

# Nicole R. Hallinen

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## Education

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- 2015     **PhD, Stanford Graduate School of Education**  
Learning Sciences & Technology Design  
Developmental & Psychological Sciences  
Dissertation:     *The importance of mathematics and well-chosen examples when preparing students for future learning in simple physics*  
Advisor:           Daniel Schwartz  
Committee:        Carl Wieman, Jennifer Langer-Osuna, Shelley Goldman
- 2009     **BS, Psychology, Carnegie Mellon University**  
Honors Thesis:    *Creating an online tutor for fractions*  
Advisor:           Robert Siegler
- 2009     **BA, French & Francophone Studies, Carnegie Mellon University**  
Thesis:            *I was playing when I learned:  
                          A narrative game for French aspectual distinction*  
Advisors:         Bonnie Youngs, Christopher Jones  
Undergraduate Minor: European Studies

## Research Interests

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Math & science learning, transfer, human induction, contrasting cases, category learning, generalization, task design, physics education, algebra learning, story problems, games & simulations, number sense

## Research Experience

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- 2016 –     IES Postdoctoral Fellow, **Temple University**  
Advisors: Julie Booth, Nora Newcombe, Elizabeth Gunderson
- 2009-15    Graduate Research, **Stanford Graduate School of Education**
- 2005-09    Undergraduate Research, **Carnegie Mellon Psychology Department**
- 2008-09    Human-Computer Interaction Research, **Pittsburgh Science of Learning Center (PSLC)**
- 2005-09    Design, Programming, & Learning Research, **Carnegie Mellon Online Writing Tutor**
- 2009        Research Internship on Language Learning Software, **Rosetta Stone, Inc.**

[Last updated: August 2018]

## Journal Publication

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Kuo, E., **Hallinen, N.R.**, & Conlin, L.D. (2017). When procedures discourage insight: Epistemological consequences of prompting novice physics students to construct force diagrams. *International Journal of Science Education*, 39(7), 814-839.

## Manuscripts Under Review

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**Hallinen, N.R.** & Booth, J.L. (*under revision*) The story for proportions: Does representation influence problem solving for algebraic proportions?

**Hallinen, N.R.** Shaping definitions: Nonexamples facilitate explicit learning of defining features in geometry.

**Hallinen, N.R.** & Schwartz, D.L. How oversimplified materials can undermine the learning and transfer of mathematical thinking in physics problems.

## Manuscripts in Preparation

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**Hallinen, N.R.**, Sprague, L., Newcombe, N., & Schwartz, D.L. Inventing a solution buffers against negative transfer.

Black, C.J., Hildebrand, L.E., **Hallinen, N.R.**, & Gunderson, E.A. More is not always better: High working memory hinders performance on an approximate symbolic calculation task.

## Refereed Proceedings

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**Hallinen, N.R.** & Booth, J.L. (2018, June). Don't just do it, explain it: A 5<sup>th</sup> grade worked examples curriculum supports transfer to algebra content. In J. Kay and R. Luckin (Eds.) *Rethinking learning in the digital age: Making the Learning Sciences count: The International Conference of the Learning Sciences (ICLS)*, London, UK.

Kaser, T., **Hallinen, N.R.**, & Schwartz, D.L. (2017, March). Modeling exploration strategies to predict student performance within a learning environment and beyond. In *Proceedings of the Seventh International Learning Analytics & Knowledge Conference*, pp. 31-40.

Kuo, E., **Hallinen, N.R.**, & Conlin, L.D. (2015, July). How prompting force diagrams discourages student use of adaptive problem-solving shortcuts. In Churukian, A.D., Jones, D.L., & Ding, L. (Eds.), *2015 Physics Education Research Conference Proceedings*, College Park, MD, July 29-30, 2015, pp. 183-186.

Blair, K., Pfaffman, J., Cutumisu, M., **Hallinen, N.**, & Schwartz, D. (2015, April). Testing the effectiveness of an iPad math game. In *Proceedings of the 33<sup>rd</sup> Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems*, pp. 727-734.

**Hallinen, N.R.**, Baldinger, E., & Selling, S.K. (2014, July). The role of examples and nonexamples in defining. In Liljedahl, P., Nicol, C., & Allan, D. (Eds.) In *Proceedings of the 38<sup>th</sup> Conference of the International Group for the Psychology of Math Education and the 36<sup>th</sup> Conference of the North American Chapter of the Psychology of Mathematics Education*, Vancouver, Canada, p. 92.

- Hallinen, N.R.** (2013, November). Supporting inductive learning to reduce overgeneralization. In Martinez, M. & Castro Superfine, A. (Eds.), *Proceedings of the 35<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Math Education*, Chicago, IL, pp. 276-279.
- Conlin, L., **Hallinen, N.R.**, & Schwartz, D.L. (2014, June). Supporting middle schoolers' use of inquiry strategies for discovering multivariate relations in interactive physics simulations. In Polman, J. L., Kyza, E. A., O'Neill, D. K., Tabak, I., Penuel, W. R., Jurow, A. S., O'Connor, K., Lee, T., and D'Amico, L. (Eds.). *Learning and becoming in practice: The International Conference of the Learning Sciences (ICLS)*, Boulder, CO, pp. 31-37.
- Hallinen, N.R.**, Blair, K.P., Chin, D.B., & Schwartz, D.L. (2014, June). Using contrasting cases for generation and instruction. In I. Glogger (Symposium Chair), *Combining generation and direct instruction to prepare students to transfer big ideas across school topics*. In Polman, J. L., Kyza, E. A., O'Neill, D. K., Tabak, I., Penuel, W. R., Jurow, A. S., O'Connor, K., Lee, T., and D'Amico, L. (Eds.). *Learning and becoming in practice: The International Conference of the Learning Sciences (ICLS)*, Boulder, CO, pp. 1179-1188.
- Hallinen, N.R.**, Cheng, J., Chi, M., & Schwartz, D.L. (2014, June). Tug of War – What is it good for? Measuring student inquiry choices in an online science game. In Polman, J. L., Kyza, E. A., O'Neill, D. K., Tabak, I., Penuel, W. R., Jurow, A. S., O'Connor, K., Lee, T., and D'Amico, L. (Eds.). *Learning and becoming in practice: The International Conference of the Learning Sciences (ICLS)*, Boulder, CO, pp. 1645-1646.
- Hallinen, N.**, Walker, E., Wylie, R., Ogan, A., & Jones, C. (2009, July). I was playing when I learned: A narrative game for French aspectual distinctions. *Proceedings of Workshop on Intelligent Educational Games, 14<sup>th</sup> International Conference on Artificial Intelligence in Education*. Brighton, UK, pp. 117-120.

### Conference Presentations and Posters

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- Ham, L., **Hallinen, N.R.**, & Gunderson, E.A. (2017, October). The influence of narrative context on children's proportional reasoning performance. Poster session presented at the *Cognitive Development Society*, Portland, OR.
- Hallinen, N.R.** & Booth, J.L. (2017, October). More to the story: Students' performance on equations and story problems involving algebraic proportions. Poster session presented at the *Cognitive Development Society*, Portland, OR.
- Hallinen, N.R.** & Schwartz, D.L. (2017, July). Choosing the right examples: How contrasting cases can affect learning and future learning. In **N.R. Hallinen** (Chair) *Contrasting cases and invention activities in PER: Grounding students' understanding of conceptual and mathematical relations in physical contexts*. Symposium conducted at the Physics Education Research Conference, Cincinnati, OH.
- Hallinen, N.R.**, Newcombe, N.S., & Dziembowski, Z. (2017, July). Constraining mathematically-correct answers to physically-appropriate solutions: The role of sketching and problem-solving frameworks. In N.G. Holmes (Chair) *Math for making sense or math for making answers?* Symposium conducted at the Physics Education Research Conference, Cincinnati, OH.

- Black, C., **Hallinen, N.R.**, & Gunderson, E.A. (2017, April). High working memory hinders initial performance on approximate symbolic calculation, but practice leads to a strategy shift. Poster session presented at the *Society for Research in Child Development*, Austin, TX.
- Hamdan, N., Ham, L., **Hallinen, N.R.**, & Gunderson, E.A. (2017, April). Linear measurement skill mediates the relation between mental transformation and number line estimation in young children. Poster session presented at the *Society for Research in Child Development*, Austin, TX.
- Hallinen, N.R.** & Booth, J.L. (2016, December). Does solving for X help you solve in context? Investigating component skills that contribute to word problem solving performance in algebra. Poster session presented at the *IES PI Meeting*, Washington, DC.
- Hallinen, N.R.** & Schwartz, D.L. (2016, November). Knowing When It No Longer Works: One benefit of inducing a solution. Poster session presented at the *Annual Meeting of the Psychonomic Society*, Boston, MA.
- Hallinen, N.R.**, Newcombe, N.S., & Dziembowski, Z. (2016, July). Drawing attention: Do sketching and problem-solving frameworks support student thinking? Poster session presented at the *Physics Education Research Conference*, Sacramento, CA.
- Hallinen, N.R.** (2016, April). Examples and mathematics: How to design physics materials for learning and transfer. Invited poster session presented at the 2016 *Annual Meeting of the American Educational Research Association*, Washington, DC.
- Hallinen, N.R.**, Blair, K.P., Tsang, J.M., & Schwartz, D.L. (2013, May). I have a hammer. Is that a nail? Inducing mathematical structure to reduce negative transfer. *Annual Meeting of the American Educational Research Association*, San Francisco, CA.
- Blair, K.P., Tsang, J. T., **Hallinen, N.**, Rosenberg-Lee, M., Menon, V., & Schwartz, D. L. (2013, May). Extending natural number understanding to the integers: Cross-disciplinary research in education, neuroscience, and cognitive science. *Annual Meeting of the American Educational Research Association*, San Francisco, CA.
- Hallinen, N.R.**, Chi, M., Chin, D.B., Prempeh, J., Blair, K.P. & Schwartz, D.L. (2012, August). Applying cognitive developmental psychology to middle school physics learning: The rule assessment method. *Proceedings of the Physics Education Research Conference*, Philadelphia, PA.
- Chi, M., Chin, D.B., **Hallinen, N.R.**, & Schwartz, D.L. (2012, August). A comparison of two instructional models using contrasting cases. Poster session presented at the *Physics Education Research Conference*, Philadelphia, PA.
- Hallinen, N.**, Semmens, R., Dohmen, I., Chin, D.B., & Chase, C. (2012, April). Express yourself: Math learning in the context of communication. Poster session presented at the *Annual Meeting of the American Educational Research Association*. Vancouver, Canada.
- Dohmen, I.M., **Hallinen, N.R.**, Schwartz, D.L., Chase, C.C., Chin, D.B., Semmens, R., & Shemwell, J.T. (2011, March). Communicating through math and measurement. Poster session presented at the *Annual inter-Science of Learning Conference*, Washington, DC.
- Hallinen, N.R.** (2010, December). Does negative integer instruction transfer to negative rational numbers? Poster session presented at *Stanford Psychological Studies in Education Student Poster Session*, Stanford, CA.

**Hallinen, N.R.** (2008, November). Effective, interesting, useful? An evaluation of the Carnegie Mellon Online Writing Tutor. *Association for the Advancement of Computer Education (AACE) E-Learn World Conference on E-Learning*, Las Vegas, NV.

### Book Chapter

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Hayes, J.R., Bajzek, D.M., Brooks, J., Reyes, B., **Hallinen, N.**, & Steinberg, E.R. (2007). Developing an online writing tutor to improve technical-writing skills in engineering and science students. In G. Rijlaarsdam (Series Ed.) and D. Alamargot, P. Terrier, & J.-M. Cellier (Vol Eds.), *Studies in Writing*, Vol. 21, *Written Documents in the Workplace*, 107-123.

### Awards & Grants

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| Cisco Systems Stanford Graduate Fellowship (SGF)       |              |
| <i>3 years of graduate tuition support and stipend</i> |              |
| Gretchen Goldsmith Lankford Teaching Award             | \$2,500      |
| Andrew Carnegie Society Scholar                        | \$2,000      |
| CMU Undergraduate Presentation Travel Award            | \$250        |
| CMU Small Undergraduate Research Grants                | \$300, \$370 |
| Vira I. Heinz Scholarship for Global Leadership        | \$5,000      |

### Teaching Experience

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#### Temple University College of Education

2016 Guest Lecturer on Learning & Transfer: Learning Theories

#### San Jose State University Laurie College of Education

2015, 2013 Instructor: Research Methods in Child Development

#### Stanford University Graduate School of Education

2015, 2014 Teaching Assistant: Core Mechanics for Learning

2015 Guest Lecturer on Inventing Activities: Curriculum & Instruction in Mathematics, Stanford Teacher Education Program

2012 Teaching Assistant: Induction, Proof, Discovery, & Statistics

#### Carnegie Mellon University Dietrich College of Humanities and Social Sciences

2009 Teaching Assistant: Introduction to Psychology

2009, 2008 Writing Assistant: Intermediate French II

### Invited Presentations

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2016 Temple University Educational Research Seminar:  
 “Instructional backfires: The risks of over-scaffolded math and science learning materials”

### Academic Service

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#### Ad-hoc Reviewer

Cognitive Processing  
 Cognitive Research: Principles and Implications  
 Journal of Experimental Psychology: Applied  
 Journal of Research on Educational Effectiveness  
 Mathematical Thinking and Learning

Physical Review: Physics Education Research

**Conference Reviewer and/or Session Chair**

American Educational Research Association (AERA)  
Cognitive Development Society (CDS)  
Psychology of Math Education (PME)  
Physics Education Research Conference (PERC)

**Mentorship**

Temple Undergraduate Research Mentor (7+ research assistants)  
Consultant and mentor, Nomster Chef (Ashley Moulton, Stanford LDT MA student)  
Stanford Pre-Education Society Mentor (Vivian Chen, undergrad & LDT MA student)  
Stanford Graduate Life Community Advisor & Head Community Advisor  
CMU Resident Advisor, Sexual Assault Advisor, & Safezone Trained LGBTQ Ally

**Committee Membership**

Stanford GSE Behavioral Neuroscience Faculty Search Committee (student representative)  
CMU Global Education Working Group (student representative)  
CMU Science and Humanities Scholars Student Advisory Council  
CMU Modern Languages Student Advisory Council

**Community Outreach**

Presenter, Franklin Institute Science After Dark

**Additional Experience with K-12 Students**

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Senior Class Program Director, Minds Matter of Philadelphia  
Child Life Volunteer, Children's Hospital of Pittsburgh  
English as a Second Language and French Classroom Tutor, Alderdice High School  
Assistant Teacher, 4 year-old class, CMU Children's School (Psychology Dept. Lab School)  
Summer Camp Counselor, 7-9 year-olds, Chatham College Music & Arts Day Camp

**Professional Societies**

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American Association of Physics Teachers  
American Educational Research Association  
Cognitive Development Society  
International Society of the Learning Sciences  
Psychology of Math Education (PME) – North America Chapter  
Phi Beta Kappa Society  
Psi Chi Psychology Honor Society