

# Warren J. Baker Endowment for Excellence in Project-Based Learning Robert D. Koob Endowment for Student Success

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## FINAL REPORT

### **I. Project Title**

Smartphone-Based Intervention Project to Support Cal Poly Ethnic Minority Students

### **II. Student(s), Department(s), and Major(s)**

(1) Carol Wang, Dept. of Psychology/Child Development

(2) Lindsay Szabo, Dept. of Psychology/Child Development

(3) Luis Cuellar, Dept. of Computer Science

### **III. Faculty Advisor and Department**

(1) Julie Rodgers, Dept. of Psychology/Child Development

(2) Alexander Dekhtyar, Dept. of Computer Science

### **IV. Cooperating Industry, Agency, Non-Profit, or University Organization(s)**

University of California, Santa Barbara, Dept. of Computer Science

University of California, Santa Barbara, Dept. of Counseling, Clinical, & School Psychology

Potsdam University, Germany

### **V. Executive Summary**

The purpose of this project was to develop a smartphone-based self-affirmation intervention (App) to help buffer the potential negative effects of discrimination/prejudice on ethnic minority Cal Poly students. More specifically, we developed a smartphone application and collected data to help validate the application which consisted of: 1) a 14 day daily diary study, in which students report their well-being and health behaviors and complete the App on 3 separate days, and 2) a psychophysiology study in which we expose students to discrimination and then deliver the self-affirmation intervention through the use of the App, while monitoring their stress responses (e.g. blood pressure, heart rate, galvanic skin response, etc.). We successfully completed the data collection for the daily diary study this year, and presented the preliminary results at an international conference on education in Madrid, Spain. We also plan to present additional analyses and results of the daily diary study at the Western Psychological Association conference in April.

Luis Cuellar, senior Computer Science undergraduate student, was in charge of designing of the mobile application and setting up the mobile survey technology (SurveySignal and Qualtrics interface). We used SurveySignal to administer the smartphone component of the survey and Qualtrics to administer the online questionnaire. Lindsay Szabo, senior Psychology undergraduate student, was the Lab Manager and Recruitment Coordinator for most of the year. Carol Wang was the Lab Manager and Recruitment Coordinator in Fall 2015. Both were responsible for assisting with the drafting of the human subjects protocol amendments, designing the survey (e.g., research on psychometric measures, literature search and review, etc.), advertising the study, scheduling of participants (e.g., recruitment through the online SONA system), administering of the intake survey (which was conducted in our laboratory in Bldg 52), enrolling and tracking students during the mobile phase of the study, and administering the follow up questionnaire. This quarter, Carol has been involved in setting up the psychophysiology study (e.g. drafting study protocol for human subjects approval, design of study materials, preparing experimental protocol and debriefing materials, etc.) including recruiting participants and overseeing preliminary data collection. The second phase of research is ongoing and should be completed in Winter. Dr. Rodgers has been responsible for overseeing the project, including finalizing human subject protocols, etc.

As is often the case with new technologies, we encountered more technical difficulties and issues with the studies than initially anticipated. For example, it took a considerable amount of time to program the SurveySignal component of the study and to design the interface for the two data collection systems (mobile and online desktop computer systems). In addition, we encountered unanticipated problems with the data collection, such as the need to send a greater number of email reminders to participants during the mobile phase of the study, and the need to re-run participants who skipped more than 3 days during the 14 day mobile phase. SurveySignal proved to be a less reliable system than anticipated, where on two occasions the company lost a portion of our data when their network went down. Despite these significant hurdles, we were able to develop a successful study protocol and recruitment system. The overall response rate was high, with over 80% of participants completing all phases of the study. We also did not anticipate the need for a loaner smartphone and mobile data plan, which was used for the psychophysiology study and for participants in the daily diary study who did not own a smartphone.

We also conducted focus groups with a subset of the participants in order to solicit feedback regarding the study protocol and recruitment procedures. Our qualitative and quantitative analyses suggest that the mobile application is easy to use and very appealing to students. Although greater validation work is still needed (through this second ongoing phase of research), we believe that the app will be effective in supporting ethnic minority students at Cal Poly and other college campuses through buffering the potential negative effects of discrimination/prejudice. Moreover, the App will be easy to disseminate via email and online resources which has the potential to reach a larger audience.

## **VI. Major Accomplishments**

- (1) We developed a scalable self-affirmation App for the smartphone.
- (2) We have validated the App, in part. We completed data collection for Phase 1 (Daily diary validation study) and Phase 2 (Psychophysiology study) is underway.
- (3) We presented the preliminary results at a conference: Szabo, L., Wang, C., Juang, L., Kia-Keating, M., Dekhtyar, A., & Spencer-Rodgers, J. (June, 2015). *A smartphone-based intervention to buffer the negative effects of perceived discrimination among ethnic minority college*

students. Poster presented at the International Conference on Learning. Madrid, Spain.

(4) Forthcoming poster presentation: Wang, C., Szabo, L., Juang, L., Kia-Keating, M., Dekhtyar, A., & Spencer-Rodgers, J. *Mobile self-affirmations, perceived discrimination, and mental/physical health among Latino- and Asian-Americans*. Poster submitted to the annual meeting of the Western Psychological Association. Long Beach, CA.

### (3) Expenditure of Funds

<b>Student Applicant(s): Lindsay Szabo, Carol Wang, Luis Cuellar</b>	
<b>Faculty Advisor: Dr. J. Rodgers/ Dr. A. Dekhtyar (Computer Sci)</b>	
<b>Project Title:</b>	<b>Requested Baker Endowment Funding</b>
<b>Travel</b> <i>subtotal</i>	<b>\$</b>
Travel: In-state	\$
Travel: Out-of-state	\$
Travel: International	\$
<b>Operating Expenses</b> <i>subtotal</i>	<b>\$</b>
Non-computer Supplies & Materials	<b>\$4,986.78</b>
Computer Supplies & Materials	\$
Software/Software Licenses	\$
Printing/Duplication	\$
Postage/Shipping	\$
Registration	\$
Membership Dues & Subscriptions	\$
Multimedia Services	\$
Advertising	\$
Journal Publication Costs	\$
<b>Contractual Services</b> <i>subtotal</i>	<b>\$</b>
Contracted Services	\$
Equipment Rental/Lease Agreements	\$
Service/Maintenance Agreements	\$
<b>TOTAL</b>	<b>\$4,986.78</b>

Note: International travel funds were rebudgeted to supplies (with permission).

### (4) Impacts to Student's Learning

Students were crucial in seeing this project come to fruition. This project fostered cross-collaboration among students and faculty and allowed for interaction across disciplines. Luis was responsible for designing the mobile application and he learned how to utilize new technologies (SurveySignal and Qualtrics). Both Lindsay and Carol played important roles in the projects. They embodied the "learn-by-doing" approach by learning how to conduct research in an

academic setting. They helped to design the daily diary and intake/exit questionnaires, drafted study protocols for human subject approval, outlined the experimental protocol, actively recruited participants, and performed data analysis. An additional 8 psychology undergraduate students were involved in the project, serving as experimenters. Furthermore, this project resulted in a preliminary poster presentation at an international conference where the students were able to hone their scientific writing in presenting the results. In sum, these skills are important and could be generalized to a variety of settings including future opportunities in research including graduate school.