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WHERE SPORT MEETS ARTS AND LETTERS:

A MENTAL SKILLS TRAINING INTERVENTION INFUSED INTO A COLLEGE ENGLISH COMPOSITION COURSE

ABSTRACT

We examine the utility of using Mental Skills Training (MST) as a platform to enhance the academic self-efficacy, motivation, and study habits of low-income undergraduate college students enrolled in an introductory English course. Three separate treatment conditions were examined which infused MST material into a pre-existing English curriculum. A quasi-experimental design was utilized to compare longitudinal trends over time on the academic-success-related variables between the treatment conditions and control conditions. Repeated measures of ANOVA results revealed an advantage over time for the intervention group on some, but not all, variables of interest relative to peers in the control group. These results suggest that infusing MST material into pre-existing college courses in other fields may be a viable way to enhance the self-efficacy, motivation, and study habits of low-income college students.

INTRODUCTION

Academic performance is a complex phenomenon that is shaped by a wide variety of factors which extend beyond the traditional notions of academic skills and content knowledge (Rosen, et al., 2010). While this statement may seem obvious, especially to those in the professional academic community, the research supporting this notion is still in an emergent stage. It wasn't until the early 2000s that Nobel prize-winning economist James Heckman (Heckman & Rubinstein 2001) popularized the term *non-cognitive skills*, where he first presented the argument that factors such as motivation, time management, and self-regulation are critical for positive life outcomes (Heckman referred to these factors as "non-cognitive" because they are not measured by commonly administered cognitive tests such as IQ or academic examinations).

Heckman's work has spurred a wide range of subsequent studies where non-cognitive attributes have been shown to be related to successful academic outcomes. In a comprehensive review of many of these works, Farrington and colleagues (2012) identified a host of non-cognitive factors which appear to influence academic performance including: persistence, resilience, grit, goal-setting, help-seeking, cooperation, conscientiousness, self-efficacy, self-regulation, self-control, self-discipline, mindsets, effort, work habits, and organization. More specifically, Duckworth and Seligman (2005) suggested that academic performance is dependent in large part on students' self-control. They claimed that measures of self-discipline are far more predictive of positive academic outcomes than are measures of IQ. Further, Dweck and colleagues (2011) expanded on these notions of the importance of non-cognitive skills by coining the term academic tenacity as one of the keys to academic achievement. They suggested educational interventions and initiatives which target non-cognitive factors can have transformative effects on students' experience and achievement and may have long-lasting effects on core academic outcomes such as GPA and test scores.

Thus, it's clear that in addition to content knowledge and study skills, students must develop sets of "non-cognitive" behaviors, skills, attitudes, and strategies in order to perform well academically. However, few in academia have taken

(continued)

INTRODUCTION *(continued)*

Dweck and colleagues (2011) advice and developed interventions which specifically target this skill-set—despite the apparent need for new curricular models. One such model, Mental Skills Training (MST), has been used extensively in sport and military environments for years, is rooted in "non-cognitive" theory, and may provide a useful platform to address these concerns.

The idea behind mental skills training is to teach non-cognitive skills (e.g., goal-setting, self-confidence, coping skills, energy management, concentration, motivation, etc.) to performers with the aim of enhancing both psychological functioning and human performance. This paradigm has been widely applied and confirmed in competitive sport contexts (e.g., Gould., Dieffenbach & Moffat, 2001; Greenleaf, Gould & Dieffenbach, 2001; Meyers, Whelan & Murphy, 1996) as well as in the military (e.g., Hammermeister, et al., 2010; Hammermeister, Pickering & Lennox, 2011; Hammermeister, et al., 2012). For example, Hammermeister and colleagues (2010) conducted a large-scale randomized control trial (n = 2566) using MST techniques with basic trainees in the U.S. Army and found small, but significant, effects revealing better use of mental skills, mental health, and improved performance for soldiers in the treatment condition relative to controls.

Since MST has shown its utility in both sport and military settings, it is surprising the application of MST-related training in academic settings has been relatively unexplored. In one of the very few data-based intervention studies utilizing MST as a protocol for enhancing academic performance, Hammermeister and colleagues (2012) found that first-generation college students exposed to 10 weeks of MST material scored higher on a variety of indicators of mental fitness, stress hardiness, and academic success compared to peers in a control condition.

Given the paucity of research in the academic setting, the objective of the present study is to expand on Hammermeister's (2012) previous work with first-generation college students and further determine if sport-related mental skills can be utilized as a training framework to enhance the mental skills, academic motivation, and study skill habits of low-income undergraduate college students enrolled in an introductory English composition course.

METHODS

INTERVENTION

A unique aspect of this intervention was that the MST material was infused into an existing English composition curriculum and delivered concurrently. This study contained three separate treatment conditions including:

- MST material infused into a pre-existing English composition curriculum and delivered by an AASP-certified consultant and sport psychology trained graduate students (n= 34). We termed this group the "sport psych-infused" condition.
- MST material delivered by English department graduate students with 10 weeks of training in MST (n = 54). We labeled this condition the "English-infused" condition.
- Material delivered by an experienced English department faculty member which included an alternative curriculum emphasizing MST and "grit" (n= 25). This condition differed from the previous two by its comprehensive use of mental skill and grit-related themes in reading and writing activities. This was labeled as the "grit" condition.
- A control condition of English composition students who did not receive MST material (n =36).

INTERVENTION *(continued)*

For the "infusion" treatment conditions (i.e., the sport psych and English groups) a series of educational sessions utilizing sport psychology techniques and methods deemed germane for English composition success were provided. These classrooms sessions introduced students to basic MST concepts such as goal-setting, self-talk, self-confidence, emotion-control, and imagery with a specific emphasis on how these constructs can be applied to English composition. Students were then asked to briefly discuss and then write about the material. This material was presented in addition to their regular English composition curriculum. For these conditions a total of 10 sessions were presented over a 10-week academic quarter with each session lasting approximately 30 minutes (see Appendix A).

In the "grit" treatment condition, the topic of inquiry was "academic achievement." Most current composition courses use scholarly themes to develop the rhetorical awareness requisite for collegiate literacy. In the "grit" section, students used popular media (for example *New York Times* reviews, TED Talks) to become acquainted with the work of Tough (2013), Duckworth (Duckworth et al., 2007), and Dweck (2006). Later, they collaboratively read and independently researched scholarship (e.g., Heckman & Rubenstein, 2001) on the topic. As a result, they were exposed to the relationship between non-cognitive skills and academic achievement in explicit content and daily classroom processes.

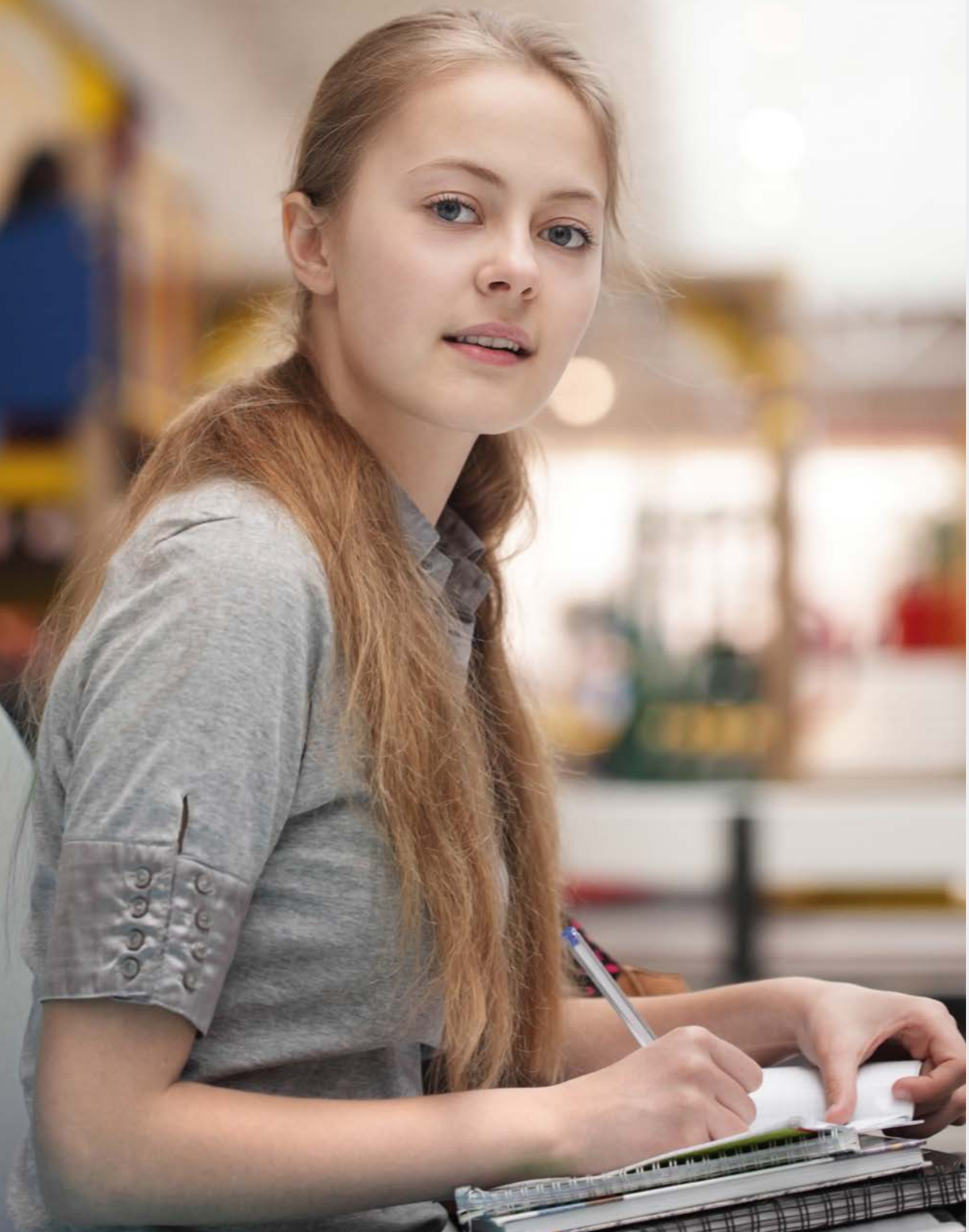
PARTICIPANTS

Participants included 149 low-income English composition students (46% males and 54% females) which represents a subset of a larger study. We used Pell Grant status as our operational indicator of low-income standing. Ages ranged from 16 to 28 years old with a mean age of 18.93 and a standard deviation of 1.54. Ethnicity demographics portrayed 49.7% Caucasian, 11.4% African American, 20.1% Latino, 7.4% Asian and 10.7% other. Participants were primarily freshman (79.2%), with a smaller percentage of sophomores (16.8%), juniors (2.7%) and seniors (.7%)

INSTRUMENTATION

DEMOGRAPHICS

A short demographic questionnaire was developed for this study and includes questions about age, gender, year in school, ethnicity, GPA, family socioeconomic status, parent's level of education, etc. Additionally, there will be a confidential identifier question asking the participant to include first initial and birth date.



MENTAL SKILLS

Developed by Thomas et al. (1999) and refined by Hardy et al. (2010), the Test of Performance Strategies (TOPS) measures psychological skills and strategies utilized by athletes during practice and competition events. The present investigation utilized the revised TOPS 2 due to its stronger psychometric properties. The verbiage for this measure has been slightly adapted to make items more relevant for use with college students. Additionally, a stem has been added in order to prompt participants to respond to items as they apply to their academic experiences (as opposed to "sport" experiences). Further, this study utilized five of the eight practice subscales from the TOPS 2 (i.e., self-talk, emotional control, goal setting, activation, and attentional control) and two of the competition subscales (i.e., negative thinking and imagery) as they were deemed most relevant for our population of interest. Additionally, due to the verbiage of the relaxation scales from the TOPS 2 not being germane to an academic population, the present study retained the relaxation (during competition) scale from the original TOPS instrument. Each subscale is comprised of four items, for a total of 32 items, which are rated on a five-point Likert scale from 1 (*never*) to 5 (*always*), indicating the frequency of mental strategy usage (i.e. "I set very specific goals" and "I motivate myself to train through positive self-talk").

SELF-EFFICACY

To measure academic self-efficacy, the present study used the self-efficacy items developed by Grant & Franklin (2007). The measurement consists of four items (e.g., "How confident are you that you can improve your GPA (Grade Point Average) by the end of this quarter?") which are rated on a 10-point Likert scale from 1 *(no confidence)* to 10 *(fully confident).*

SELF-CONFIDENCE

Confidence was measured using the Sport Confidence Inventory (SCI; Vealey, 2002), a 14-item, self-report questionnaire developed to assess three types of sport confidence. Individuals are asked to assess their abilities in relation to their perceptions of success. Verbiage for this measure has been slightly adapted to make items relevant for an academic population. The standard stem for each question is, "How certain are you that…" and responses are rated on a 7-point Likert scale from 1 *(can't do it at all)* to 7 *(totally certain)*. The SCI is comprised of three subscales, including: physical skills and training; cognitive efficacy; and resilience (Vealey, 2002). For this study, only the cognitive efficacy and resilience subscales were utilized.

ACADEMIC MOTIVATION

The Academic Motivation Scale (AMS; Vallerand et al., 1992) is the result of the cross-validation of the Echelle de Motivation en Education (EME; Vallerand et al., 1989), a French-Canadian motivation scale. The AMS is a seven-factor instrument designed to measure three types of intrinsic motivation (intrinsic motivation to know, to accomplish, and to experience stimulation), three types of extrinsic motivation (external, introjected, and identified regulation), and amotivation. The scale asks participants to indicate the extent that each item presently corresponds to a reason why they go to college (e.g., "In order to obtain a more prestigious job later on"). Each subscale consists of four items, for a total of 28 items, which are rated on a 7-point Likert scale ranging from 1 *(does not correspond at all)* to 7 *(corresponds exactly).*

STUDY SKILLS

In order to measure an individual's qualitative approach to studying, a revised version of the Study Process Questionnaire (R-SPQ-2F: Biggs, Kember, & Leung, 2001) was utilized. The R-SPQ-2F is a 20 item instrument rated on five-point Likert scale from A *(never or rarely true of me)* to E *(always or almost always true of me)*. It is designed to give the individual a score for the two main factors of *deep approach* and *surface approach*, as well as a score for each of the subscales of *deep motive, deep strategy, surface motive*, and *surface strategy*. The reliability coefficients for each of the two factors were acceptable, with Cronbach alphas of 0.73 for *deep approach* and 0.64 for *surface approach*. The alphas for the subscales ranged from 0.57 to 0.72. Confirmatory factor analysis also verified the two-factor structure of the instrument (Biggs et al., 2001).

RESULTS

Table 1 (next page) shows means and standard deviations for the targeted mental skill variables, table 2 (page 16) shows means and standard deviations for academic motivation variables, while table 3 (page 17) provides the same for our indicators of study skill/habits. Due to the exploratory nature of this study and the small sample size, p-values of <.10 were deemed worthy of further discussion. Figures 1-8 provide a visual overview comparing the treatment and control group change trajectories of these longitudinally assessed outcome variables.

MENTAL SKILLS

Table 1 provides information on the group means and standard deviations for each variable across the various groups. The repeated measures ANOVA revealed a quadratic effect for the Emotion Control subscale of the TOPS2, F(3,66) = 2.36, p = .08, (see Figure 1). A linear effect was found for the TOPS 2 subscales of Activation, F(3,66) = 1.95, p = .13 (see Figure 2). Linear effects were also noted for the cognitive subscale of the SCI, F(3,65) = 2.69, p = .05 (see Figure 3), and the SCI total, F(3,65) = 2.60, p = .06 (see Figure 4). Finally, linear effects were also found for the Academic Self-Efficacy scale F (3,64) =3.67, p=.02 (see Figure 5).

TABLE 1: DESCRIPTIVE STATISTICS MENTAL SKILLS

	Sport Psych Infused						English Infused						Grit Curriculum						Control					
	T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3	
Subscales	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Self-Efficacy*	7.30	1.71	7.50	1.76	7.86	1.83	8.10	1.47	8.10	1.45	8.20	1.46	8.43	1.47	8.31	1.62	8.02	2.04	8.25	1.68	8.42	1.55	7.65	2.05
Emotion Control++	3.33	0.73	3.42	0.75	3.38	0.67	3.19	0.82	3.29	0.80	3.61	0.69	3.12	0.74	3.31	0.74	3.73	0.82	3.44	0.56	3.47	0.60	3.59	0.68
Attention Control +	2.86	0.71	2.79	0.65	3.02	0.68	3.13	0.64	3.15	0.61	3.10	0.58	2.87	0.54	3.03	0.68	2.98	0.64	3.03	0.56	2.96	0.63	3.08	0.64
Activation	5.03	1.29	4.97	1.23	4.88	1.52	5.38	0.94	5.13	0.94	5.14	1.08	5.15	0.97	5.31	0.82	5.44	1.05	5.27	0.91	5.13	0.92	5.14	0.93
SCI Cognitive*	4.56	1.39	4.99	1.28	4.59	1.45	4.59	1.28	4.95	1.20	5.01	1.14	5.22	1.28	5.27	1.13	5.88	1.33	5.17	1.16	5.00	1.08	5.06	1.18
SCI Resilience	5.37	1.49	5.52	1.44	5.17	1.61	5.19	1.43	5.49	1.40	5.53	1.43	5.82	1.42	5.72	1.29	6.43	0.72	6.16	0.85	5.96	0.94	5.71	0.92
SCI Total**	5.03	1.30	4.97	1.23	4.88	1.52	5.38	0.94	5.13	0.94	5.14	1.08	5.15	0.97	5.31	0.82	5.44	1.05	5.27	0.91	5.13	0.92	5.14	0.93

a. Significant at .05 – Linear effect*
b. Significant at .10 – Linear effect**
c. Significant at .05 – Quadratic effect+
d. Significant at .10 - Quadratic effect++

MOTIVATION

Table 2 provides means and standard deviations for the AMS subscales. Repeated measures ANOVA revealed a significant linear effect for the AMS subscales of accomplishment motivation, F(3,63) = 3.47, p -.02 (see Figure 6) and introjected motivation, F(3,63) = 2.93, p = .04 (see Figure 7).

TABLE 2: DESCRIPTIVE STATISTICS ACADEMIC MOTIVATION

	Sport Psych Infused						English Infused						Grit Curriculum						Control					
	T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3	
Subscales	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
IM to accomplish*	4.26	1.56	4.75	1.42	4.47	1.58	4.44	1.35	4.75	1.35	4.88	1.39	5.17	1.41	5.01	1.43	5.85	1.38	5.15	1.18	4.92	1.08	4.86	1.32
IM to know	4.89	1.41	5.21	1.30	4.70	1.50	4.88	1.32	5.05	1.09	5.14	1.08	5.29	1.31	5.53	0.99	5.90	1.32	5.25	1.35	5.10	1.44	5.25	1.27
IM to stimulate	3.07	1.51	3.98	1.85	4.02	1.79	3.31	1.38	3.89	1.49	4.19	1.41	4.10	1.58	4.12	1.50	4.88	1.55	3.84	1.45	3.79	1.57	4.31	1.43
EM external	6.00	1.15	5.83	1.17	5.52	1.60	5.85	0.89	5.77	1.10	5.79	1.08	5.94	1.42	5.46	1.77	6.23	0.84	6.22	1.01	6.17	0.76	6.08	0.88
EM introjected*	5.40	1.45	5.52	1.44	5.17	1.61	5.22	1.45	5.46	1.40	5.54	1.43	5.82	1.42	5.72	1.29	6.44	0.72	6.17	0.84	5.96	0.94	5.71	0.92
EM identified	6.01	1.01	5.91	1.06	5.67	1.20	5.97	0.75	5.98	0.89	5.95	1.05	5.97	1.33	5.85	1.27	6.56	0.64	6.34	0.91	6.34	0.68	6.09	0.93
Academic Motivation Total	1.81	1.40	2.04	1.39	2.28	1.60	1.68	1.12	1.95	1.37	1.75	1.31	1.65	1.24	1.81	1.31	1.08	0.22	1.69	1.02	1.90	1.38	2.14	1.34

a. Significant at .05 – Linear effect*

STUDY SKILLS

Table 3 displays means and standard deviations for our indicators of study skill. Repeated measures ANOVA results did not reveal significant effects for any of these variables of interest. However, the RSPQ surface approach to studying subscale approached quadratic significance F (3,65)=1.72, p=.17 (see Figure 8).

TABLE 3: DESCRIPTIVE STATISTICS STUDY SKILLS

	Sport Psych Infused						English Infused						Grit Curriculum						Control					
	T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3	
Subscales	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Deep approach	2.72	0.59	2.70	0.67	2.83	0.65	2.76	0.62	2.84	0.65	2.92	0.73	2.88	0.56	3.05	0.71	3.35	0.63	2.79	0.61	2.78	0.60	2.87	0.75
Surface approach	2.74	0.59	2.66	0.54	2.80	0.73	2.58	0.63	2.55	0.55	2.69	0.71	2.74	0.76	2.51	0.46	2.65	0.54	2.56	0.54	2.76	0.63	2.96	0.70
Hours studying	2.18	1.47	3.12	1.58	3.00	1.56	2.36	1.59	3.08	1.50	3.23	1.56	2.36	1.42	2.53	1.18	3.42	1.44	2.55	1.77	2.96	1.55	2.81	1.82

DISCUSSION

SPORT PSYCH CONDITION MENTAL SKILLS

Visual examination of the longitudinal plots shows the sport psych infused group appeared to differ over time relative to the other groups on several of the mental skill variables. On the positive side, students in this condition appear to display a subtle "j-curve" over time on the emotion control variable (see Figure 1). This indicates students may have undergone a minor "breaking-in" process as they initially attempt to absorb the emotion control concepts over the first five weeks of the intervention; however, once the material begins to resonate they then show improvement during the last five weeks. This appears to be only moderately different from the English-infused condition and the control group but very different from the grit condition which shows an inverse j-curve (i.e., subtle improvement first five weeks then dramatic decline the last five weeks). On the attention control variable the sport psych infused condition again displays a j-curve which suggests a similar process as with emotion control. After an initial learning period where a subtle decline is noted, the students in this condition show improvement over the last five weeks (see Figure 2). Again, this appears to differ from the grit condition but not from control or the English-infused condition. On academic self-efficacy, the sport psych-infused group appears to steadily improve over time while the control group declines dramatically and the other two groups show only moderate change (see Figure 5). Conversely, the sport psych condition appears to decline slightly over time on the SCI-variables which differs from the grit condition but not the other two. This finding is somewhat disappointing as self-confidence was a targeted variable for all of the treatment conditions and one we expected to see improvement in (see Figures 3 & 4).

FIGURE 1. Longitudinal plots for emotion control.

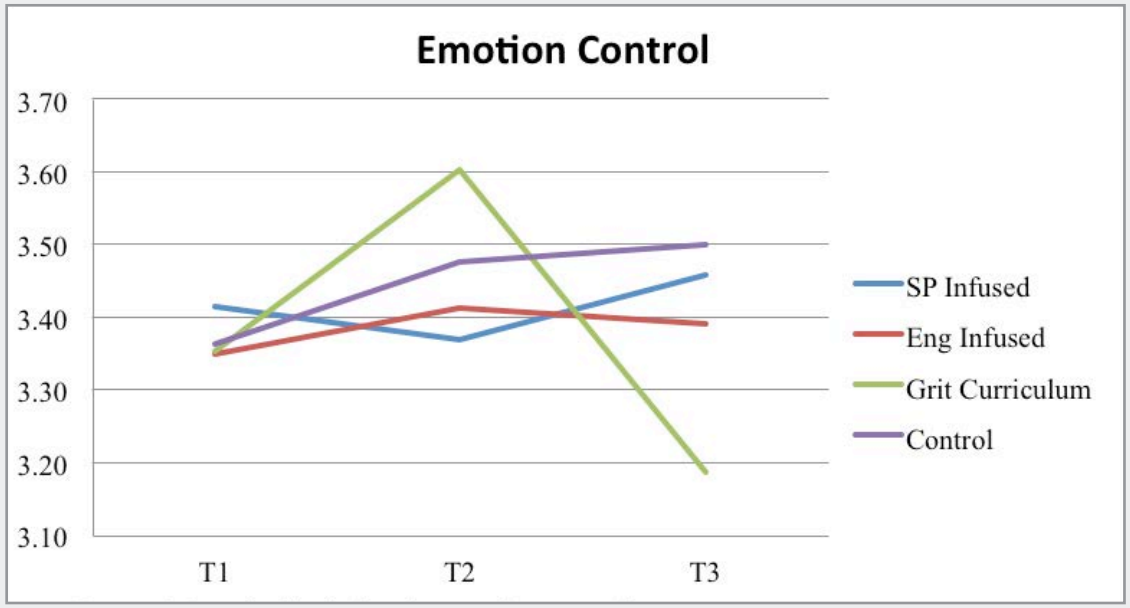


FIGURE 2. Longitudinal plots for attention control.

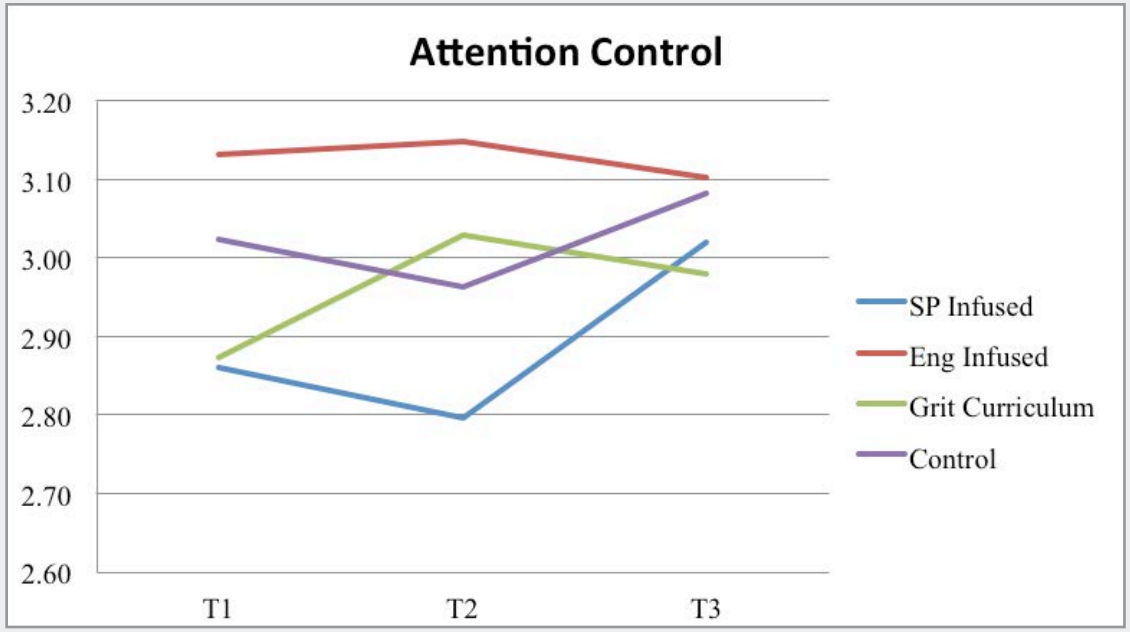


FIGURE 3. Longitudinal plots for self-confidence cognition.

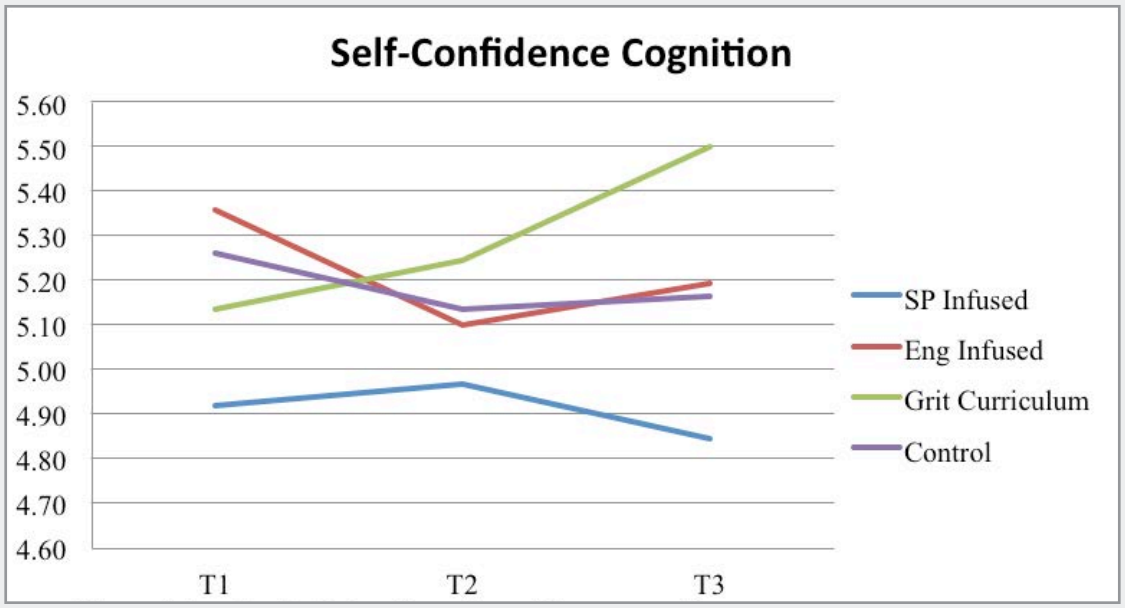


FIGURE 4. Longitudinal plots for self-confidence inventory total.

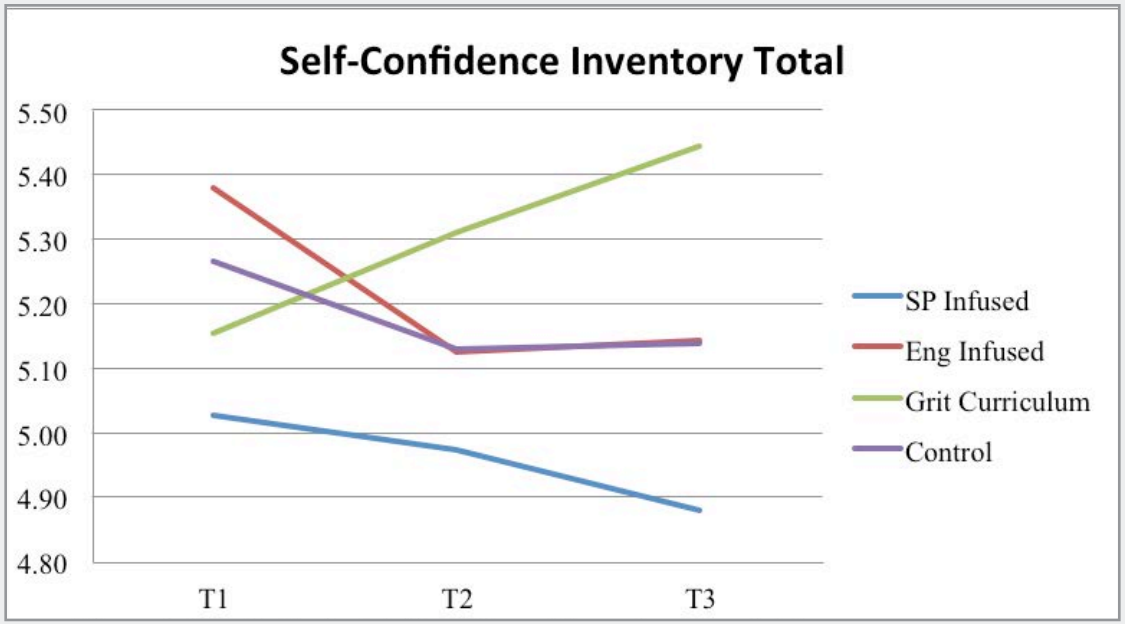
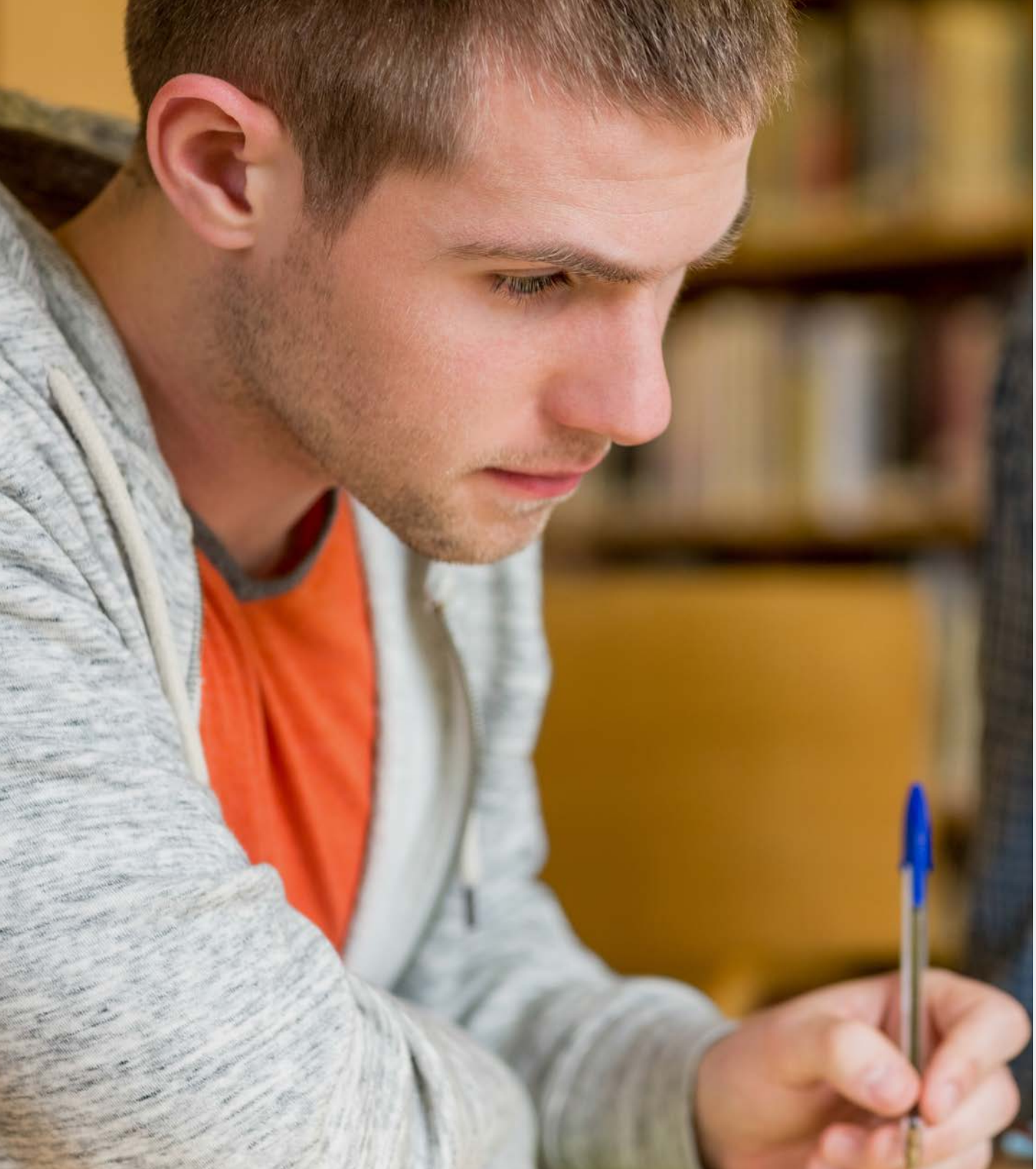


FIGURE 5. Longitudinal plots for self-efficacy.

MOTIVATION

On the AMS variables that displayed a significant overall effect (i.e., the intrinsic motivation to accomplish and external introjected motivation subscales), the sport psych-infused group appears to show little change over time. This is in stark contrast to the grit condition which displays well-defined j-curves on both AMS variables. Further, the curve for the control condition shows a decline on both of the AMS variables (see Figures 6 & 7).



STUDY SKILLS

While none of the study skills variables reached mathematical significance the RSPQ surface approach subscale came close and the longitudinal plot provides some interesting discussion points. The sport psych-infused condition again shows a subtle j-curve, although in this instance that is not a positive finding as this suggests students in this group were slightly less engaged in their studying as the 10-week intervention progressed—especially during the last five weeks (see Figure 8). This finding is also similar to the other two treatment conditions. However, it is interesting to note that the control group displays a dramatic, and linear, upward trend across the entire 10-week time frame which suggests that the fact the sport psych condition showed little change may indeed be a more positive result than appears on the surface.

Taken in aggregate, these findings suggest only moderate intervention success with this sport psych-infused group. A number of factors likely contributed to the mixed results including a) the relatively small dose (approximately 30–45 minutes per week) of MST material presented, b) the difficulty many of the English department instructors had in reinforcing the MST material, and c) the lack of clarity inherent in the process of infusing one curriculum within another.

FIGURE 6. Longitudinal plots for intrinsic motivation to accomplish.

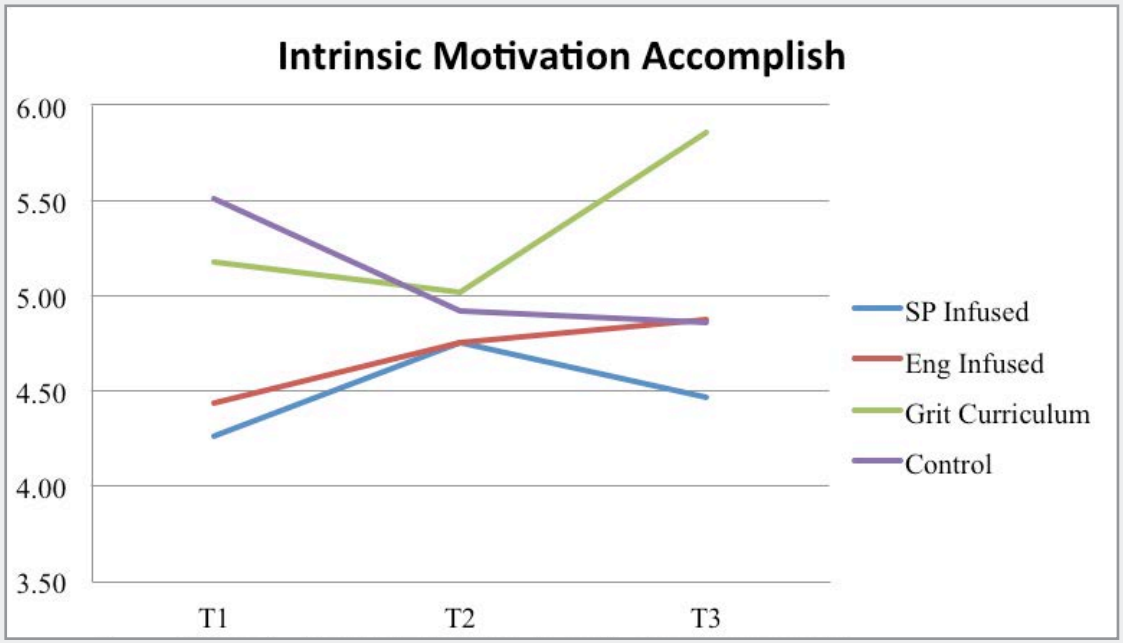


FIGURE 7. Longitudinal plots for extrinsic motivation to introject.

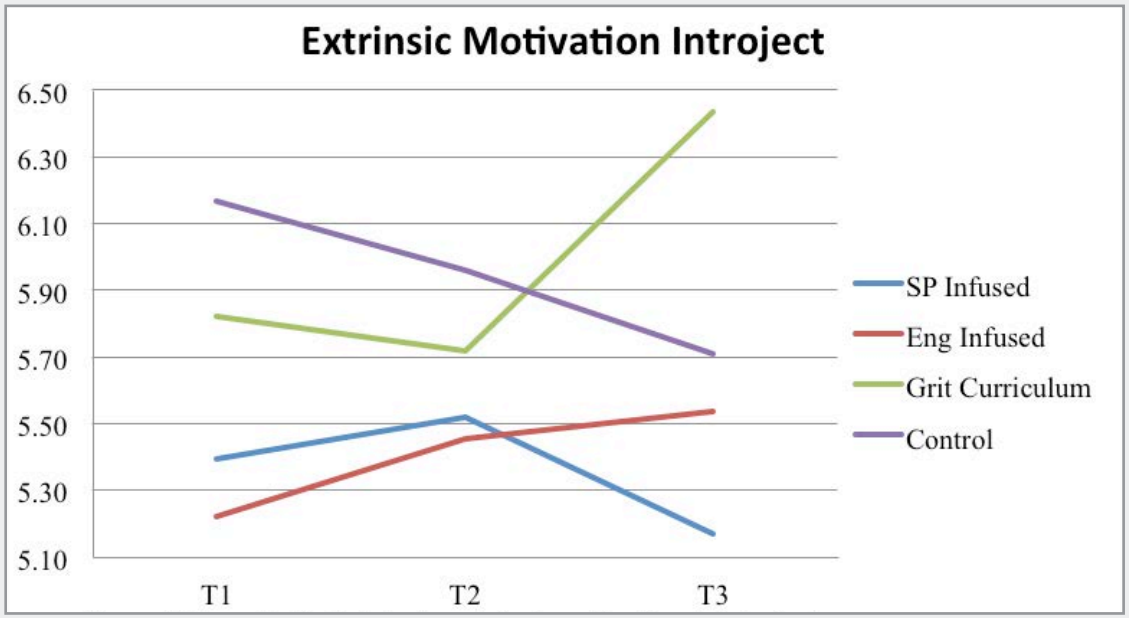
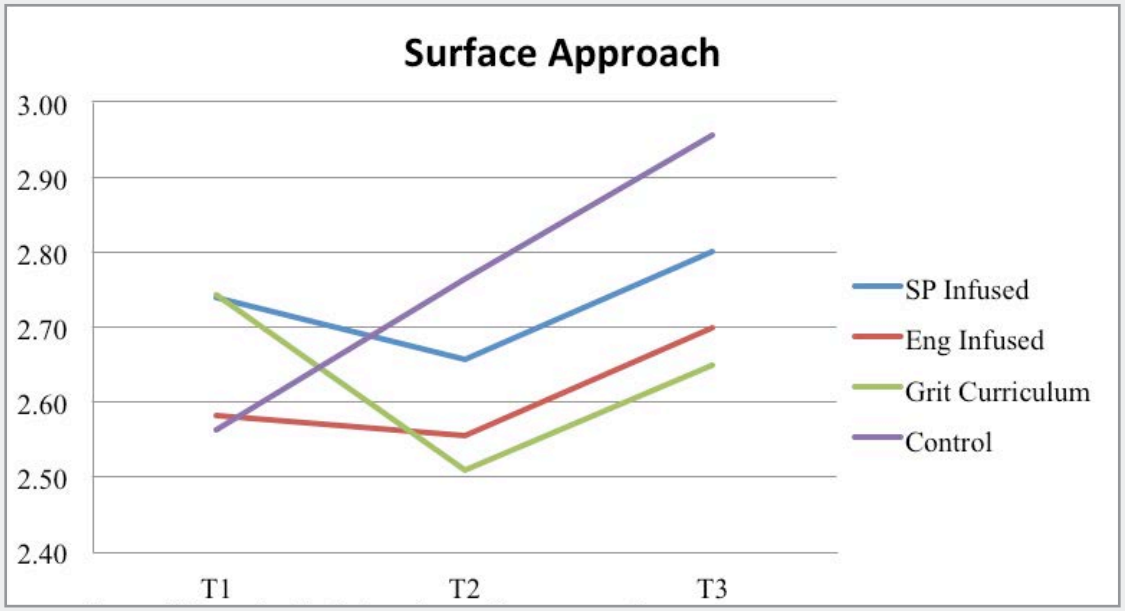


FIGURE 8. Longitudinal plots for surface approach.



ENGLISH TA CONDITION

MENTAL SKILLS

Visual inspection of the longitudinal plots shows the condition taught by English TAs displayed very few positive noteworthy changes over time. This is in contrast to both the sport psych-infused and the grit conditions which exhibited some positive upward trends over the course of the 10 weeks. The only finding of note would be on the SCI total which shows a decline in confidence, especially in the first five weeks.

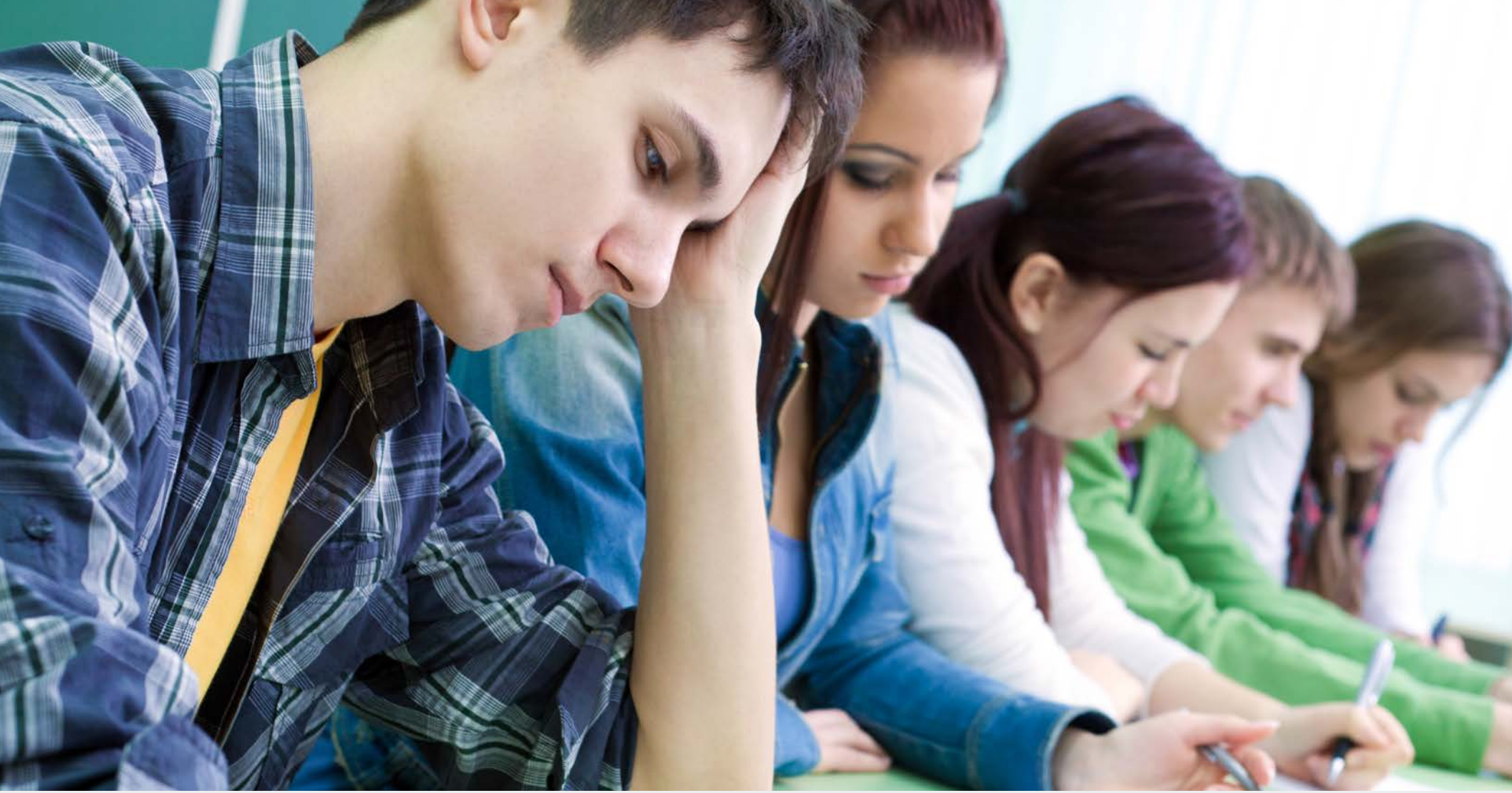
MOTIVATION

Similar to the findings for mental skills, this condition shows little change over the 10-week intervention.

STUDY SKILLS

A subtle j-curve appears evident on the AMS surface approach subscale which again suggests a slight decrease in study efficiency over the last five weeks.

Overall, no noteworthy effects were evident for this condition on any of the variables of interest, suggesting we had very little success with this intervention condition. Factors which may have underscored this lack of success include a) the English TAs not being well-versed in MST concepts, b) the lack of commitment to the MST concept by the English TAs, and c) the "mixed" message provided to students inherent in the two curriculum approach.



GRIT CONDITION

MENTAL SKILLS

Visual inspection of the longitudinal plots revealed several findings of note. First, the grit condition displays a dramatic inverse j-curve on the TOPS2 emotion control subscale (see Figure 1) suggesting less knowledge and use of this variable—especially over the last five weeks. This is in contrast to the longitudinal plots for the SCI variables which show linear improvement over the course of the study. Further, the slope for the SCI variables appears to differ from the other three conditions. Meanwhile, little change over time was noted with this condition on either the TOPS2 subscale of attention control or the academic self-efficacy instrument. These findings suggests that the grit condition was able to influence self-confidence in a meaningful fashion but not attention control or academic self-efficacy, while emotion control appears to worsen over time. Interpreting these results is somewhat problematic as one would expect emotion control and self-confidence to be covariates (e.g., Bandura, 1997). However, it should be noted that self-confidence was a strongly targeted and emphasized construct across all of our treatment conditions while emotion control was less so.

MOTIVATION

Visual inspection of the AMS subscales reveals a well-defined j-curve for both the intrinsic motivation to achieve subscale and the introjected motivation subscale. These findings suggest students in this condition were more intrinsically motivated to accomplish their English composition-related work over time but simultaneously felt more "extrinsic" pressure in the form of introjected motivation. These findings again appear to be somewhat incongruent as one would generally expect to see an inverse relationship between these two variables. We suspect several factors may be at play here: first, the instructor for this course was a very experienced and dynamic pedagogue who was capable of both engaging students in the joy of learning while simultaneously maintaining a strict classroom environment where students were held accountable for their work. Thus, it's quite possible students could experience enhanced intrinsic motivation (especially to accomplish) while also feeling somewhat driven by a sense of guilt if they didn't live up to the instructors expectations. Lastly, while the AMS displayed good internal consistency, the students may have had some difficulty interpreting the nuances between these instruments. Given that, we feel it's safe to say that students in this condition are reporting more generalized motivation (i.e., more benefit and less cost) for their English composition course over time.

STUDY SKILLS

Similar to the other two treatment conditions, a subtle j-curve appears evident on the AMS surface approach subscale which again suggests a slight decrease in study efficiency over the last five weeks. However, this finding remains noteworthy given the strong linear upward slope of the control condition which suggests a greater decrease in study efficiency with students who did not receive any treatment. Further, our cross-sectional research has consistently shown relationships between MST-related constructs and study skill (e.g., Hammer, et al., 2013; Jordan, et al., 2012). While we believe this relationship exists, these findings clearly show we have not yet developed the most effective way to impact these variables using the MST framework. While it's not likely study skills and MST are independent, they may very well be additive and may require a more robust and specific intervention to attain an effect.

Taken in collectively, these results suggest a much stronger intervention effect with this condition as opposed to the other two. Factors which may have contributed to this relative level of success include a) a much larger dose of MST material (approximately five hours per week as opposed to 30 minutes or less for the other two treatment conditions), b) the "mixed message" effect was likely minimized due to the entire curriculum being MST and grit based, and c) a potential trainer effect as material was delivered by an experienced full-time faculty member well versed in MST, who was an expert pedagogue, and had strong ability to connect with undergraduate university students. This sits in contrast with the other conditions which were taught primarily by graduate assistants with varying levels of expertise in MST.

CONCLUSIONS

This study showed that the infusion of MST material into an English composition was moderately effective as long as several considerations were met: First, the "dose" of MST appeared to require a certain level of critical mass to be effective. In this study we were not able to determine precisely where that threshold lies. However, it appears to lie somewhere beyond the 30 minutes per week allocated to the "infusion" groups and may require up to five hours per week of immersion to garner an effect. Not surprisingly, the grit condition provided the largest dose of MST-related material and also showed the most consistent effects. While this is a clear indicator of the importance of dose, this finding also strongly suggests the viability of a resilience-based themed approach to English composition. The second consideration which should be highlighted is the importance of the instructor—as it is very likely we experienced a trainer effect in the grit condition. While the importance of outstanding teachers is not news to the higher education community, this finding shows the importance of having skilled staff for the delivery of MST-based intervention material as the concepts simply cannot be "absorbed" by the sample population otherwise. The third consideration of note was the low-income status of the study population. While we did not find major differences on our variables of interest between low-/high-income students, we did see more profound effects over time with the lower income group. The intervention in the present study was based off prior experimental studies which were aimed at first-generation college students (e.g., Hammermeister, et al., 2010) which are generally a lower income group than their generational peers. Thus, it's possible our material was inadvertently "targeted" more toward this group than other subpopulations in our sample.

Lastly, taken at face value our findings may appear to be on the modest side – particularly with the infusion conditions. However, given the critical importance of college graduation for the students themselves, employers, and the economy, as well as the prevalence and cost in time and energy of other programs designed to enhance persistence, we believe the outcomes presented here are noteworthy. Summer bridge programs, supplemental instruction programs, first-year programs, mentoring programs, developmental education programs, and culturally specific advising and retention programs are often separate from or additional to the general education and major requirements for a degree. College composition, however, is one of the most universally required, transferable gateway courses at any institution. The infusion of MST into the composition course was low cost (.75% of one faculty member for two years), and whether or not individual students became more resilient, those who passed the course received credit towards graduation. Unlike other programs mentioned above, MST did not cost the students additional money or time. The economy of this effort suggests future research into this type of approach may be warranted.

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APPENDIX A

Recommended Sequence for Mental Fitness Skills for Academic Success

UNIT	MFT CONCEPT	ENGL 101 GOALS EMPHASIZED	CONNECTIONS
ESSAY EXAM	**Week 1**: Goal Setting (Intro) **Note:** Goal setting reviews occur every week of quarter **Week 2:** Self-Talk **Week 3:** Emotion Control	– Reading comprehension, analyze texts – Identify elements of rhetorical situation – Use academic discourse	The essay exam is a familiar context and a fairly simple rhetorical situation. Readings will be challenging and will require students to summon emotional control to persevere through "boring" texts, to harness the power of stress in the writing situation, and to use self-talk to help them organize and analyze during the exam situation.
AUTOBIOGRAPHY	**Week 4:** Goal Setting (Class Specific) **Week 5:** Visualization/Imagery	– Tone – Writing process – Use evidence – Collaboration – Freedom from error	An academic autobiography presents a complex rhetorical situation using forms of evidence easy to access though challenging to present appropriately. Using visualization/ imagery in MFT echoes the skill set needed to present focused and persuasive retrospective evidence in the auto-biography.

APPENDIX A *(continued)*

UNIT	MFT CONCEPT	ENGL 101 GOALS EMPHASIZED	CONNECTIONS
RESEARCH PAPER	**Week 6:** Self Confidence **Week 7:** Thinking Traps **Week 8:** Resilience (after draft is returned)	– Logical fallacies – Using evidence – Error freedom – Rhetorical situation – Academic discourse	The research paper requires students to both analyze the needs of an academic paper and to join the academic discourse community as a producer of knowledge. Students need to build self-confidence as they read complex texts that are not shared by the entire class. They also need to avoid the thinking traps and self-doubt that can creep in during a project that feels enormous and stretches over many weeks.
REFLECTION	**Week 9:** Support Networks; Goal Setting	– Reflection	Students may need to consciously invoke their goals and resilience strategies after they receive feedback on their first complete drafts. In addition, because their research writing is the start of their membership in an academic discourse community, they can begin to think about how to develop, choose, and sustain relationships (with real people and scholars) to enable them to reach their goals. A review of the goals students set for ENGL 101 and the degree to which they achieved them, the strategies that they invoked or failed to invoke, and the effect of these strategies will provide a framework for their reflection.