

**Associations Between Low-Income Children's Fine Motor Skills in Preschool and Academic Performance in Second Grade****Authors**

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**Abstract**

Given the growing literature pertaining to the importance of fine motor skills for later academic achievement (Grissmer, Grimm, Aiyer, Murrah, & Steele, 2010), the current longitudinal study, drawing upon the Miami-Dade School Readiness dataset, examines whether the fine motor skills of economically disadvantaged preschool students predict later academic performance in 2nd grade. More specifically, we expand on the current literature to evaluate whether two types of fine motor skills—fine motor object manipulation and fine motor writing—predict academic achievement above and beyond the effects of demographic characteristics and early language and cognition skills. Through employing multilevel modeling techniques, the results indicate that after controlling for gender, race/ethnicity, free/reduced lunch status, and number of school absences, performance on both fine motor writing and object manipulation tasks had significant positive effects on 2nd-grade reading and math achievement, as measured by grades and standardized test scores. Stronger effects were yielded for writing tasks compared to object manipulation tasks.

**Practical/Social Implications**

The findings of a link between fine motor skills and reading and math achievement suggest that children with stronger early writing skills may be more likely to form internal models of the symbol systems that serve as the foundation for academic disciplines. Further, the results also indicate that fine motor skills are positively linked to self-regulation, another positive predictor of academic achievement.

Overall, the current study suggests that fine motor skills, particularly fine motor writing, should be considered a valuable indicator of school readiness (Grissmer et al., 2010). The use of early education curricula that include fine motor writing and copying might prove to be an effective method for improving learning during the early school years.

**Citation**

Dinehart, L. & Manfra, L. (2013). Associations between low-income children's fine motor skills in preschool and academic performance in second grade. *Early Education and Development, 24*, 138-161.

**Acquisition of Social Referencing via Discrimination Training in Infants****Authors**

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**Abstract**

This experiment investigated social referencing as a form of discriminative learning in which maternal facial expressions signaled the consequences of the infant's behavior in an ambiguous context. Eleven 4- and 5-month-old infants and their mothers participated in a discrimination-training procedure using an ABAB design. Different consequences followed infants' reaching toward an unfamiliar object depending on the particular maternal facial expression. During the training phases, a joyful facial expression signaled positive reinforcement for the infant reaching for an ambiguous object, whereas a fearful expression signaled aversive stimulation for the same response. Baseline and extinction conditions were implemented as controls. Mothers' expressions acquired control over infants' approach behavior for all participants. All participants ceased to show discriminated responding during the extinction phase. The results suggest that 4- and 5-month-old infants can learn social referencing via discrimination training.

### Practical/Social Implications

Social referencing frequently is lacking in children with an autism spectrum disorder and developmental disabilities, and this deficit has been associated with poor social and verbal performance later in development (Ozonoff & South, 2001). This study could provide the basis for training social referencing in infants at risk of developmental disabilities and very young children with autism spectrum disorders. Our study is also relevant to normal development. Baer (1973) suggested a three-step process for studying child development. The first step is to determine if the “natural” behavioral process could be demonstrated to be sensitive to operant contingencies in a laboratory setting. Step 2 is to conduct naturalistic observations to determine if those operant principles appeared to operate in the natural environment. The final step was to manipulate those natural events within the natural environment. The present study could be considered to be part of Step 1.

### Citation

Pelaez, M., Virues-Ortega, J., & Gewirtz, J. (2012). Acquisition of social referencing via discrimination training in infants. *Journal of Applied Behavioral Analysis, 45*, 23-36.

### Prospective Mathematics Teachers’ Sense Making of Polynomial Multiplication and Factorization Modeled with Algebra Tiles

### Author

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### Abstract

This study is about prospective secondary mathematics teachers’ understanding and sense making of representational quantities generated by algebra tiles, the quantitative units (linear vs. areal) inherent in the nature of these quantities, and the quantitative addition and multiplication operations—referent preserving versus referent transforming compositions—acting on these

quantities. Although multiplicative structures can be modeled by additive structures, they have their own characteristics inherent in their nature. I situate my analysis within a framework of unit coordination with different levels of units supported by a theory of quantitative reasoning and theorems-in-action. Data consist of videotaped qualitative interviews during which prospective mathematics teachers were asked problems on multiplication and factorization of polynomial expressions in  $x$  and  $y$ . I generated a thematic analysis by undertaking a retrospective analysis, using constant comparison methodology. There was a pattern which showed itself in all my findings. Two student teachers constantly relied on an additive interpretation of the context, whereas three others were able to distinguish between and when to rely on an additive or a multiplicative interpretation of the context. My results indicate that the identification and coordination of the representational quantities and their units at different categories (multiplicative, additive, pseudo-multiplicative) are critical aspects of quantitative reasoning and need to be emphasized in the teaching–learning process. Moreover, representational Cartesian products-in-action at two different levels, indicators of multiplicative thinking, were available to two research participants only.

### Practical/Social Implications

Teacher education programs should provide opportunities for student teachers to explicitly engage in quantitative reasoning in a manner that leads to using all three levels of unit coordination. This necessitates a focus on discrete mathematics content with a particular emphasis on sets, relations, Cartesian products, and mapping structures, which by definition encompass levels of unit coordination and quantitative reasoning in their structure. In particular, at first, polynomial multiplication and factorization can be thought of as totally irrelevant to set theoretical aspects, quantitative reasoning, or unit coordination. However, when prospective teachers engage in and want to make sense of what they are doing, they end up performing mathematically, exhibiting set theoretical aspects.

**Citation**

Caglayan, G. (2013). Prospective mathematics teachers' sense making of polynomial multiplication and factorization modeled with algebra tiles. *Journal of Mathematics Teacher Education*, 16, 349-378.

**A Connectivity Model for Assessment of HIV Transmission Risk in Injection Drug Users (IDUs)**

**Authors**

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**Abstract**

The purpose of this study was to produce models composed of mapping of connectivity networks of HIV transmission risk in injection drug users (IDUs). This methodology provided a novel approach and diagnostic tool for understanding HIV infection transmission risk and drug use in the typical niche of IDUs, i.e., a "shooting gallery" (a gathering site for injection drug activity). Furthermore, component IDUs may have memberships in multiple "shooting galleries" revealing subsequent interconnectivities. Charting of IDU connectivity diagrams illustrated the relationships of peripheral sites to the critical central core of high HIV transmission risk. Members of this highly interlinked and infectious central core of IDUs had high HIV transmission risk and severe drug use-producing high morbidity and mortality that resulted in great public health concern. In addition, connectivity diagrams reveal very high HIV transmission risk in component IDUs in "dual memberships", i.e., membership in more than one central core (with the highest number of partners). Therefore, IDUs with "dual memberships" were the most infectious members of the "shooting gallery". In summation, network mapping of HIV transmission risk in IDUs allows for subsequent socio-behavioral analysis and the development of focused individual and programmatic interventions.

**Practical/Social Implications**

The IDU network web is a structural representation of HIV transmission risk in severe substance abuse and unprotected sexual activity. The model in this work is a useful approach in gauging interventions for prevention and treatment of IDUs congregating in "shooting galleries." Obtaining medical treatment for HIV/AIDS and curbing substance abuse are the highest priorities of early intervention. Consequential measures such as preventive education and teaching of health skills can promote health and prevent recidivism. The IDU "shooting galleries" provide a useful venue for qualitative and ethnographic analysis of a connectivity model focused on health promotion and disease prevention.

**Citation**

Flaer, P.J., Cistone, P., Younis, M., Parkash, J. (2013). A connectivity model for assessment of HIV transmission risk in injection drug users (IDUs). *Evaluation and Program Planning*, 39, 23-27.

**The Effects of a Self-Monitoring Package on Homework Completion and Accuracy of Students with Disabilities in an Inclusive General Education Classroom**

**Authors**

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**Abstract**

This study used a multiple baseline design across subjects to investigate the effects of a self-monitoring package on the math and spelling homework completion and accuracy rates of four fourth-grade students (two boys and two girls) with disabilities in an inclusive general education classroom. Throughout baseline and intervention, participants were assigned daily homework. During intervention, participants self-monitored in the evening at home and in the morning on the computer at school, and took part in a brief scripted, daily conference with the special education teacher to review the self monitoring sheets. During the last two intervention

phases, the conference was reduced to two and then one randomly selected day(s) per week, respectively. Maintenance data were taken over a 2–3-week period after the removal of the intervention. The self-monitoring package led to higher percentages of both math and spelling homework completion and accuracy during each phase of the intervention compared to baseline. These improved performances were maintained.

### **Practical/Social Implications**

Homework is considered important in improving the comprehension and maintenance of previously learned ideas and concepts. Yet, some students with disabilities are unprepared to meet increased homework expectations in inclusive classrooms in the general education environment.

Self-management techniques have been demonstrated to assist in homework completion. Self-monitoring, the strategy employed in this study, is a natural step toward taking responsibility for one's own behavior and becoming independent. Self-monitoring software packages have been shown to be useful for improving homework assignment accuracy across all grade levels with both general education students and student with disabilities.

KidTools, a free, downloadable software program that could be easily implemented by a special or general education teacher, was the self-monitoring software used to test its effects on homework completion and math and spelling accuracy. Supporting the considerable utility of using technology to support educational efforts for students with disabilities, the results revealed that the introduction of the self-monitoring package substantially improved both spelling and math homework completion and accuracy rates.

### **Citation**

Falkenberg, C.A. & Barbetta, P.M. (2013). The effects of a self-monitoring package on homework completion and accuracy of students with disabilities in an inclusive general education classroom. *Journal of Behavioral Education*, 22, 190-210.

### **Relational and Social Competencies with Aggressive Youth**

#### **Authors**

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#### **Abstract**

School counselors (SCs) have a wide range of responsibilities in schools, such as administrative, disciplinary, and counseling duties (Dahir & Stone, 2009). Due to the large number of responsibilities, SCs sometime struggle with developing programs to meet relational needs of at-risk students. The purpose of this article was to provide SCs with a creative, hands-on approach to use with youth struggling with anger and relational issues. SCs in four schools collaborated with a mental health counselor to implement a school-based anger management group that focused on creating leadership abilities and improving relational competencies of students. A pretest–posttest design revealed significant changes in participants' anger and leadership ability.

### **Practical/Social Implications**

The research findings indicated that developing leadership skills in youth was linked with a decline in anger. Consequently, by managing the self-perception of angry students through, for example an intervention, as was done in this study, a positive change (from aggressor to potential leader) in youth behavior could occur. The research also highlighted the influential role of school counselors in helping youth develop their social and relational skills. Finally, the results supported allowing students to practice their relational competencies and develop leadership skills by having the youth teach the activities and lessons they learned to peers not in the group.

### **Citation**

Burt, I., Patel, S.H. & Lewis, S.V. (2012). Anger management leadership groups: A creative intervention for increasing relational and social competencies with aggressive youth. *Journal of Creativity in Mental Health*, 7, 249-261.



## Expanded Markers of Success in Introductory University Physics

### Authors

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### Abstract

As part of our Physics Education Research Group efforts to transform the physics instruction at Florida International University (FIU), we have focused attention on how to assess the reforms we implement. In this paper, we argue that the physics education community should expand the ways that it measures students' success beyond grades and conceptual inventory scores to include assessments of students' participation in a learning community and changes in their attitudes. We present case studies of three introductory undergraduate physics students' increasing participation in the physics learning community at FIU, which is a large, urban, Hispanic-serving institution. In previous work, we have reported gains in conceptual learning and attitudes about learning science in those students enrolled in the introductory courses at FIU taught with Modeling Instruction, which operates in a collaborative learning environment [Brewe, Kramer, & O'Brien, 2009. Modeling instruction: Positive attitudinal shifts in introductory physics measured with CLASS. *Physical Review Special Topics—Physics Education Research*, 5(1). doi: 10.1103/PhysRevSTPER.5.013102]. This paper expands upon those results in considering the variety of opportunities for participating in the physics learning community and by closely examining three aspects of student participation: students' attitudes about learning physics, their ties within the physics classroom, and their relationships within the physics learning community. This provides a more comprehensive understanding of how students in underrepresented groups may become successful physics learners.

## Practical/Social Implications

An implication of this study is that instructors and researchers can and should attend to students' development beyond the increase in their conceptual knowledge. By monitoring students' ties to the community and their attitudes about learning, we can better understand whether students are integrating into their local scientific learning community and whether they are developing ideas about learning that align with the larger community of scientists. An instructor would not need to conduct a detailed study such as that presented here; SNA, combined with currently-used learning attitude surveys can provide a snapshot of a class's community structure and beliefs. If community ties and beliefs are assessed, instructors can facilitate these through implementing classroom changes such as an increased group work.

### Citation

Goertzen, R.M., Brewe, E., & Kramer, L. (2012). Expanded markers of success in introductory university physics. *International Journal of Science Education*, 35, 262-288.

## Applying an Interactive Quantitative-Qualitative Framework: How Identifying Common Intent Can Enhance Inquiry

### Authors

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### Abstract

This article offers a conceptual discussion of a series of qualitative and quantitative research endeavors that share common underpinnings and purpose. The article demonstrates several commonalities between approaches with the hope of encouraging readers to allow research questions to guide methodological choices and avoid overemphasizing division between research paradigms. The current work offers an extension of ideas previously published in *Human Resource Development Review* (Newman & Hitchcock,

2011) to address a call to explore aspects of theory building in the context of research methods (Reio, 2010). Specific ideas discussed here focus on commonalities between quantitative and qualitative work when dealing with the broad notion of generalization, and include

- connections between transferability, probabilistic generalization, naturalistic generalization, and external validity;
- commonalities between multiple (or collective) case studies and meta-analyses; and
- phenomenological perspectives and probability.

**Practical/Social Implications**

Although the methodological paradigm wars have been rejected by many (Tashakkori & Teddlie, 2010), it is still traditional to present methods as quantitative,

qualitative or mixed at the possible cost of limiting research design creativity. This work expands on the idea that different research paradigms share much in common and we wish to give voice to a perspective that it is sometimes best to think of research as research and not get caught up in paradigm discussion. It is our hope that the aforementioned points will stimulate methodological diversity among social science, and thus HRD, researchers, as well as promote a stronger understanding of the purpose of different research techniques that can inform and guide theory building efforts in the social sciences.

**Citation**

Hitchcock, J. & Newman, I. (2013). Applying an interactive quantitative-qualitative framework: How identifying common intent can enhance inquiry. *Human Resource Development Review*, 12, 36-52.