Yang, F. (2000). Pain response in Chinese and non-Chinese Canadian infants: Is there a difference? *Social Science & Medicine*, *51,* 175 184.

Rosseland, L. A., & Stubhaug, A. (2004). Gender is a confounding factor in pain trials: Women report more pain than men after arthroscopic surgery. *Pain*, *112,* 248-253.

Unruh, A. M. (1996). Gender variations in clinical pain experience. *Pain*, *65,* 123-167.

Weiner, D., & Rudy, T. (2002). Attitudinal Barriers to Effective Treatment of Persistent Pain in Nursing Home Residents. *Journal of the American Geriatrics Society*, *50,* 2035-2040.

Weisse, C. S., Foster, K. K., & Fischer, E. A. (2005). The Influence of Experimenter Gender and Race on Pain Reporting: Does Racial or Gender Concordance Matter? *Pain Medicine*, *6,* 80-87.

Appendix A

Demographic Questionnaire

Part V: General Demographic Information

Please answer all items below. If you have any questions, please ask.

1. What is your Gender?
   □ Female □ Male

2. What is your age? _____ Years

3. What is your ethnicity?
   □ American Indian/Alaska Native □ Hispanic/Latino
   □ Black/African American □ Hawaiian/Pacific Islander
   □ Asian □ White
   □ Other: _____

4. Are you employed?
   □ Yes □ No

   If yes, are you employed full or part time?
   □ Full time □ Part time

5. Do you currently work in a healthcare setting?
   □ Yes □ No

6. What is your approximate annual income? _____

7. Do you have any Children?
   □ Yes □ No

   If yes, how many children do you have _____

In the space provided below, please list the age and gender of each of your children:

□ □
□ □
□ □
□ □
□ □

If you are an undergraduate (nursing students skip to #12):

8. What is your class rank?

□ Freshman □ Sophomore
□ Junior □ Senior
□ Other _____

9. What is/are your current Major(s)? _____

10. What is/are your current Minor(s)? _____

11. What is your current GPA? _____

If you are a nursing student:

12. How far through your program are you? (e.g. A2, T1) _____

13. Have you done your clinical rotation in Pediatrics yet?

□ Yes □ No

Appendix B

Child Pain and Anxiety Questionnaire Male Stimulus

Part I: Video Pain Ratings

You just watched a video clip of Samuel receiving his Pre-Kindergarten finger stick.

Please answer the following questions by making a vertical mark through the horizontal lines below. There are no right or wrong answers. If you are confused at all, please let us know.

For example, in response to question 1 below, if you feel that he was very anxious before the finger stick, you might mark the line in the following manner:

Not Anxious ——————————/—————— Very Anxious

If you feel that he was not anxious, you might mark the line in the following manner:

Not Anxious ——/—————————————— Very Anxious

1. How anxious was he **before the finger stick**?

Not Anxious _____ Very Anxious

2. How anxious was he **during the finger stick**?

Not Anxious _____ Very Anxious

3. How anxious was he **after the finger stick**?

Not Anxious _____ Very Anxious

4. How much pain did he experience **during the finger stick**?

No Pain _____ Severe Pain

5. How anxious were **you watching** this video?

Not Anxious _____ Very Anxious

Appendix C

Child Pain and Anxiety Questionnaire Female Stimulus

Part I: Video Pain Ratings

You just watched a video clip of Samantha receiving her Pre-Kindergarten finger stick.

Please answer the following questions by making a vertical mark through the horizontal lines below. There are no right or wrong answers. If you are confused at all, please let us know.

For example, in response to question 1 below, if you feel that he/she was very anxious before the finger stick, you might mark the line in the following manner:

Not Anxious ——————————/————— Very Anxious

If you feel that she was not anxious, you might mark the line in the following manner:

Not Anxious —/———————————— Very Anxious

1. How anxious was she **before the finger stick**?

Not Anxious _____ Very Anxious

2. How anxious was she **during the finger stick**?

Not Anxious _____ Very Anxious

3. How anxious was she **after the finger stick**?

Not Anxious _____ Very Anxious

4. How much pain did she experience **during the finger stick**?

No Pain _____ Severe Pain

5. How anxious were **you watching** this video?

Not Anxious _____ Very Anxious

Appendix D

Validity Questionnaire

Part VI: Group Assignments

For tracking purposes, please indicate the gender and hair color of the child that you rated.

What was the gender and hair color of the child in the video?

□ blonde male
□ blonde female
□ brown hair male
□ brown hair female

You are finished, thanks for your time! Please remember to help us by NOT discussing this study and its purpose with other students.