

Graduate Research Day 2013

Florida Atlantic University

Charles E. Schmidt College of Science

Dyadic Instruction for Middle School Students: Liking Promotes Learning

Amy C. Hartl, Dawn DeLay, Brett Laursen

Psychology; Florida Atlantic University

This study examines whether friendship facilitates or hinders learning in a dyadic instructional setting. Working in 80 same-sex pairs, 160 (60 girls, 100 boys) middle school students ($M = 12.13$ years old) were taught a new computer programming language and programmed a game. Students spent 14 to 30 ($M=22.7$) hours in a programming class. At the beginning and the end of the project, each participant separately completed (a) computer programming knowledge assessments and (b) questionnaires rating perceived friendship with the partner. Results support the proposition that friendship promotes learning: Higher levels of initial friendship predicted greater subsequent increases in computer programming knowledge for both partners. One partner's initial programming knowledge also predicted the other partner's subsequent perceptions of friendship: The greatest declines were found for students who, at the outset, were close to partners with little computer programming knowledge; the greatest increases were found for students who, at the outset, were not close to partners with considerable computer programming knowledge.

Dyadic Computer Programming Instruction for Middle School Students: Friendship Promotes Learning

Amy C. Hartl¹, Dawn DeLay¹, Jill Denner², Linda Werner³, Brett Laursen¹, Ashley Richmond¹,
Shrija Dirghangi¹, Cody Hiatt¹, Daniel J. Dickson¹, Gilly Bortman¹, Lauren Shawcross¹

¹Florida Atlantic University, ²ETR Associates, ³University of California, Santa Cruz

Introduction

Many teachers require students to work in dyads. Some allow friends to work together; others do not. Friends collaborate enthusiastically, but there is concern they may goof off and be disruptive (Zajac & Hartup, 1997). Friends may be advantageous as they are mutually invested in the relationship, communicating openly and resolving disagreements in a mutually satisfactory manner, which provides a foundation for working together to solve problems and achieve a common goal (Laursen & Pursell, 2009). Conversely, the presence of friends can distract from learning and interfere with productivity, as pressure to perform may be reduced (Maldonado et al., 2009) and off-task behaviors may increase (Krackhardt, 1999).

The present study examined the effect of friendship on learning in a collaborative computer programming environment. A modified longitudinal Actor-Partner Interdependence Model (APIM: Kenny, Kashy, & Cook, 2006) was applied to the data to address 2 research questions: Does friendship promote learning? Does task knowledge promote friendship?

Method

Participants

Participants were 160 students (60 girls, 100 boys; $M = 12.13$ years, $SD = 1.00$) in 80 same-sex dyads from middle schools throughout California. Students completed an average of 22.66 hours of instruction ($Range = 14-30$, $SD = 3.19$).

Measures

Friendship represents affinity for the partner, assessed using 6 items from the 23-item Friendship Qualities scale (e.g., "I feel happy when I am with my partner") (Bukowski, Hoza, & Boivin, 1994). Items were measured on a scale from 1 (Not True) to 5 (Very True) ($\alpha = .90$).

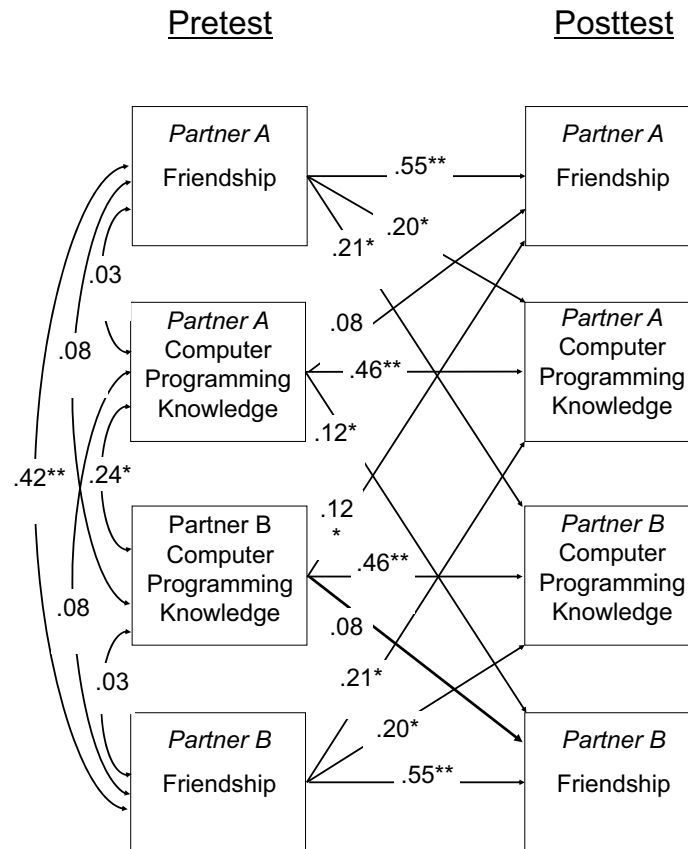
Computer Programming Knowledge was assessed with an 8-item test of programming ability (e.g., "What would happen if you were to play the above 3 lines of code") (Kelleher, 2007). Responses to items were either correct (1) or incorrect (0).

Each student received a score indicating the number of correct responses ($Range = 0-8$) ($\alpha = .76$).

Procedure

During the first 2 sessions, students worked with several partners, then privately submitted the names of 3 students they wanted to work with, in rank order. Teachers assigned students to dyads accordingly. During the first half of the semester, students learned programming skills and concepts. During the second half of the semester, students designed and programmed their own interactive computer game.

Figure 1. Initial friendship predicts changes in self and partner computer programming knowledge and initial computer programming knowledge predicts changes in partner reports of friendship.



Note. $N = 80$ dyads. * $p < .05$, ** $p < .001$, two-tailed. $\chi^2_{(2)} = 2.61$, $p > .05$, $RMSEA = .06$, $TLI = .96$. Correlated error terms not depicted.

Results

Perceptions of Friendship Predicting Change in Computer Programming Knowledge

Pretest friendship was significantly associated with changes in the student's own computer programming knowledge from pretest to posttest ($\beta = .20$), as well as changes in the partner's computer programming knowledge from pretest to posttest ($\beta = .21$). The closer an individual felt toward the partner at the outset, the more his or her own computer programming knowledge improved and the more their partner's computer programming knowledge improved.

Computer Programming Knowledge Predicting Change in Perceptions of Friendship

Pretest computer programming knowledge was significantly associated with changes in partner reports of friendship from pretest to posttest ($\beta = .12$), but not with changes in self-reports of friendship ($\beta = .08$).

Discussion

Our findings come down firmly on the side of friendship as a facilitator of instruction. Friendship shapes subsequent learning by both the individual and by the partner, such that adolescents learn more the more they like their partners. The findings suggest that even if children are not able to work with their best friends, there is merit in encouraging them to work with someone whom they like. As friendship increased, participants learned more, suggesting that children should be allowed to select collaborative learning partners in order to take full advantage of the benefits of prior affiliation. Importantly, effort should also be made to avoid pairing children who dislike one another.

As well, initial abilities anticipate changes in partner reports of friendship. Posttest friendship was better predicted by pretest partner computer programming knowledge than by one's own computer programming knowledge. Children may base assessments of attraction on the perceived costs and benefits of the relationship (Laursen & Hartup, 2002), e.g., a friend with academic skills can be valuable in terms of the potential for tutelage and support.

Funding

This project was supported by a grant to Jill Denner and Linda Werner from the U.S. National Science Foundation (0909733). Brett Laursen also received support from the U.S. National Science Foundation (0923745) and the U.S. National Institute of Child Health and Human Development (HD068421).