

TRULY ACCOMPLISHED:
EXPLORATORY STUDY OF SUCCESS MAP DEVELOPMENT

by

DOREY STEVIA CHAFFEE

A thesis submitted in partial fulfillment of the requirements
for the Honors in the Major Program in Psychology
in the College of Sciences
in The Burnett Honors College
at the University of Central Florida
Orlando, Florida

Summer Term 2013

Thesis Chair: Dr. Barbara Fritzsche

©2013 Dorey Stevia Chaffee

ABSTRACT

The current study examined Truly Accomplished (TA), an intervention designed to help individuals develop personalized systems to measure and improve behavior by utilizing well-established principles and research on motivation, participation and feedback. This study focused on participation during Success Map development (an integral step in the TA process) and the impact of using experts to develop Success Maps in the TA system. Using the context of fitness, 40 female participants were randomly assigned to either complete the regular TA process, developing their own Success Maps, or the modified TA process, using expert-developed Success Maps. A repeated-measures design with one between-subjects independent variable was used to measure overall effectiveness scores, changes in fitness performance (plank, wall-sit, push-ups, curl-ups) and body composition (BMI, percent body fat), attitudes of system development, satisfaction with TA and satisfaction with life. Additionally, the similarities between expert and self-developed Success Maps were compared. Across all participants, large gains in effectiveness were found, including significant increases in all measures of fitness performance; however, attitudes were poorer when Success Maps were developed by experts. Moreover, there were differences between expert and self-developed Success Maps. Results support TA as an effective intervention for positive behavior change. The practical and theoretical implications of the differences found between conditions are discussed.

I dedicate this thesis to my mentor and thesis chair, Dr. Barbara Fritzsche, who has been a role model and source of inspiration. Throughout this year she has fostered my confidence to succeed academically, professionally and personally through her unwavering support, encouragement and belief in my abilities. Undoubtedly her influence will impact my future endeavors and for that I am grateful.

Also, to my mother, Jill Chaffee, for her unfailing love and support and my father, Rick Chaffee, for his endless enthusiasm and genuine interest in my research.

ACKNOWLEDGMENTS

I would like to express my deepest appreciation to all of those who made this thesis possible. I would like to thank my thesis chair, Dr. Barbara Fritzsche, and my committee members Dr. Valerie Sims and Dr. Thomas Fisher for their invaluable guidance, support, suggestions and patience throughout this thesis.

Additionally, I would like to express my sincerest gratitude to Dr. Robert Pritchard, for his advice, generous support, encouragement, and his warm enthusiastic nature; his professional career and research interests have been a source of inspiration. Additionally, I would like to thank Elissa Ashwood and Natalie Dixon who offered practical insights and guidance in the facilitation of this project.

I would like to thank Jessalynn Bush and Tim Powell, who served as subject matter experts, for their commitment, unique perspectives and acknowledge their crucial role in this study. Also, my lab members, especially Lindsay Dhanani and Luiz Xavier, who spent countless hours answering my questions and listening to me, and Carly Tucker for her support and friendship. My fellow research assistants, Carly Tucker, Gina Anderson, Megan Geary and Yesenia Cancel, who served as Truly Accomplished facilitators and worked countless hours to make this project possible. I cannot thank them enough for their dedication and hard work.

Finally, I would like to thank my sister, for her ever-present voice of reason, and Kaleb Starr, for his support and encouragement.

TABLE OF CONTENTS

INTRODUCTION	1
THEORETICAL AND EMPIRICAL FOUNDATIONS	3
Motivation Theory	3
Action-to-Results Connections	4
Results-to-Evaluation Connection	5
Evaluation-to-Outcome Connection	6
Outcome-to-Need Satisfaction Connection	7
Implications of Participation.....	8
Participation in Identifying Strategies/Objectives	8
Participation in Measures/Indicators and Success Map/Contingency Development.....	9
Participation in Feedback.....	9
Truly Accomplished Empirical Study	10
Truly Accomplished Procedure	12
Success Map.....	13
PURPOSE.....	18
METHOD	20
Participants.....	20
Subject Matter Experts.....	21
Design	21
Steps in Truly Accomplished.....	22

To Feel List	22
Strategies	22
Measures	23
Success Map development	24
Collect Indicator Data	25
Feedback Reports	26
Feedback Meetings	26
Measures	27
Overall Effectiveness	27
Physiological Measures	28
Body Composition	28
Fitness Measures	28
Success Map Comparison	29
Attitudes	31
System Development	31
Satisfaction with Truly Accomplished.....	31
Satisfaction with Life Scale	32
Demographics	32
RESULTS	33
Data Analysis	33
Participants' TA Systems.....	33
Overall Effectiveness	34

Physiological Measures	38
Physical Fitness.....	38
Body Composition	39
Success Map Comparison.....	41
Upper Shape and Degree	42
Lower Shape and Degree	42
Attitudes.....	43
System Development	44
Satisfaction with Truly Accomplished.....	45
Life Satisfaction	46
DISCUSSION.....	47
Summary of and Key Findings	47
Overall Effectiveness	47
Physiological Measures	49
Success Map Comparison.....	50
Attitudes	53
Limitations	55
Time	55
Measures	56
Facilitator and Training.....	56
Generalizability.....	57
Data Analysis	58

Directions for Future Research	58
Conclusion	59
APPENDIX A: INFORMED CONSENT	60
APPENDIX B: EXAMPLE FEEDBACK REPORT	65
APPENDIX C: DEMOGRAPHICS	70
APPENDIX D: ATTITUDES OF SYSTEM DEVELOPMENT	72
(Acceptance, Understanding, Ownership, Perceived Validity and Motivation).....	72
APPENDIX E: SATISFACTION WITH TRULY ACCOMPLISHED.....	78
APPENDIX F: SATISFACTION WITH LIFE SCALE	81
REFERENCES	83

LIST OF FIGURES

Figure 1. Pritchard-Ashwood Motivation Theory (Pritchard & Ashwood, 2008).....	4
Figure 2. Comparison of ProMES to Truly Accomplished (Pritchard & Ashwood, 2012).....	8
Figure 3. Completed Success Map.....	15
Figure 4. Completed Success Map set	25
Figure 5. Linear Shape; Critical Mass Shape; Diminishing Returns Shape (Truly Accomplished Success Meter Software Manual; Pritchard, 2012).....	30
Figure 6. Small, Medium, Large Diminishing Returns Shapes (Truly Accomplished Success Meter Software Manual; Pritchard, 2012)	30
Figure 7. Small, Medium, Large Critical Mass Shapes (Truly Accomplished Success Meter Software Manual; Pritchard, 2012).....	31
Figure 8. Mean Overall Effectiveness Scores Over Time	36
Figure 9. Frequency Distribution of Individual Effect Sizes	37
Figure 10. Linear Relationship of Cardio Activity in the Lower Half of the Success Map	51
Figure 11. Critical Mass Curve of Cardio Activity in the Lower Half of the Success Map.....	52

LIST OF TABLES

Table 1 32

Table 2 33

Table 3 38

Table 4 39

Table 5 40

Table 6 40

Table 7 45

INTRODUCTION

Success—it is a universal desire that drives all people, yet the formula for success is uniquely individual. Described as “the progressive realization of predetermined, worthwhile, personal goals” (Meyer as cited in Brainy Quote), the achievement of success hinges on one’s ability for personal growth and development. The rapid expansion of the self-help industry captures the collective drive toward personal improvement. Even amid a recession in 2008, Americans spent 11 billion dollars on self-improvement programs and an annual growth of 6.2 % is expected for 2012 (Lindner, 2009). The majority of programs on the self-help market are developed from vague theoretical backgrounds using untested methods, creating bad strategies and disappointing results for consumers. Truly Accomplished (TA) is unlike other self-improvement programs available; it was developed using methods that are supported by 30 years of research; shown to increase performance an average of 150%, using measures that are of utmost importance to the individual (Ashwood, 2013).

TA is an empirically supported evidence-based intervention designed to produce behavior change by integrating well-established principles and research on motivation, participation and feedback into an innovative program. Developed by Pritchard and Ashwood, TA helps individuals identify what they want out of life and then assists in the achievement of desired personal change (Dixon, 2012; Pritchard & Ashwood, 2012). This is accomplished through the development of a personalized measurement and feedback system, which through a series of steps aligns values, goals and behavior to increase motivation and maximizes satisfaction (Dixon, 2012). TA’s methodology is derived from the Productivity Measurement and Enhancement System (ProMES), an intervention used to improve workplace productivity and

overall employee performance, utilizing a motivational approach to develop a performance measurement and feedback system. Motivation theory is an essential component from which both systems are built.

THEORETICAL AND EMPIRICAL FOUNDATIONS

Motivation Theory

The Naylor-Pritchard-Ilgen (NPI) theory of motivation defines motivation as “the process of allocating personal resources in the form of time and energy to various acts in such a way that the anticipated affect resulting from these acts is maximized” (Naylor, Pritchard, & Ilgen, 1980, p. 159). Pritchard and Ashwood (2008) further expanded on this theory emphasizing that “motivation is the process used to allocate energy to maximize the satisfaction of needs” (p. 6). The Pritchard-Ashwood theory suggests five components to the motivation process: *Actions*, *Results*, *Evaluations*, *Outcomes*, and *Need Satisfaction*, and the strength of the connection between each component greatly influences motivation. As Prichard and Ashwood (2012) describe, in order to be motivated to take action, one must expect that the action will lead to the desired results, and the results will lead to a desired evaluation, which will lead to desired the outcomes, and those outcomes will lead to need satisfaction. Essentially, people are motivated by expectations of how actions applied over time will produce valued results and satisfy their needs. A summary of the Pritchard-Ashwood Motivation Theory is shown in Figure 1 (Pritchard & Ashwood, 2008).

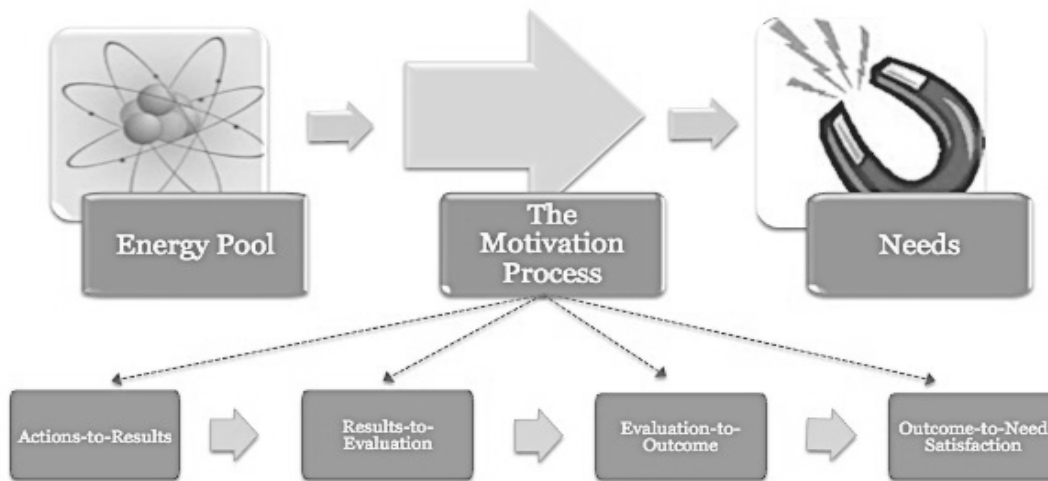


Figure 1. Pritchard-Ashwood Motivation Theory (Pritchard & Ashwood, 2008)

Action-to-Results Connections

Time and energy is required to produce an *Action*. We decide the direction of the action, what we will work on; the effort of the action, how hard we will work; and the persistence of the action, how long we will work. An action pertains to anything a person does which produces measurable *Results*, which are specific, controllable and tangible (Pritchard & Ashwood, 2008). For optimal motivation results are accurately aligned with an individual's valued outcomes. The action-to-results connection in the Pritchard-Ashwood (2008) theory of motivation is the relationship we expect between the amount of energy we put into an action and the amount of the result produced; this perceived relationship between the amount of effort and expected amount can range from strong to weak. In order for this connection to be strong the individual must be confident that he or she can complete the action, have control over the action, and must have a clear understanding of the result produced from any given level of effort.

In TA this connection is strengthened in the development of the measurement system, which is designed by the TA user in conjunction with a TA facilitator for guidance. All decisions in the development of the measurement system are under the control of the TA user, ensuring all selected measurable actions met the criteria to maximize motivation. Furthermore, connections are strengthened through feedback meetings, where strategies are developed to get maximum results from each action (Pritchard & Ashwood, 2012).

Results-to-Evaluation Connection

The results-to-evaluation connection, as described in the Pritchard-Ashwood (2008) theory of motivation, relates to the relationship between the quantity of results produced and effectiveness of those results, given by the evaluator. In other words, this is the measurement and evaluation connection. Important aspects in the results-to-evaluation connection are that evaluations are valid or perceived valid, given in a timely manner, and that changes in the amount of results produced must be perceived as resulting in changes in the level of evaluation (positive or negative). Furthermore, there must be a clear understanding of the relative importance of different results, identify the expected level of each result, know when he or she is above or below expectations, and have the ability to prioritize between areas of improvement (Pritchard & Ashwood, 2012). Additionally, to maintain a strong connection both descriptive (the quantitative value) and evaluative (perceived effectiveness of the value) feedback must be given on the results produced.

In TA the results-to-evaluation connection is operationalized by Success Maps, which are graphical representations of this relationship. Success Map development is an essential and complex part of the TA process, and is later discussed in detail. However, for now it is important

to note that TA maximizes this connection by implementing each of the above-mentioned implications through the development of the feedback system, also known as the Success Meter.

Evaluation-to-Outcome Connection

The evaluation-to-outcome connection from the Pritchard-Ashwood (2008) theory of motivation is “the perceived relationship between the favorableness of the evaluation and the expected amount of an outcome” (p. 29); each connection is “... different for different evaluators” and “...different evaluators control different outcomes” (p. 36). Outcomes are rewards or punishments; they can be both intrinsic and extrinsic and can be increased both directly and indirectly. There must be a distinct variation between positive and negative outcomes, which link good performance to positive outcomes and poor performance to negative outcomes. The connection between performance levels and outcomes, both intrinsic and extrinsic, fosters motivation. If the level of performance does not directly affect the outcomes, performance will not improve. To maximize motivation there should be as many positive outcomes as possible and limited negative outcomes. For the evaluation-to-outcome connection to be strong, outcomes must stay strong, clear, and consistent.

In TA it is expected that outcomes occur indirectly through variations in effectiveness scores contained in evaluative feedback and the subsequent positive or negative feelings associated with the given level of performance. The connection is maximized because the TA user builds the feedback system, which gives consistent evaluations at any level of performance and ensures transparency. Therefore, the consequences of good and poor performance are clear and consistent over time (Pritchard & Ashwood, 2012).

Outcome-to-Need Satisfaction Connection

In accordance to the Pritchard-Ashwood (2008) theory of motivation, the outcome-to-need satisfaction connection communicates the relationship between the outcome level and anticipated need satisfaction level. Differences in outcomes should result in changes in the level of need satisfaction, where negative outcome levels produce higher dissatisfaction and positive outcome levels produce higher satisfaction. It is important that the outcomes actually satisfy fundamental needs of the individual and satisfy as many needs as possible (Pritchard & Ashwood, 2012). Accurate expectations of need satisfaction are essential to maintain motivation and must occur regularly to keep needs satisfied.

In TA the outcome-to-need satisfaction connection is maximized because desired feelings are clearly identified, and then a system is developed that methodically aligns strategies and measures to produce outcomes of value and satisfy important needs. System transparency and stability ensure accurate expectations should exist between outcomes and need satisfaction (Pritchard & Ashwood, 2012).

Both models (Naylor, Pritchard, & Ilgen, 1980; Pritchard & Ashwood, 2008) of motivation are based on expectancy theories (Kanfer, 1990), and extensive research on ProMES has offered valid support (Pritchard, Harrell, DiazGranados, & Guzman, 2008). ProMES is developed through a series of specific steps, defined by Pritchard (1990) as, “(1) identify salient products; (2) develop indicators of these products; (3) establish contingencies; and (4) develop feedback reports” (p. 20). A meta-analysis of 83 field studies was conducted using the ProMES intervention. This study compiled 20 years of transnationally collected data and was shown to be an effective method to increase productivity, with a mean effect size of 1.16, yielding large

productivity increases that lasted over time (Pritchard et al., 2008). Unlike ProMES, which focuses on group productivity and company goals, TA focuses on the productivity and development of the individual, designed to assist individuals with any desired personal change. The methodology of ProMES and TA and the steps to create and use the measurement and feedback system are essentially the same; however, the terminology differs, as shown in Figure 2 (Pritchard & Ashwood, 2012).

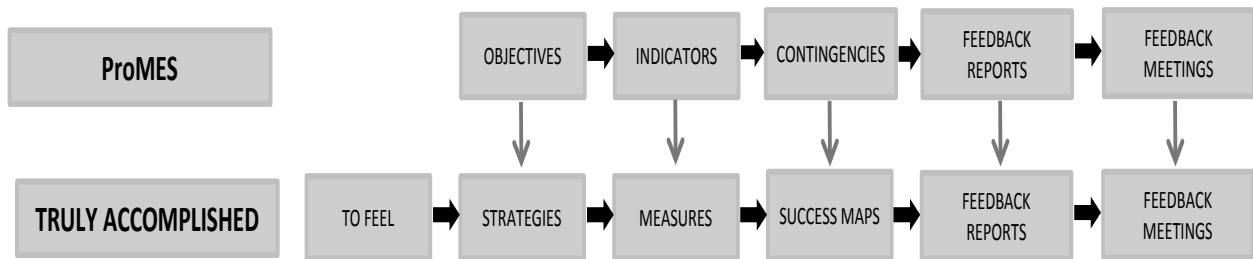


Figure 2. Comparison of ProMES to Truly Accomplished (Pritchard & Ashwood, 2012)

Implications of Participation

The NPI and Pritchard-Ashwood theories stress the importance of participation in system development; participation promotes acceptance, ownership, understanding, and perceived validity of the system (Naylor, Pritchard, & Ilgen, 1980; Pritchard & Ashwood, 2008). TA, like ProMES, is developed through a series of steps, each one designed in a participative nature further enforcing the theoretical motivation components discussed prior.

Participation in Identifying Strategies/Objectives

The first step involves decision-making, specifically identifying strategies by focusing on areas of importance. Research has shown that employee participation on issues of importance is

linked to positive effects on performance and attitudes, specifically acceptance (Cawley, Keeping, & Levy, 1998; Dipboye & de Pontbriand, 1981; Locke & Schweiger, 1979); furthermore, participation in decision-making increases individuals' perceptions of fairness, acceptance of decisions, and goal commitment (Bobko & Colella, 1994; Cawley, Keeping, & Levy, 1998; Kanfer, 1990; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1989).

Participation in Measures/Indicators and Success Map/Contingency Development

The next two steps in the process involve developing performance measures for the selected strategies and building a corresponding Success Map for each measure. Wright, Pritchard, van Tuijl, Weaver, Bedwell, and Fullick (2010) state that people should participate in the development of performance indicators ensuring greater acceptance and understanding on what they will be evaluated on; this further increases performance accountability. Participation during Success Map development has shown to promote system ownership by increasing personal accountability and perceived control over the results (Dixon, 2012). According to Spector (1986) perceived control has been empirically linked to various positive outcomes including motivation, performance and commitment.

Participation in Feedback

The final step in the process is the evaluation and feedback on performance. These evaluations are the resulting effectiveness scores derived from the developed measures and Success Maps. Since evaluations are based on the resulting scores, this further stresses the importance of standards by which people are evaluated; measures and contingencies must be realistic, clear, and developed through participation (Bobko & Colella, 1994; Taylor, Tracy,

Renard, Harrison, & Carroll, 1995). A high level of participation influences perceived validity by ensuring system transparency. Through participation people have confidence that the indicators and contingencies accurately reflect the level of productivity (Pritchard et al., 2008). Perceived validity in the system is essential for effective feedback; people must perceive the evaluation as valid. This is accomplished by having people develop the system from which they are evaluated.

The two central concepts in the theory supporting TA are motivation and participation, which emphasize the importance of strong connections between *action-to-results*, *results-to-evaluation*, *evaluation-to-outcome* and *outcome-to-need satisfaction* for individual motivation to be high. These connections are impacted by participation in system development, which is necessary to promote acceptance, understanding, ownership and perceived validity of the system.

Truly Accomplished Empirical Study

Although there have been dozens of studies on the effectiveness of ProMES there has been only one empirical study on TA. Dixon's (2012) study examined the effectiveness of TA by measuring the improvement of an individual's behavior and examined possible workplace spillover effects associated with that behavior change.

Dixon's (2012) study employed a one-group, pre-post design, composed of 44 participants, 75% of which were female, with a mean age of 43 years. Dixon served as the facilitator, guiding each participant through the development of his or her TA system, typically taking between two and four hours. The participants and facilitator started the process by clarifying values, selecting strategies, defining measures and developing Success Maps. Once the systems were developed, weekly data were collected and feedback began. The data were generated into a spreadsheet and weekly feedback reports of effectiveness scores were recorded.

A weekly meeting between the facilitator and the participant, utilizing the feedback report, permitted an opportunity to discuss progress, priorities and strategize for further improvement.

Data were collected at three specific points throughout the four-week study. Prior to system development measures of conscientiousness, core self-evaluations, goal orientation, stress, life satisfaction, future change efficacy, job satisfaction, job performance and job efficacy were taken. After system development was complete, measures of overall effectiveness scores, psychological safety, goal difficulty and qualitative data were taken. Finally, following feedback measures of overall effectiveness scores, stress, life satisfaction, job satisfaction, job performance, job efficacy, satisfaction with ICA and qualitative data were recorded.

Dixon (2012) found that TA is an effective intervention for lifestyle change. Results showed TA's effect on behavior and attitudes was significant, resulting in large gains in effectiveness, with a mean effect size of 2.93. TA's impact seemed to extend into subject well-being, beyond actual behavior change. In addition, an increase in job satisfaction and job efficacy proved promising indications of positive workplace spillover (Dixon, 2012).

Because studies of TA have been limited, there are numerous aspects of development and application that need to be investigated. One proposed area of study is in the development of Success Maps, an essential part in the TA process. Normally, individuals develop these Success Maps on their own with guidance from a TA facilitator. Participation in the development of the TA system is set up to be consistent with the theory of motivation used in ProMES (Prichard, 1990), which links motivation to the acceptance of the developed system. Prichard argues, in order for acceptance to be high, the individual must be heavily involved in the development of objectives, indicators and contingencies. Individuals must feel a "sense of ownership".

Truly Accomplished Procedure

TA utilizes the same fundamental step structure to develop the measurement feedback system as used in ProMES. The process begins by building the users measurement system using a three-step method. In TA the first step is building a To Feel List. To do this the TA user identifies how he or she wants to feel now (e.g., healthily, connected, spiritual, successful, etc.). This is an important first step in clarifying what the user's needs are and what outcomes will satisfy them. This list is the foundation from which the system is build. Once these feelings are established strategies are developed, which are tangible objectives that if fulfilled would lead to the desired feeling. It is important that the strategies meet the right level of detail, general enough to lead to the desired feeling but specific enough to know when you have achieved it, and it is important they are complete, meaning they encompass the whole feeling. Next, measures are developed for each strategy to accurately reflect how well the strategy is being achieved. For example, an individual might want to feel healthy. A strategy might be "Increase physical activity," then a measure for that strategy might include the "Number of 30-minute cardiovascular exercises per week" or the "Number of 20-minute strength training exercises per week." For measures to be effective they must completely achieve the corresponding strategy, they must be written in a way that maximizes individual control, it must be feasible to collect data on each measure and the data must be reliable (Pritchard & Ashwood, 2012). The facilitator guides each one of these steps to ensure the criteria for an effective measurement system is met. Next, the Success Meter is developed, which is the feedback system that uses Success Maps to evaluate the effectiveness of any given amount of a measure and in combination with weekly results provides information on how to make improvements.

Success Map

Success Maps are developed for each measure, each having an individualized level of effectiveness. According to Pritchard et al. (1989), a contingency (or in TA a Success Map) is defined as “the relationship between the amount of the indicator and the effectiveness of that amount.” In TA, Dixon (2012) defines effectiveness as “the amount of value created for that person by that level of performance on the indicator.” Effectiveness scores are numerical values ranging from negative numbers, indicating that performance is below minimum expectation, and positive numbers, indicating performance is above minimum expectation. An effectiveness score of zero indicates the minimum expectation level is met (Dixon, 2012, p. 4).

Using the previous example of the strategy, “Increase physical activity,” and the corresponding measure, “Number of 30-minute cardiovascular exercises per week,” an individual can decide the effectiveness for each unit measured. First, the best and worst possible performance on the measures is established, followed by the lowest acceptable performance. These quantities are represented along the horizontal axis and labeled “Number of 30-minute cardiovascular exercises per week.” For example, the worst possible performance is zero cardiovascular exercises per week, the best possible is 14, equaling two 30-minute increments of cardiovascular exercise per day, and the lowest acceptable performance is seven. These performance values are established for each Success Map.

Once the best, worst and lowest acceptable performance values are established, the performance value in relation to its level of effectiveness is determined. This is accomplished through a ranking system and converts all Success Maps to a common overall effectiveness scale. The vertical axis displays effectiveness scores ranging from a minimum effectiveness

score of -100 to a maximum effectiveness score of +100. To begin, the zero effectiveness score is evaluated. An effectiveness score of zero represents the level of performance needed to meet minimum expectations, marking that performance value as neither good nor bad, but neutral. In the previous example, seven 30-minute cardiovascular exercises per week equals an effectiveness score of zero. To establish effectiveness scores for the worst possible performance, a value of zero, and the best possible performance (a value of 14) all measures must be ranked. This is accomplished by picturing the measures across all Success Maps at their lowest acceptable performance level (neutral or zero effectiveness) then determining which measure if raised to the best possible performance level would be most beneficial to the person. This measure would receive a maximum ranked of one. The second best possible performance level that would add the most benefit to the person's life would receive a maximum rank of two. This is continued until all measures are ranked according the value each measure would add to the individual's life. The same ranking process is replicated for the worst possible performance. Again, it begins by picturing all measures at their lowest acceptable performance level and then determining which measure if dropped to their worst possible performance level would be the most detrimental to the individual. This measure would receive a minimum rank of one; the next measure that would be the most harmful if dropped to the worst possible performance level would receive a minimum rank of two. This is continued until all measures are ranked.

Next, effectiveness scores are assigned. The measure with the maximum ranked one would be assigned the effectiveness score of +100. All other measures are ranked relative to this. If the maximum ranked two were only half as beneficial than rank one, it would receive an effectiveness score of +50; if the maximum rank two is almost as beneficial as rank one then it

could receive an effectiveness score of +90 or +95. Again, the process is repeated for all of the minimum rankings. The measure that was assigned a minimum rank of one would receive an effectiveness score of -100. All other measures are ranked relative to this. By ranking and scoring effectiveness levels in relation to one another this creates a common scale, which will give an overall effectiveness score. Once all measures are scaled and reviewed for accuracy the Success Map set is complete. An example of a completed Success Map is shown in Figure 3.

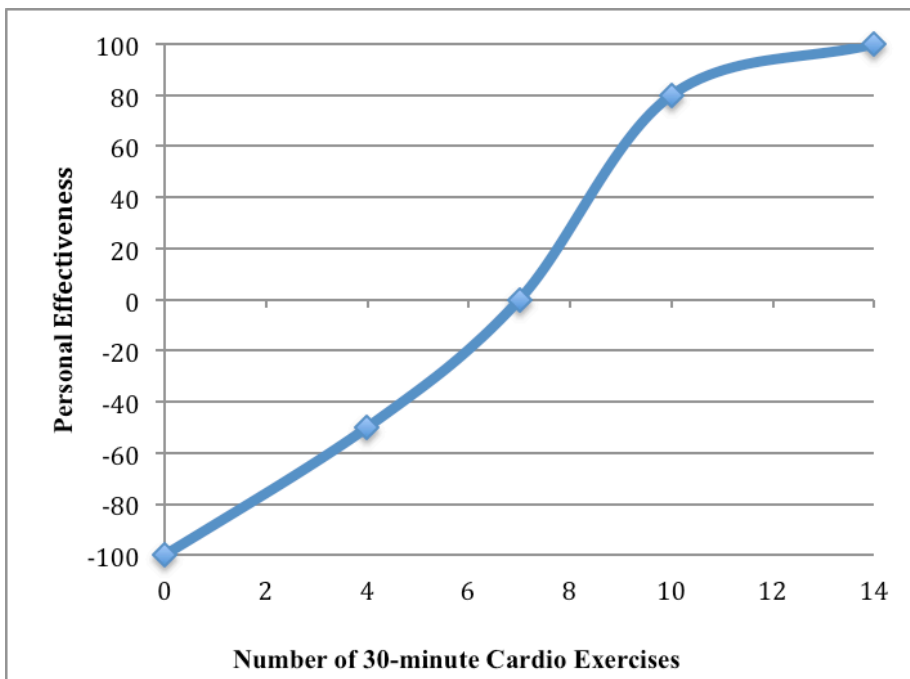


Figure 3. Completed Success Map

Success Maps are beneficial for several reasons. According to Dixon (2012), Success Maps are effective at providing individuals with a clear understanding of the importance of each indicator in relation to one another and the ability to prioritize between them. Dixon (2012) states, “The greater the range in effectiveness scores between minimum and maximum indicator

levels, the greater the importance of the indicator.” To maximize effectiveness, a performance value that falls on a steep point of the Success Map curve should take precedence over one that falls on a flatter point. This is because a steeper curve indicates a maximum gain in effectiveness for a minimal increase of output. While plotting the points of performance values and effectiveness scores three common shapes emerge: linear, diminishing returns and critical mass curve. According to Dixon (2012), “a *linear* relationship indicates that for each gain in the level of the indicator, there is an equal gain in effectiveness,” where as “a *diminishing returns* curve indicates large gains in effectiveness, followed by a decrease toward the maximum level of the indicator” and “a *critical mass* curve indicates very little gain in effectiveness until a person reaches substantial levels of the indicator” (p. 43-44). Other benefits include an overall effectiveness score and the lowest acceptable performance value (an effectiveness score of zero), which allows individuals to understand the minimum expectation of performance on any measure. The overall effectiveness score is possible because each indicator is converted to a common scale and can thus be summed, allowing the individual to see his/her overall effectiveness for the given time period (Dixon, 2012, p. 5-7).

Once all of the Success Maps are developed and reviewed for accuracy, data collection can begin. Performance on each measure is recorded daily. Using the previous example, “Number of 30-minute cardiovascular exercises per week,” the person records the total number of cardiovascular exercises each day and then sums the total data from the measure for the week. The facilitator inputs the weekly results into the Success Meter, which uses Success Maps to create a feedback report. The feedback report gives both descriptive (the amount of a measure) and evaluative (the effectiveness of that amount) information on their overall performance across

all measures, their performance on each measure that week, on each measure over time, on potential effectiveness gains (where to focus their efforts) and on potential effectiveness loss (what measures would be most harmful if decreased). Finally, the TA user continues to measure performance, review reports and monitor progress over time (Dixon, 2012; Pritchard & Ashwood, 2012).

PURPOSE

Although TA differs from ProMES by focusing improvement on areas of personal growth (e.g., health, personal relationships, spirituality, work, finances), it parallels ProMES's method of system development, specifically the aspect of participation to promote system ownership (Pritchard et al., 1989). Participation is an integral component in the motivation theory behind both intervention methods; it "fosters acceptance, ownership, understanding and belief in the validity of the system" (Pritchard & Ashwood, 2008, p. 79). TA promotes participation throughout system development, by identifying how the person wants to feel now, developing strategies, defining measures, assigning values of importance (i.e., Success Maps) and through feedback.

The purpose of this study was to begin to examine a broader question: which step(s) in the TA process are necessary for an individual to have acceptance, ownership, understanding and perceived validity in the completed system? This study focused specifically on participation during Success Map development and evaluated the outcome of substituting expert-derived Success Maps for self-developed Success Maps and the subsequent affects on performance. Presumably, Success Map development is where in-depth participation occurs, contributing significantly to motivation. Furthermore, this study sought to understand the difference between expert and non-expert judgments when evaluating the effectiveness of any given level of performance. Specifically, this study examined: (1) How critical to the success of Truly Accomplished is participation in Success Map development?; (2) How similar are expert-developed Success Maps to self-developed Success Maps?; (3) If expert-developed Success Maps were substituted for self-developed Success Maps, would motivation to use TA be

adversely affected, leading to decreased performance? The importance of these questions is to further understand the motivational component attached to Success Map development and to gain insight into the ability of non-experts to make judgments on performance and effectiveness values. Furthermore, expert-developed Success Maps could potentially be more accurate and effective at obtaining desired outcomes, and if they are more accurate and do not negatively affect motivation, this could streamline the TA process.

To answer these questions, this study focused on Success Map development, utilizing the context of physical fitness to determine the differences, if any, between expert-developed and self-developed (i.e., novice) Success Maps. Then, to examine the affects of participation during Success Map development, expert-developed Success Maps were substituted for self-developed Success Maps, and attitudes and overall performance were measured.

METHOD

Participants

Participants were recruited from a southern university undergraduate population using SONA systems. To qualify to participate in this study the applicant must 1) be female, 2) have expressed an interest in improving her fitness ability, by answering “yes” to fitness questions posted on SONA, and 3) answer “no” to all questions on a Physical Activity Readiness Questionnaire (PAR-Q) form, which is a self-screening questionnaire used to assess the safety or possible risk of an individual who is beginning an exercise program based on “yes” or “no” answers to specific health questions. Fifty-six participants were recruited and completed the PAR-Q; however, eight participants answered “yes” to one or more questions and were subsequently eliminated.

Systems were developed for 48 participants, 24 in the self-developed condition and 24 in the expert-developed condition. Six participants in the self-developed condition and two participants in the expert-developed condition completed systems but failed to follow through to the final feedback meeting. These participants were subsequently excluded from final analyses. The final sample ($N = 40$) included 18 participants in the self-developed condition and 22 participants in the expert-developed condition, which is comparable to Dixon’s (2012) sample size ($N = 44$). Participants’ age ranged from 18 years to 33 years ($M = 20.15$, $SD = 3.02$); there were 3 African Americans, 26 Caucasians, 10 Hispanic or Latino, and 1 who reported her ethnicity as other. Participation was entirely voluntary; each participant was awarded course extra credit and all participants received informed consent. The consent document is included in Appendix A.

Each participant completed a facilitator-led system development session, followed by four feedback sessions. Feedback sessions were held weekly. Four facilitators were randomly assigned to work one-on-one with each participant. The number of participants per facilitator ranged from 9 to 12. Three facilitators were graduate students in the Industrial Organizational Psychology Masters Program and one was an undergraduate student double majoring in Psychology and Sport and Exercise Science.

Subject Matter Experts

Two subject matter experts (SMEs), one male and one female, were recruited through contacts at the YMCA. SMEs education and work experience included: 1) Exercise Physiologist and Health Coach, with a masters in Exercise Physiology and a certified Strength and Conditioning Specialist (CSCS) and 2) former Wellness Director for the YMCA, adjunct instructor for UCF College of Education, Sport and Exercise Science Program, and Aerobics and Fitness Association of America (AFAA) and Keiser Indoor Cycling certified.

SMEs were trained to use the Truly Accomplished Success Meter Software to develop Success Map sets for 24 participant systems. Each Success Map was developed through consensus, using performance measures previously determined by each participant. Each SME received an honorarium.

Design

A repeated-measures design with one between-subjects independent variable was used. Participants were randomly assigned to either complete the (1) normal TA process by developing their own fitness Success Maps or (2) the modified TA process by using expert-developed fitness

Success Maps. Measures were collected at the initial meeting prior to system development (Time 1), following system development (Time 2), and after the final feedback meeting (Time 3). Aside from the Success Map development manipulation all other aspects of the TA process were the same for participants. All systems addressed only fitness strategies. Each step in the TA process is detailed below.

Steps in Truly Accomplished

To Feel List

At the beginning of the system development process, participants were guided through a To Feel List to help them get a clear picture of what they really want in terms of fitness; how they want to feel when they think about fitness and their body (e.g., strong, confident, attractive). To do this, participants began by describing their current fitness situation and how they feel. Then, they were asked to picture themselves in their best shape and describe the associated feelings. From this exercise a feelings list was developed. The facilitator checked each feeling listed to ensure it was an actual feeling (i.e., not a goal or a specific measure) and to ensure it was truly an important feeling to that individual and not based on any outside influence. This step allowed individuals to get a better sense of what was important to them in terms of fitness and to understand that in order to achieve these feelings they must engage in behavior change. These feelings were recorded and used to develop strategies.

Strategies

Participants were then asked to develop strategies based on each feeling. To do this, participants evaluated each feeling and developed a list of objectives that if fulfilled would lead

to the desired feeling. A least one strategy was recorded for each feeling. The TA facilitator reviewed each strategy with the participant to ensure that the strategy was 1) stated clearly, 2) captured and encompassed the entire feeling and 3) was the right level of detail. The strategies were recorded, and then based on these strategies measures were developed.

Measures

Measures are developed to reflect how well each strategy is being achieved. That is, they are quantifiable actions in which performance on each strategy is assessed. Participants reviewed their list of strategies and determined measurable actions they felt would accurately capture their performance on achieving each strategy. The facilitator reviewed all of the measures with the participant to ensure they met the key criteria for a good measure: 1) it is an actual measure, meaning it indicates what is being measured and how it's being measured; 2) there is a clear definition on how the measure is quantified, 3) it leads to the corresponding strategy and encompasses the entire strategy, meaning if you did more of the measure(s) it would achieve the entire strategy, 4) it is controllable by the participant, meaning the more effort that's exerted the more the measure improves, 5) the measure collects reliable data, meaning performance would be consistently measured the same way and 6) data is efficient to collect, meaning performance could be recorded daily and easily calculated. Once the facilitator reviewed each measure to ensure it met all of the key criteria, the measures were recorded and developed into Success Maps.

Success Map development

Success Maps were developed from each measure either by experts or by the participant. The process of Success Map development was analogous, except that experts had to reach consensus in each step of the process, where participants who developed their own Success Maps relied solely on their own judgment. Experts used the participants selected measures and physiological information (i.e., fitness test results, body composition) to make judgments in each step of the Success Map development process. Success Maps in each condition were developed using Truly Accomplished Success Meter Software and followed the same set of steps: 1) establish the best, worst, and lowest acceptable level of performance, 2) determine effectiveness scores for the best and worst performance, 3) input the range of values for the measure between the best and worst performance and 4) assign the remaining effectiveness scores for the values between the best and worst performance. Each step was previously described in detail in the Success Map section.

Once Success Maps were developed for all measures and reviewed for accuracy (and consensus in the expert condition) the system was complete. Prior to leaving, all participants were explained how the Success Meter uses Success Maps and weekly performance results to create their feedback report. An example feedback report was presented and explained to participants to prepare them for what will be discussed at the upcoming feedback meeting. Participants were instructed to record the data from their measures daily and a feedback meeting was scheduled one week from the day of system development. An example of a completed Success Map set is shown in Figure 4.

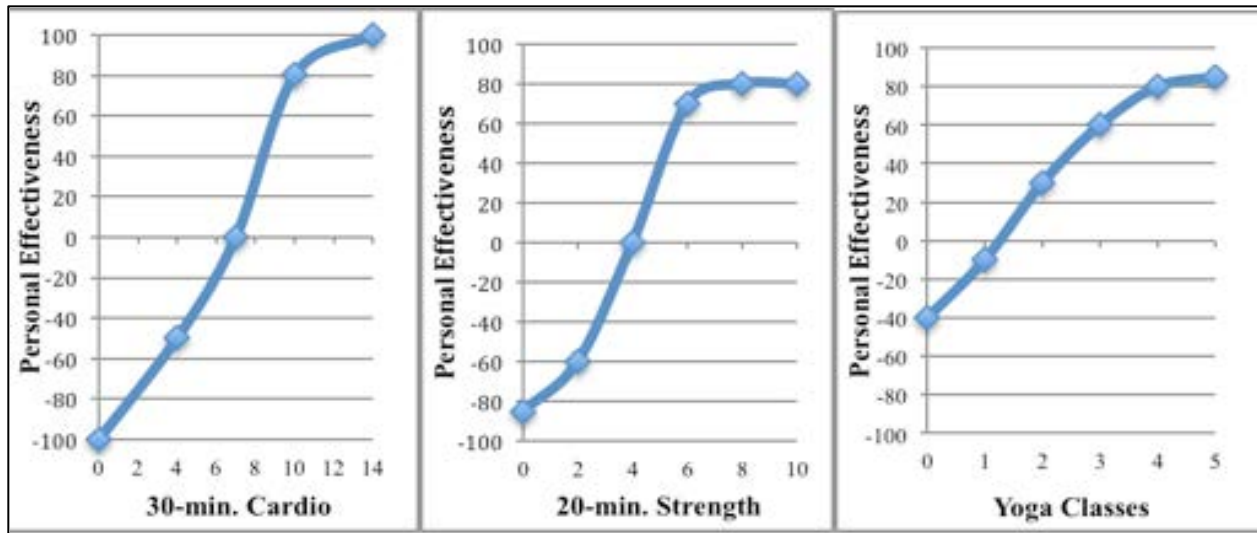


Figure 4. Completed Success Map set

Collect Indicator Data

The feedback portion of the intervention began with the participants tracking their performance on each of their measures daily. To do this, the participants made daily counts of their performance on each measure and then summed the total count on each measure for the week. The weekly results from the measures were sent to the facilitator and then were used to generate a feedback report. Results were recorded daily for four weeks. The initial week of data collection (i.e., before feedback) was used as the baseline score for each measure.

Participants in the modified condition were explained their expert-developed Success Maps prior to the first feedback meeting. Each participant was informed on what was considered good, bad and average performance on each measure. This included a specific range of values that indicated they were improving, with the best possible performance being the greatest value, and a specific range of scores that indicated they were declining in performance, with the worst

possible performance being the lowest value. Finally, they were given the value of the lowest acceptable performance.

Feedback Reports

Each week the facilitator entered the participants' weekly results into the Truly Accomplished Success Meter Software to generate a feedback report. The feedback report provided five graphs with information regarding the participants' performance: Graph 1) showed the overall effectiveness score, and once more that one week of measures were entered, it show the overall effectiveness score over time; Graph 2) showed the effectiveness score by measure; Graph 3) showed performance on each measure over time; Graph 4) showed potential effectiveness gains, what increases would yield the largest effectiveness gains; and Graph 5) showed potential effectiveness losses, what decreases would yield the largest effectiveness losses. An example feedback report is shown in Appendix B.

Feedback Meetings

The initial week of data collection, following system development, served as a baseline score. Thereafter, the facilitator and participant would review the feedback report and discuss progress. If the participant improved, together they would identify which actions were beneficial and how to continue improving. If the participant did not improve, together they would strategize ways to make improvements for the following week. Thus, feedback meetings and reports were used to gain knowledge, both descriptive and evaluative, on current performance and aid in the development of successful strategies for continued improvement.

Measures

Each measure is discussed below and all self-report measures are included in the Appendices.

Overall Effectiveness

Overall effectiveness was calculated as an effect size (d) for each participant. The effect size represents the amount of gain in each person's overall effectiveness score and served as the dependent variable in the subsequent analyses. Individual effect sizes were computed by taking the difference between the overall effectiveness score at the final feedback meeting and the overall effectiveness score at baseline, divided the pooled standard deviation of the overall effectiveness scores during feedback. The effectiveness score recorded at the first feedback meeting, prior to feedback, served as the baseline score.

Dixon (2012) states that calculating participants overall effectiveness as an effect size is necessary to reduce error related to variations in individual systems, specifically the number measures per system and the weight of effectiveness scores. For example, Participant A's system could have five measures and Participant B's system could have two measures. Presumably, Participant A would always show higher effectiveness scores compared to Participant B. However, Participant A's larger effectiveness scores do not necessarily equate to superior performance over Participant B; it could simply be a function of the number of measures. Therefore, analysis of unstandardized effectiveness scores is an inappropriate method of capturing behavior change.

Physiological Measures

Body Composition

Participants' Body Mass Index (BMI) was measured at the initial meeting prior to system development (Time 1) and again at the final feedback meeting (Time 3). BMI is an indicator of body fat and is calculated using a person's weight and height. Quetelet's formula: $\text{weight (kg)} / [\text{height (m)}]^2$ was used as an objective measure to assess the physiological effects of participating in the TA intervention. Research has shown Quetelet's formula is a convenient and reliable indicator for obesity, and the correlation between the BMI number and body fatness is strong (Center for Disease Control, 2011; Garrow & Webster, 1985). In addition to BMI, participants' body fatness was measured using a 3-site skinfold assessment at the initial meeting prior to system development (Time 1) and again at the final feedback meeting (Time 3). A skinfold measure was collected at three sites: triceps, suprailium (i.e., hip), and thigh. Skinfold analysis is a common field assessment used by fitness professionals to predict body fatness (National Council on Strength & Fitness, 2012).

Fitness Measures

Participants' muscular endurance was measured by recording the total number of consecutive modified push-ups and the total number of consecutive curl-ups without rest. Measures were recorded and evaluated using procedures listed by the American College of Sports Medicine (Thompson, Gordon, & Pescatello, 2009). In addition, the number of seconds participants were able to hold a standard plank and the number of seconds they were able to hold a 90-degree wall-sit position were recorded. The plank and 90-degree wall-sit exercises were

recorded and evaluated following a standardized procedure. All fitness measures were assessed at the initial meeting prior to system development (Time 1) and again at the final feedback meeting (Time 3).

Success Map Comparison

Expert and self-developed Success Maps were evaluated by making judgments to determine the shape (linear, diminishing returns shape, critical mass curve) and degree (small, medium, large) of the upper and lower maps (i.e., above and below the lowest acceptable performance), then were analyzed using a chi-square test of independence to detect any significant differences.

Success Map shapes and degrees were evaluated by making subjective judgments using examples and descriptions outlined in the Truly Accomplished Success Meter Software Manual (Pritchard, 2012), and other various publications for both ProMES and Truly Accomplished (e.g., Dixon, 2012; Pritchard, Weaver, & Ashwood, 2012). Listed in Figure 5 are examples from the Truly Accomplished Success Meter Software Manual (Pritchard, 2012) showing a linear shape, diminishing returns shape, and a critical mass curve; in addition, Figure 6 and 7 shows what constitutes a small, medium and large degree of a diminishing returns and critical mass curve. One person, not blind to condition, determined the shape and degree of each Success Map.

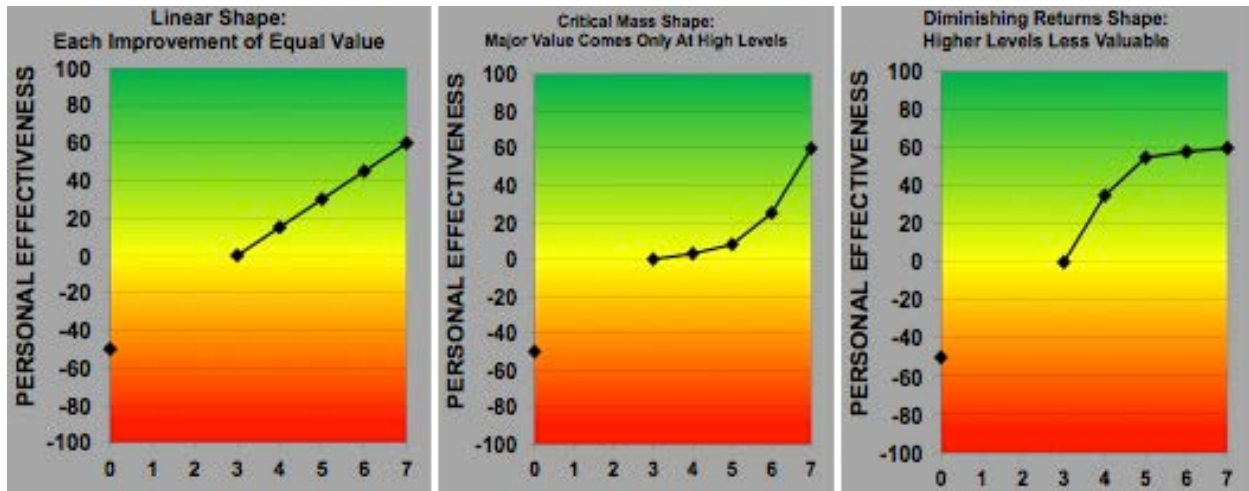


Figure 5. Linear Shape; Critical Mass Shape; Diminishing Returns Shape (Truly Accomplished Success Meter Software Manual; Pritchard, 2012)

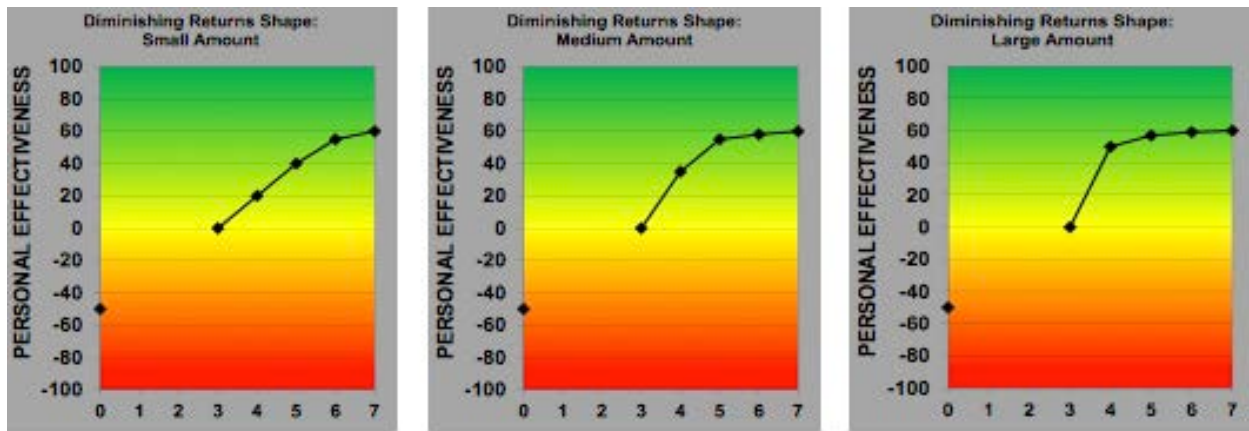


Figure 6. Small, Medium, Large Diminishing Returns Shapes (Truly Accomplished Success Meter Software Manual; Pritchard, 2012)

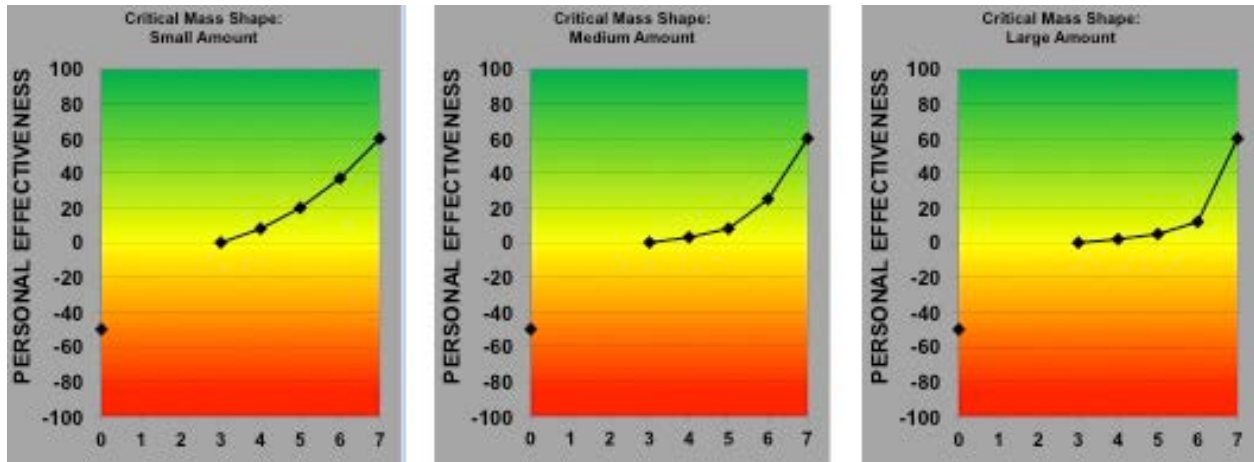


Figure 7. Small, Medium, Large Critical Mass Shapes (Truly Accomplished Success Meter Software Manual; Pritchard, 2012)

Attitudes

System Development

Following system development (Time 2) participants' attitudes toward their completed system were measured for acceptance, understanding, ownership, perceived validity and motivation to use TA. Each attitude is an integral component associated with participation in system development and the motivation theory behind TA. The 21-item self-report measure is rated on a five-point Likert-type scale ranging from *Strongly Disagree* (1) to *Strongly Agree* (5). Example items include, "*The Truly Accomplished system is valid*" and "*I understand how the Truly Accomplished system works.*"

Satisfaction with Truly Accomplished

Participants' satisfaction with TA was assessed at the final feedback meeting (Time 3) using a modified version of Dixon's (2012) three-item self-report measure ($\alpha = .72$) rated on a

five-point Likert-type scale. Dixon's questions were modified for the context of fitness. For example, Dixon's (2012) question "*Overall, I am satisfied with the Truly Accomplished process*" was modified to "*Overall, I am satisfied with the Truly Accomplished process in helping me reach my fitness goals*". Five additional questions were added to Dixon's (2012) measure. The rating scale ranged from *Strongly Disagree (1)* to *Strongly Agree (5)*.

Satisfaction with Life Scale

Participants' satisfaction with life was measured prior to system development (Time 1) and again following the final feedback meeting (Time 3) using a five-item Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; $\alpha = .89$). Example items include, "*I am satisfied with my life*" and "*In most ways my life is close to my ideal,*" rated on a five-point Likert-type scale ranging from *Strongly Disagree (1)* to *Strongly Agree (5)*.

Demographics

Participants were asked to complete a demographics measure asking for their age, gender, education, and ethnicity. Demographic information was collected prior to system development (Time 1).

RESULTS

Data Analysis

Data from 18 self-developed systems and 22 expert-developed systems were prepared and analyzed using SPSS version 20.0 statistical software. Descriptive statistics and intercorrelations for all study variables are shown in Table 1.

Table 1

Means, Standard Deviations and Intercorrelations of all Study Variables

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. D	40	3.77	4.14	1													
2. BMI	40	22.69	3.30	-.238	1												
3. Fat %	40	22.36	4.76	-.333*	.761**	1											
4. Plank	40	77.68	36.82	-.119	-.322*	-.354*	1										
5. Wall-sit	40	66.55	32.61	-.046	-.208	-.240	.758**	1									
6. Curl-up	40	47.90	14.33	-.197	.082	.281	.126	.205	1								
7. Pushup	40	23.40	13.79	-.018	-.333*	-.380*	.555**	.445**	.159	1							
8. SWLS	40	19.38	2.93	-.118	.096	.208	-.116	-.124	.087	-.117	1						
9. ACPT	39	21.92	2.13	-.139	.307	.221	-.281	-.084	-.131	-.168	.484**	1					
10. UNDSND	38	21.50	2.20	-.190	.276	.188	-.253	-.097	-.126	-.305	.442**	.876**	1				
11. OWN	39	21.26	2.88	-.130	.255	.166	.010	.157	-.076	-.070	.316*	.785**	.849**	1			
12. PV	39	20.72	2.58	-.141	.243	.130	-.252	-.059	-.061	-.075	.480**	.830**	.864**	.796**	1		
13. MOT	40	4.35	0.80	-.177	.134	.108	.033	.086	-.066	.077	.422**	.646**	.590**	.724**	.630**	1	
14. TA Sat	40	35.78	7.84	-.003	.226	.175	-.035	.236	.096	.118	.012	.285	.278	.495**	.435**	.392*	1

Note. Coefficient alpha reported in the diagonal. D = Effectiveness Score; BMI = Body Mass Index; Fat % = Body Fat Percentage; Plank = Plank Seconds; Wall-sit = Wall-sit Seconds; Curl-up = Curl-ups Total Count; Pushup = Pushup Total Count; SWLS = Satisfaction With Life; ACPT = Acceptance; UNDSND = Understanding; OWN = Ownership; PV = Perceived Validity; MOT = Motivation to use system; TA Sat = Satisfaction with Truly Accomplished. * $p < .05$. ** $p < .01$.

Participants' TA Systems

An examination of participants' systems showed the number of feelings ranged from 1 to 4 ($M = 2.73$, $SD = 0.88$), strategies ranged from 1 to 4 ($M = 2.53$, $SD = 0.78$) and the number of measures ranged from 2 to 10 ($M = 3.70$, $SD = 1.56$). Measures typically fell into four categories: Cardiovascular exercises (51 measures; e.g., number of miles running, number of minutes swimming), Muscular Strength exercises (77 measures; e.g., number of upper-body weight sessions, number of squats), Flexibility exercises (9 measures; e.g., number of minutes stretching, number of yoga sessions), and Other exercises (11 measures; e.g., number of 60 minute workout classes, number of shot/dribble drills). Two participant systems with feelings, strategies and measures are shown in Table 2.

Table 2

Feelings, Strategies and Measures for Two Participant Systems

Participant	Feelings	Strategies	Measures
A	Stronger	Increase exercise	Number of days working out at the gym
	Confident	Increase endurance	Number of minutes swimming
	Fast		Number of minutes running
B	Energetic	Increase exercise	Number of 45 minute Zumba classes
			Number of miles running
	Confident	Tone body	Number of sets of arm exercises (12 reps)
	(Attractive)		Number of sets of leg presses (12 reps)

System development in the self-developed condition took approximately 35 minutes ($M = 36.00$, $SD = 10.08$) to complete, with the majority of the time spent developing measures (approximately 10 minutes) and building Success Maps (approximately 15 minutes). System development in the expert-developed condition took approximately 21 minutes ($M = 21.55$, $SD = 6.25$) to complete. Expert-developed Success Maps took approximately 15 minutes to complete per participant. Each feedback meeting lasted approximately 10 minutes ($M = 10.4$, $SD = 2.8$).

Participants' overall effectiveness was measured at baseline and at each feedback meeting for three weeks. A dependent t -test showed the mean level of overall effectiveness increased significantly from baseline ($M = -36.23$, $SD = 157.14$) to the final feedback meeting ($M = 95.13$, $SD = 170.01$), $t(39) = -8.13$, $p < .001$, $d = 2.60$, indicating large increases in performance over the three feedback periods. To measure the amount of gain in each person's overall effectiveness score an effect size was computed (Cohen's d) for each participant, as previously described. Individual effect sizes ranged from -3.46 to 15.46, with a mean of 3.77 ($SD = 4.14$), indicating large increases in effectiveness over the three feedback periods.

Overall Effectiveness

The first research question addressed how important it is to develop one's own Success Maps to the success of TA. Figure 8 displays the mean overall effectiveness scores for all participants in each condition over time. The mean level of effectiveness at baseline was 57 ($SD = 126.44$) for self-developed systems and -112.50 ($SD = 139.19$) for expert-developed systems; the mean level of effectiveness at feedback completion was 172.06 ($SD = 132.53$) for self-developed systems and 32.18 ($SD = 173.89$) for expert-developed systems. The graph shows monotonic increases in both conditions from baseline to the final feedback meeting. The slope of

the line for the expert-developed condition was 44.88 compared to the self-developed condition 35.79, which indicates the expert condition had a greater change in overall effectiveness scores from baseline to the final feedback meeting. Gains in overall effectiveness were calculated for each participant to determine the degree of improvement between each feedback session.

Effectiveness gains in the expert-developed condition were 144.68 ($SD = 96.75$) compared to 115.06 ($SD = 108.89$) in the self-developed condition. An independent samples t -test showed the effectiveness gains between the two conditions were not significantly different, $t(38) = -.91, n.s.$

However as previously discussed, overall effectiveness scores are unstandardized and influenced by the number of measures in the system and assigned effectiveness values; therefore, direct analysis of overall effectiveness scores between participants is an inappropriate method to capture behavior change. A more appropriate method is calculating overall effectiveness as an effect size.

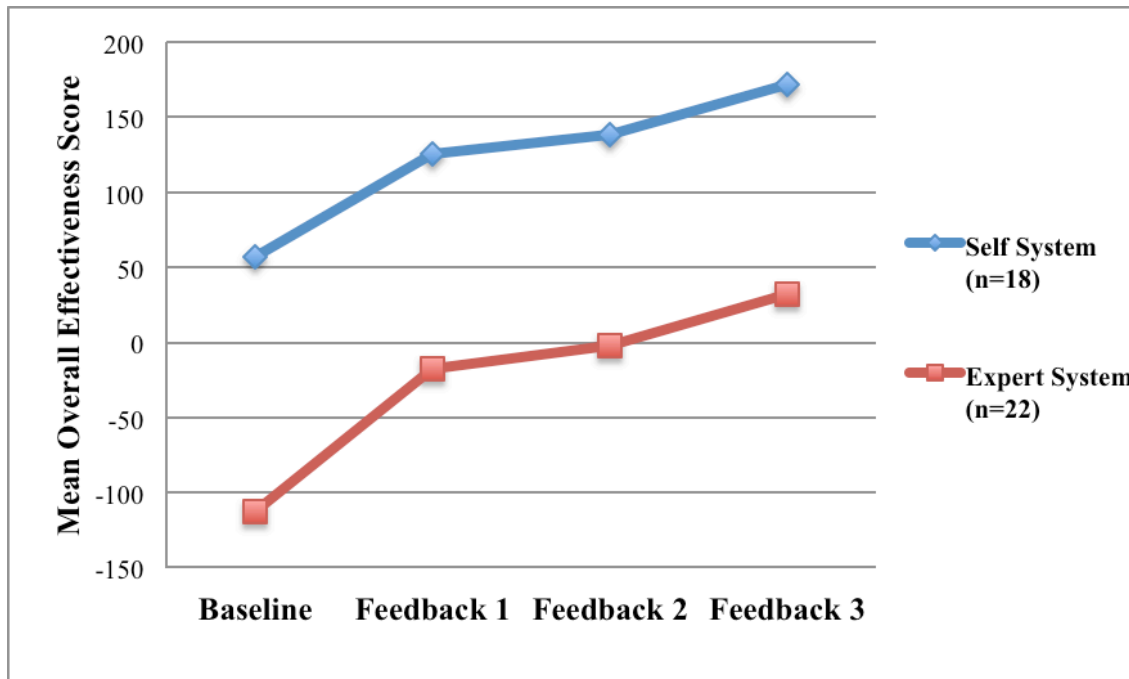


Figure 8. Mean Overall Effectiveness Scores Over Time

To examine the amount of gain in each person’s overall effectiveness score, an effect size was computed for each participant. Individual effect sizes standardize the overall effectiveness score so that the score isn’t influenced by the number of measures per system and assigned effectiveness values. Figure 9 shows a frequency distribution of effect sizes for all participants in each condition. The majority of effect sizes were positive indicating positive behavior change from baseline to the final feedback meeting. Individual effect sizes ranged from -1.04 to 6.54 ($M = 2.26, SD = 2.01$) in the self-developed condition and -3.46 to 15.46 ($M = 5.01, SD = 5.00$) in the expert-developed condition. The majority of effect sizes clustered around 1.00 to 3.00; however, all effect sizes greater than 6.00 ($n = 6$) were from the expert-developed condition. An independent samples *t*-test showed a significant difference in individual effect sizes between the

two conditions, $t(29) = -2.36$, $p = .026$, $d = .88$, indicating participants in the expert-developed condition had larger increases in effectiveness over the three feedback periods.

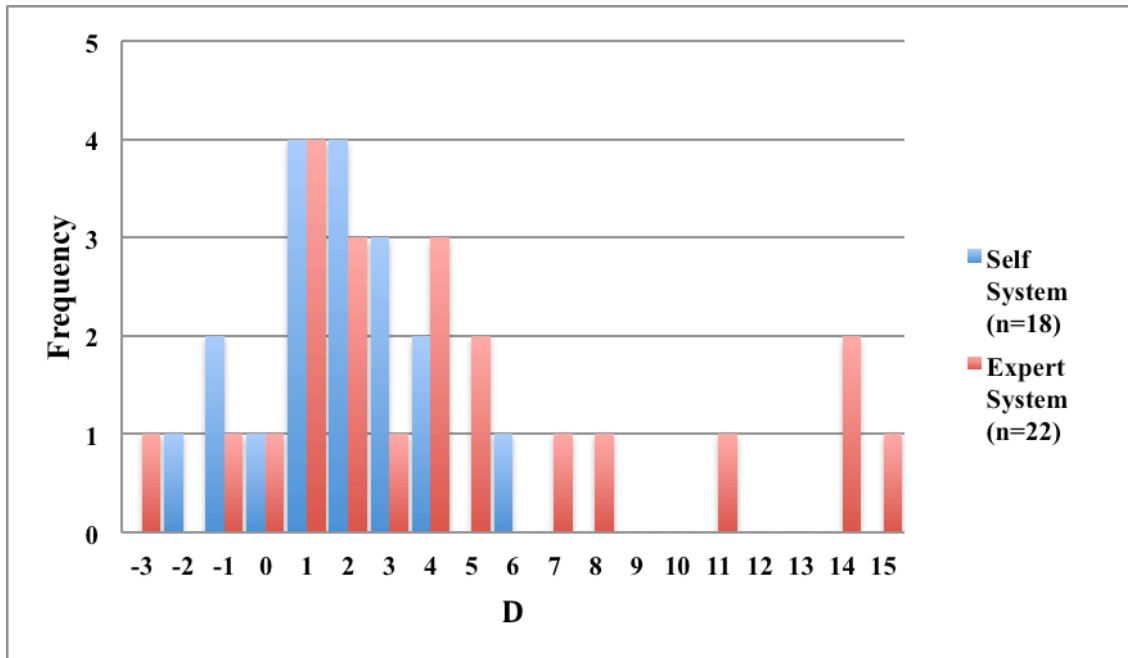


Figure 9. Frequency Distribution of Individual Effect Sizes

In summary, the first research question, which addressed how critical self-developed Success Maps were to the success of TA, was evaluated using the slope of the lines presented in Figure 8, unstandardized effectiveness gains from each feedback meeting and individual effect sizes. Results revealed no difference between the raw effectiveness gains across condition. However, when effectiveness scores were standardized the expert-developed condition showed significantly greater increases in effectiveness from baseline to the final feedback meeting, indicating participants in the expert-developed condition were more effective. Therefore, expert-developed Success Maps do not appear to hinder the success of the TA process when they replace self-developed Success Maps.

Physiological Measures

Overall effectiveness scores are a central outcome in examining the effectiveness of TA for proximal behavior change, but another key component, from a research standpoint, is linking overall effectiveness to more distal outcomes. In this case, external measures related to changes in physical activity were examined using fitness tests and changes in body composition.

Physical Fitness

Changes in participants' fitness levels were measured by the total number of consecutive modified push-ups without rest, total number of consecutive curl-ups without rest, number of seconds holding a plank, and the number of seconds holding a 90-degree wall-sit position. Data from fitness measures were collected pre- and post-intervention and analyzed using a dependent *t*-tests. The analyses indicated significant improvement in fitness performance pre- and post-intervention on all fitness measures, suggesting external support for the effectiveness of TA. Descriptive and inferential statistics are shown in Table 3.

Table 3

Measure	<u>Pre-intervention</u>	<u>Post-Intervention</u>	<i>t</i> (39)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			
Push-ups	17.90 (10.02)	23.40 (13.79)	-5.25	<.001	1.68
Curl-ups	40.30 (14.05)	47.90 (14.33)	-5.53	<.001	1.77
Plank	64.30 (31.55)	77.68 (36.82)	-3.60	.001	1.15
Wall-sit	57.38 (26.11)	66.55 (32.61)	-2.51	.016	.80

Note. Plank and wall-sit were measured in seconds.

For each fitness measure an Analysis of Covariance (ANCOVA) was conducted in which condition was the independent variable, post-test fitness scores were the dependent variables and pre-test fitness score was the covariate. This test examines whether being in one condition or the other influenced fitness scores, controlling for pre-test levels of fitness. The ANCOVAs revealed no significant difference in post-test fitness scores as a function of condition.

Descriptive and inferential statistics are shown in Table 4.

Table 4

Descriptive and Inferential Statistics for Physical Fitness Measures Between Conditions Pre- and Post-Intervention

Measure	Self-System	Expert-System	$F(1,37)$	p
	$M (SD)$	$M (SD)$		
Push-ups	21.50 (9.60)	24.95 (16.52)	0.08	.777 <i>n.s.</i>
Curl-ups	48.22 (14.84)	47.64 (14.33)	0.11	.746 <i>n.s.</i>
Plank	79.33 (32.32)	76.32 (40.83)	1.34	.254 <i>n.s.</i>
Wall-sit	71.94 (33.50)	62.14 (31.95)	0.1	.921 <i>n.s.</i>

Note. Plank and wall-sit were measured in seconds.

Body Composition

Changes in body composition were measured using the participant's BMI, body fat percentage, lean weight and fat weight. Data from body composition measures were collected pre- and post-intervention and analyzed using dependent *t*-tests. The analyses revealed no significant differences in body composition pre- and post-intervention. The descriptive and inferential statistics are listed in Table 5.

Table 5

Descriptive and Inferential Statistics for Body Composition Measures Pre- and Post-Intervention

Measure	Pre-intervention	Post-Intervention	<i>t</i> (39)	<i>p</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
BMI	22.52 (3.27)	22.69 (3.30)	-1.99	.054, <i>n.s.</i>
Body Fat %	22.88 (4.93)	22.36 (4.76)	1.89	.066, <i>n.s.</i>
Lean Weight	103.50 (12.71)	103.11 (17.24)	0.23	.817, <i>n.s.</i>
Fat Weight	31.59 (11.44)	30.62 (11.79)	1.92	.062, <i>n.s.</i>

Additionally, ANCOVAs revealed no significant changes in body composition between the two conditions. Descriptive and inferential statistics for changes in body composition for the self-developed and expert-developed condition are shown in Table 6.

Table 6

Descriptive and Inferential Statistics for Body Composition Measure Between Conditions Pre- and Post-Intervention

Measure	Self-System	Expert-System	<i>F</i> (1,37)	<i>p</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
BMI	23.96 (4.18)	21.64 (1.86)	0.07	.787 <i>n.s.</i>
Body Fat %	23.32 (4.74)	21.57 (4.74)	0.14	.906 <i>n.s.</i>
Lean Weight	109.72 (14.33)	97.70 (17.83)	0.58	.450 <i>n.s.</i>
Fat Weight	33.82 (13.73)	28.01 (31.95)	0.43	.515 <i>n.s.</i>

Thus, data from fitness measures showed significant increases in fitness performance post-intervention, but body composition measures showed no change following the 4-week intervention. No differences were found across condition, suggesting that fitness gains occurred regardless of whether participants developed their own Success Maps or used expert-derived Success Maps.

Success Map Comparison

The second research question addressed the similarity between self-developed Success Maps and expert-developed Success Maps. Success Maps represent the relationship between the quantity of a measure and the effectiveness of that amount. To create a Success Map decisions are made to determine the effectiveness for each value and then the relationship is plotted. Three common shapes emerge above and below the lowest acceptable performance (a value of zero): linear, diminishing returns shape, and critical mass curve. In a linear relationship the quantity of a measure and effectiveness are directly proportional, meaning each change in the amount of a measure leads to an equal change in effectiveness. A diminishing returns shape indicates initial increases in a measure leads to substantial gains in effectiveness, then at certain point further increases do not equate to increases in effectiveness. A critical mass curve indicates minimal gains in effectiveness as a measure increases, followed by substantial gains in effectiveness after the quantity of a measure reaches a certain point. The degree, or severity, of the shape in diminishing returns and critical mass curves vary. To examine this research question, the shape and degree of 81 expert-developed Success Maps and 67 self-developed Success Map were compared.

Upper Shape and Degree

Data from the upper shapes of Success Maps showed 8 linear shapes, 55 diminishing returns shapes and 4 critical mass curves in the self-developed condition. In the expert-developed condition, there were 16 linear shapes, 55 diminishing returns shapes and 10 critical mass curves. A chi-square test of independence showed the relationship between the upper shapes in the expert and self-developed conditions was not significant, $X^2(2, N = 148) = 3.95, n.s.$

The degree, or severity, of diminishing returns and critical mass curves was analyzed using a chi-square test of independence. Data showed 34 small amounts, meaning the degree of the shape was minimal, 9 medium amounts, meaning the degree of the shape was moderate, and 16 large amounts, meaning the shape was severe, in the self-developed condition. Data from the expert condition showed 43 small amounts, 11 medium amounts and 11 large amounts. Results from a chi-square test of independence showed the relationship between the degree of diminishing returns and critical mass upper shapes in expert and self-developed conditions was not significant, $X^2(2, N = 124) = 1.89, n.s.$

Lower Shape and Degree

Data from the lower shapes of Success Maps showed 38 linear shapes, 11 diminishing returns shapes and 18 critical mass curves in the self-developed condition and 26 linear shapes, 15 diminishing returns shapes and 40 critical mass curves in the expert-developed condition. A chi-square test of independence showed a significant difference in the lower shapes of Success Maps between the two conditions, $X^2(2, N = 148) = 9.98, p = .007$, where linear shapes were more common in the self-developed condition and critical mass curves were more common in the expert-developed condition.

The degree, or severity, of diminishing returns and critical mass curves was analyzed using a chi-square test of independence. Data showed 16 small amounts, 4 medium amounts and 9 large amounts in the self-developed condition. Data from the expert condition showed 27 small amounts, 13 medium amounts and 13 large amounts. Results from a chi-square test of independence showed the relationship between the degree of the lower shapes between the two conditions was not significant, $X^2(2, N = 82) = 1.40, n.s.$

Thus, the shape (linear, diminishing returns, critical mass) and degree (small, medium, large) of the upper and lower half of Success Maps between the two conditions were compared. Results from the upper shape and degree showed no significant differences in shape or degree, meaning experts and novices developed similar Success Maps; however, results revealed a significant difference in the lower shape of expert and self-developed Success Maps, where participants in the self-developed condition were more likely to create Success Maps with linear shapes and experts were more likely to create Success Maps with critical mass curves. Results showed no significant difference in the degree of the lower shapes between the two conditions. Therefore, results suggest that expert and self-developed Success Maps were similar in many aspects; however, the shape of Success Maps differed when assigning values below the lowest acceptable performance.

Attitudes

The third research question addressed attitudes of condition and whether substituting expert-developed Success Maps for self-developed Success Maps would adversely affect motivation to use TA, leading to decreased performance. To analyze this question, attitudes of

system development, satisfaction with TA and life satisfaction were examined to determine if feelings linked to Success Map developed would impact the success of TA.

System Development

Participants' attitudes of acceptance, understanding, ownership, perceived validity and motivation to use TA were measured directly after system development and analyzed using an independent samples *t*-test. Analyses revealed significant differences between attitudes in the self-developed condition and the expert-developed condition, where participants in the self-developed condition report higher levels of acceptance, understanding, ownership, perceived validity and motivation to use TA compared to the expert-developed condition. However, participants reported high positive attitudes toward system development in both conditions, where participant responses of "agree" or "strongly agree" were 87.3% ($n = 39$) in acceptance, 86.8% ($n = 38$) in understanding, 79.5% ($n = 39$) in ownership, 71.8% ($n = 39$) in perceived validity and 90% ($n = 40$) in motivation to use TA. Descriptive and inferential statistics are displayed in Table 7.

Table 7

Descriptive and Inferential Statistics for Attitudes of System Development

Attitude	<u>Self System</u>	<u>Expert System</u>	<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M (SD)</i>	<i>M (SD)</i>				
Acceptance	22.94 (2.24)	21.05 (1.62)	37	3.06	.004	1.01
Understanding	22.59 (2.29)	20.62 (1.72)	36	3.03	.005	1.01
Ownership	22.47 (2.57)	20.31 (2.80)	37	2.46	.019	.81
Perceived Validity	21.67 (2.63)	19.90 (2.30)	37	2.23	.032	.73
Motivation to use	4.72 (.46)	4.05 (.90)	38	2.90	.006	.94

Note. Acceptance, Understanding, Ownership are Perceived Validity has a maximum of 25. Motivation to use TA has a maximum of 5.

Results suggest that participation in Success Map development had a significant influence on attitudes of system development, where participants in the self-develop condition reported higher positive attitudes toward their system. However, the majority of participants' attitudes toward system development were positive and did not adversely affect their overall effectiveness scores or performance on fitness measures.

Satisfaction with Truly Accomplished

The mean level of satisfaction with TA was 35.78 ($SD = 7.84$) on a scale with a maximum of 45. The analysis of responses to these items indicated that 87.5% of participants agreed or strongly agreed that they were satisfied with the TA process, while 0 percent strongly disagreed. There were no significant differences between the self-developed condition ($M = 26.78$, $SD = 6.86$) and the expert-developed condition ($M = 34.95$, $SD = 8.63$), $t(38) = .727$, *n.s.*,

which suggests that participation in Success Map development has no meaningful impact on satisfaction with TA.

Life Satisfaction

Life satisfaction was measured pre- and post-intervention and was analyzed using a dependent *t*-test. Analysis revealed life satisfaction increased significantly, $t(39) = -4.23$, $p < .001$, $d = 1.35$, post-intervention ($M = 19.38$, $SD = 2.93$) from pre-intervention ($M = 18.15$, $SD = 3.19$). An ANCOVA was used to compare post-life satisfaction scores between conditions, controlling for pre-test scores. The analysis showed a significant difference, $F(2,37) = 6.38$, $p = .016$, $\eta^2 = .15$, where the self-developed condition reported higher life satisfaction ($M = 20.17$, $SD = 2.48$) compared to the expert-developed condition ($M = 18.73$, $SD = 3.17$). Results indicate that participating in TA leads to increased life satisfaction; however, participating in Success Map development has a greater impact.

Thus, results showed that participants' attitudes of acceptance, understanding, ownership, perceived validity and motivation to use TA were significantly higher for participants who developed their own Success Maps than for participants who used expert-developed Success Maps, even though reported satisfaction with TA was high in both conditions. Results showed significant increases in life satisfaction following the use of TA; however, participants who developed their own Success Maps reported higher life satisfaction compared to those who used expert-developed Success Maps. Overall results indicate that attitudes of system development and life satisfaction are linked to participation in Success Maps development, where the self-developed condition reported higher positive attitudes.

DISCUSSION

Summary of and Key Findings

This study was conducted to explore the impact of using experts to develop Success Maps in the TA system. Specifically, this study examined how critical participation in Success Map development was to the success of TA, how similar expert developed Success Maps were to self-developed Success Maps and if expert-developed Success Maps adversely affect the TA process leading to poorer attitudes and effectiveness. Interestingly, findings suggest that performance outcomes were similar (regardless of who built the Success Maps), even though expert-developed Success Maps looked different than self-developed Success Maps. However, attitudes were poorer when Success Maps were developed by experts. This suggests that generating one's own Success Maps may be an important part of the TA process. Each of these findings will be discussed below.

Overall Effectiveness

Results showed that participants' effectiveness scores in the expert and self-developed condition increased greatly from baseline to the final feedback meeting. The mean level of overall effectiveness for both conditions at baseline was -36, well below the lowest acceptable performance of zero, and effectiveness scores had increased +58.9 by the final feedback meeting. The mean effect size for both conditions was 3.77, which is 4.7 times greater than .80, Cohen's (1988) criteria for a large effect. Results showed the expert-developed condition had significantly higher mean effect size ($d = 5.01$) than the self-developed condition ($d = 2.26$). This means, on average and assuming a normal distribution, participants in the expert-developed

condition improved by 5.01 standard deviations from the mean, which is well above the 99th percentile of 3.0.

The mean effect size in the self-developed condition was consistent with Dixon's (2012) findings ($d = 2.93$), which examined the effectiveness of TA as an overall lifestyle intervention for positive behavior change, and is considerably larger than the mean effect size of 1.16 found in the ProMES meta-analysis (Pritchard et al., 2008). As noted by Dixon (2012) there are several potential explanations to explain the difference in effect sizes between ProMES and TA. First, the ProMES meta-analysis combined 83 field studies with a range of effect sizes from -2.53 to +5.37; therefore, Dixon's findings were within this range. Second, TA focuses on increasing personal effectiveness compared to ProMES, which focuses on increasing group productivity; therefore, this presumably increases control and accountability and decreases social loafing. Finally, because TA is a personal process, unique to each individual, it increases intrinsic motivation (Dixon, 2012).

This study's findings suggest that the replacement of expert developed Success Maps in lieu of self-developed Success Maps has a positive impact on overall effectiveness. This implies that control, accountability, intrinsic motivation, and ultimately the success of TA were not contingent upon personal involvement in Success Map development. This indicates that the process of individuals defining their own feelings, developing their own strategies, designing their own measures and participating in feedback may be enough to fulfill the need for control, accountability and maintain intrinsic motivation. Furthermore, results suggest that limiting individuals' feelings, strategies and measures to a specific subgroup, in this case fitness, does not adversely impact individuals' success with TA. Possible explanations for individuals in the

expert-developed condition having larger increases in overall effectiveness may be due to individuals' trust in expert opinion, and/or knowledge differences between fitness experts and non-fitness experts when making fitness decisions.

Physiological Measures

Despite individuals in the expert-developed condition having significantly larger increases in overall effectiveness across the three feedback periods, it did not translate to a significant difference in external measures of fitness between conditions. Both conditions showed significant increases in fitness performance post-intervention. This implies that regardless of condition engaging in TA leads to improved outcomes.

The results support the idea that individuals, who are not fitness experts, can successfully develop fitness measures that lead to improved fitness performance. This finding is important because individuals using TA are responsible for creating their own strategies, measures and Success Maps, and most likely the TA user is not an expert in the area he/she is looking to improve (e.g., health, relationship, professional development, spirituality, financial outcomes, etc.), unlike ProMES where the group responsible for developing the performance measurement and feedback system are experts in their field. Furthermore, results support the link between distal outcomes (i.e., external fitness measures) and proximal outcomes (i.e., overall effectiveness scores). This finding is significant to the support of TA as an effective method for behavior change by providing tangible outcomes. These findings complement and extend Dixon's (2012) findings, by showing external, objective evidence of the effectiveness of the TA intervention.

There were no significant changes in body composition detected pre- and post-intervention. This is likely linked to the time restraint of this study, which was a total of four weeks, with only three weeks of feedback. When measuring health outcomes (e.g., fitness performance, body composition) changes in body composition are not likely to be immediate. However, improvement on fitness measures post-intervention suggest that increasing the length of the study may have led to measureable changes in body composition.

Success Map Comparison

By comparing the shape and degree of expert and self-developed Success Maps, this study found significant differences. Specifically, results showed participants in the self-developed condition were more likely than experts to create a linear relationship between the quantity of a measure and the effectiveness of that amount when evaluating the lower half of Success Maps. This suggests participants in the self-developed condition believe any given amount of change in a measure is equally effective. Figure 10 shows a linear relationship for cardio activity; an increase from zero cardio activity to 20 minutes of cardio activity results in the same amount of effectiveness gain as increasing from 40 minutes to 60 minutes, meaning either increase would add the same amount of benefit to the individual's life. In contrast, experts were more likely to create critical mass curves in the lower half of Success Maps when evaluating the quantity of a measure and the effectiveness of that amount, meaning experts believe effectiveness scores increase minimally until a certain quantity of the measure is met, at that point effectiveness scores increase substantially. Figure 11 shows a critical mass curve for cardio activity; an increase from zero cardio activity to 20 minutes, 20 minutes to 40 minutes, and 40 minutes to 60 minutes leads to minimal gains in effectiveness. However, any amount of

cardio activity over 60 minutes leads to dramatic increases in effectiveness. This suggests experts believe an individual benefits very little until a certain amount of the measure is met, above that point the individual benefits significantly.

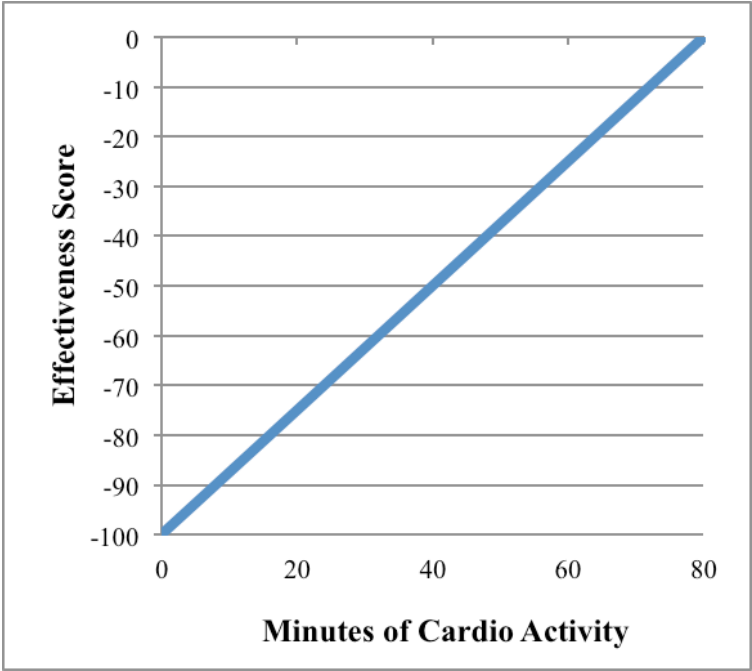


Figure 10. Linear Relationship of Cardio Activity in the Lower Half of the Success Map

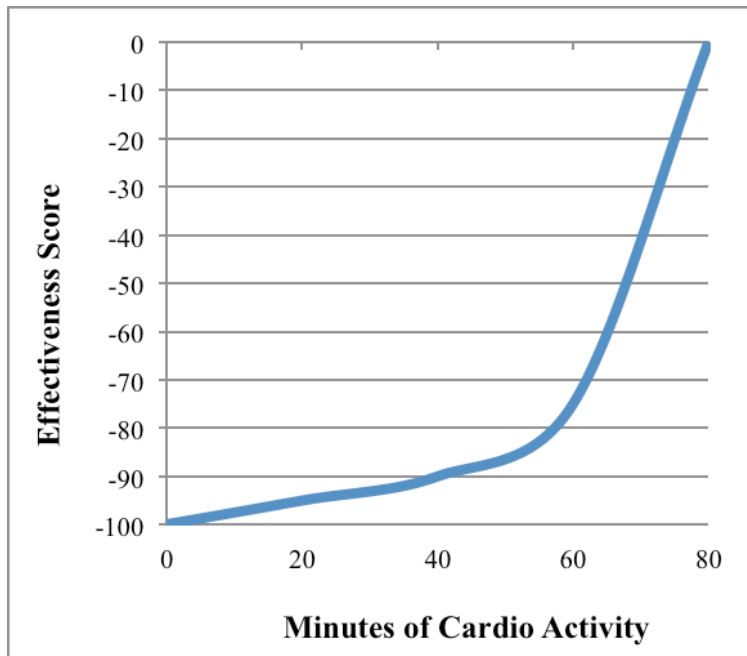


Figure 11. Critical Mass Curve of Cardio Activity in the Lower Half of the Success Map

It is likely that expert judgments are more accurate when determining the amount of a measure and the effectiveness of that amount. However, fitness performance was not adversely affected by the differences in expert and novice judgments, suggesting that participants in the self-developed condition can effectively develop Success Maps that lead to improved performance. The lack of association between fitness improvement and expert developed Success Maps may be due to baseline scores. Participants in the self-developed condition started with a mean baseline score of 57, which is above the lowest acceptable performance, compared to the expert developed condition where the mean baseline score was -112.50, which is well below the lowest acceptable performance. This means participants in the self-developed condition started well above their lowest acceptable performance level; therefore, were unaffected by the shape of their lower Success Maps.

Results showed significant differences in the lower shape of Success Maps. However, expert and self-developed Success Maps were similar in other ways. There were no differences in judgment detected in the upper shape of Success Maps between the expert and self-developed condition when positive effectiveness scores (above lowest acceptable performance) were evaluated, and there were no differences in the degree of the diminishing returns and critical mass curves between the two conditions.

Attitudes

By measuring participants' attitudes toward system development, this study was able to link attitudes of acceptance, understanding, ownership, perceived validity and motivation to use TA to participation in Success Map development, where participants in the self-developed condition reported higher positive attitudes compared to the expert-developed condition. Results were consistent with the NPI and Pritchard-Ashwood theory of motivation and previous research on participation in decision-making.

The Pritchard-Ashwood theory (2008) stresses the importance of maintaining a strong connection between the five components of the motivation process (actions, results, evaluations, outcomes, need satisfaction) in order to maximize motivation. Although each step in the TA process emphasizes participation to reinforce these connections, the results-to-evaluation connection is of specific interest to this study because it is operationalized by Success Map development. As previously described, the results-to-evaluation connection relates to the quantity of results produced and the perceived effectiveness of those results (Pritchard-Ashwood, 2008). Success Map development is part of the feedback system and to maximize performance from feedback, evaluations must be congruent with personal standards (Taylor, Fisher, & Ilgen,

1984). Therefore, expert-developed Success Maps can be undermined if the individual disagrees with the level of effectiveness assigned to each value of a measure. Furthermore, research has linked participation in Success Map development to system ownership by increasing personal accountability, perceived control over the results (Dixon, 2012), and perceived validity of the results by ensuring system transparency (Pritchard et al., 2008). In addition, participation in decision-making is linked to positive effects on performance and attitudes, specifically acceptance (Cawley, Keeping, & Levy, 1998; Dipboye & de Pontbriand, 1981; Locke & Schweiger, 1979), and increases perceptions of fairness and goal commitment (Bobko & Colella, 1994; Cawley, Keeping, & Levy, 1998; Kanfer, 1990; Pritchard et al., 1989).

Results from this study showed that participation in Success Map development had a greater positive influence on participants' attitudes and motivation to use TA compared to participants who did not engage in the development of their Success Maps; however, these differences did not adversely affect overall performance and attitudes of acceptance, understanding, ownership, perceived validity and motivation to use TA were generally high in both conditions. This suggests participation in the development of strategies and measures to fulfill feelings of personal importance were enough to maintain motivation.

Satisfaction with TA was unaffected by differences in condition and 87.5% of participants agreed or strongly agreed they were satisfied with the TA process. Interestingly, this finding is higher than Dixon's (2012) results, which found 78% of participants agreed or strongly agreed that they were satisfied with the TA process. Dixon's (2012) study did not limit participants' measures to a specific context, but rather encouraged participants to include all areas of importance. This indicates that excluding other areas of potential importance and

focusing on a specific area of behavior change (i.e., fitness, health, etc.) does not adversely affect overall satisfaction with the TA intervention. Furthermore, this finding indicates that modifying the Success Map development process does not adversely impact satisfaction with TA.

Significant increases in life satisfaction were found pre- and post-intervention in both conditions, which is consistent with Dixon's (2012) findings. However, when differences in life satisfaction were compared between the two conditions, participants in the self-developed condition reported higher life satisfaction compared to the expert-developed condition. This finding corresponds with attitudes of system development (i.e., acceptance, understanding, ownership, perceived validity and motivation) and suggests that participating in each step of the TA process leads to greater positive attitudes compared the modified TA process where participation in Success Map development is omitted.

Limitations

Time

As previously mentioned, the length of a study is a critical factor to detect significant changes in health outcomes, as these changes are not immediate. This study was limited to four weeks, with three weeks of feedback, which likely contributed to no significant changes in body composition pre- and post-intervention and no significant differences in fitness performance between the two conditions. However, it is important to note that participants improved significantly on all fitness measures (i.e., plank, wall-sit, curl-ups, push-ups) from their pre-intervention performance, suggesting that with time participants' body composition would eventually improve.

Measures

Fitness measures used to detect changes pre- and post-intervention were limited to the number of push-ups and curl-ups and to the number of seconds holding a plank and wall-sit position, each of which are muscular endurance measures. No measures were used to evaluate changes in cardiovascular endurance or flexibility. Participants choose 51 cardiovascular exercises to measure and improve using their TA system, which suggests that significant changes in cardiovascular endurance might have been detected had this been measured. Experts advised that a measure of resting heart rate, a three-minute step test, or a 1.5-mile run would have been reasonable cardiovascular measures. Additional limitations include the fact that this study didn't emphasize other positive health strategies and measures, such as dietary changes, sleeping habits and stress management, which could have impacted changes in fitness ability, body composition and overall satisfaction with TA and life.

Facilitator and Training

It is important to consider the impact of the facilitator and training. Each participant was randomly assigned a facilitator to work one-on-one with for the duration of the study. Each facilitator was assigned between nine and 12 participants and varied in their degree of knowledge regarding fitness. It is possible that the facilitator indirectly impacted individuals' choices of strategies and measures. Furthermore, the differences in each facilitator's personality, manner of explanation during system development, and degree of giving effective feedback may have contributed to participants' feelings toward their experience and ultimately their success with TA. Additionally, since TA is still relatively new training materials were limited. Facilitators were given background information on the theory supporting TA and trained on how to perform

each step in the TA process, including the use of Truly Accomplished Success Meter Software. However, an experienced TA facilitator did not conduct training. Each facilitator was equipped with a protocol to guide participants through the process and ensure they received the same information. However, facilitators were encouraged to include additional information and explanation as needed and were encouraged to develop a friendly rapport with each participant. Therefore, individual differences in personality, style of communication, technique and training are confounding variables to consider. It is important to note that even though facilitators were not professionally trained, this did not negatively impact participants overall success with TA, lending even more support to the effectiveness of the intervention.

Generalizability

The use of an all female student sample, with an age range of 18 years to 33 years ($M = 20.15$, $SD = 3.02$), limits the generalizability of the findings. Additionally, pre-intervention body composition scores indicate participants were in relatively good shape prior to beginning the intervention. The mean pre-intervention BMI score was 22.52, which is within the range of BMI scores (18.50 - 24.90) considered normal (U.S. Department of Health and Human Services, 2013). Furthermore, participants pre-intervention mean body fat percentage was 22.88, which falls within the fitness classification range of 21 – 24 percent (American Council on Exercise, 2009). Therefore, this restricts the extent to which the results can be generalized to the population.

Data Analysis

This study analyzed fitness (push-ups, curl-ups, plank, wall-sit) and body composition (BMI, body fat, lean weight, fat weight) measures pre- and post-intervention using multiple *t*-tests and data between conditions pre and post-intervention were analyzed using ANCOVAs, where pre-intervention data served as the covariate and condition as the independent variable. Since conducting multiple statistical tests on related dependent variables is problematic due to alpha inflation (which increases the likelihood of making a Type I error), future analyses should consider using Multivariate Analysis of Variance (MANOVA) to analyze fitness and body composition measures pre- and post-intervention and a Multivariate Analysis of Covariance Variance (MANCOVA) to analyzed data between conditions and pre- and post-intervention.

Furthermore, there were limitations associated with the analysis of expert and self-developed Success Maps to determine the shape and degree of each map, a highly subjective process. Specifically, Success Maps were analyzed by one person who was not blind to conditions, which poses a problem with accuracy and reliability of the data. Future analysis to determine the shape and degree of each Success Map should be conducted by multiple people, blind to condition, to establish interrater reliability.

Directions for Future Research

Because this study is only the second empirical study of TA, there are numerous opportunities and directions for future research. Specifically, the differences between expert and novice judgments should be explored by comparing Success Maps developed from identical measures and information. In other words, allowing the TA user to create Success Maps and then using the same measures have experts develop Success Maps for the TA user. This would allow

direct comparison of effectiveness scores and statistical analysis of effectiveness gains. Additionally, other ways to capitalize on the knowledge of experts without compromising the TA process should be explored. One idea is to develop a pick list of common measures and corresponding expert-developed Success Maps and then allow the TA user to pick from this list. For example, fitness Success Maps could be developed on multiple levels of fitness ability and the TA user could then decide which Success Map is appropriate for them. By giving the TA user control to pick his or her own measures and corresponding Success Map levels, one might capitalize on expert judgment while potentially maintaining the motivation and participation components of TA.

Conclusion

This study showed that TA is an effective intervention for positive behavior change, providing additional support to Dixon's (2012) findings. TA was shown to be effective even when limited to a specific context, in this case fitness, and modified by the substitution of expert derived Success Maps. Moreover, this study linked effectiveness scores to objective outcomes (i.e., fitness measures), providing critical external support for the effectiveness of TA.

APPENDIX A: INFORMED CONSENT



Truly Accomplished: A Fitness Intervention

Informed Consent

Principal Investigator: Barbara Fritzsche, PhD
Co-Investigator: Dorey Chaffee

Introduction: Researchers at the University of Central Florida (UCF) study many topics. To do this we need the help of people who agree to take part in a research study. You are being invited to take part in a research study, which will include about 50 people at UCF. You have been asked to take part in this research study because you have expressed an interest in improving your fitness ability. You must be a woman who is 18 years of age or older to be included in the research study.

The person doing this research is Dorey Chaffee of the University of Central Florida's Department of Psychology. Because the researcher is a student she is being guided by Dr. Barbara Fritzsche, a UCF faculty supervisor in the Department of Psychology. UCF students learning about research are helping to do this study as part of the research team. Their names are: Carly Tucker, Megan Geary, Gina Anderson, and Yesenia Cancel.

What you should know about a research study:

- Someone will explain this research study to you.
- A research study is something you volunteer for.
- Whether or not you take part is up to you.
- You should take part in this study only because you want to.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide it will not be held against you.
- Feel free to ask all the questions you want before you decide.

Purpose of the research study: The purpose of this study is to test the effectiveness of Truly Accomplished (TA) as a fitness intervention.

What you will be asked to do in the study: Prior to participation in this study, all potential participants are first screened using the PAR-Q, and some participants may be ineligible to take part in the study. Once approved to participate in this study you will be randomly assigned to either complete a normal or modified TA process. You will begin the study by completing a series of questionnaires. The questionnaires will ask you demographic information, your feelings toward health, fitness, and life satisfaction, and your attitude toward the overall TA fitness intervention. Then, physiological measures will be recorded of your height, weight, muscular strength and endurance, and a skinfold test. Your muscular strength and endurance will be measured by the amount of push-ups and curl-ups (crunches) you can perform, and the amount of time you can hold a plank and a 90-degree wall-sit position. The skinfold test will measure your skinfold thickness, using a skinfold caliper, at three points on your body: triceps, suprailium (on your side, just above your hipbone), and thigh. You will be required to wear fitness attire, specifically shorts or loose fitting pants that will allow us to take a skinfold measure of the front of your thigh, and above your hipbone. The collection of all your physiological measures will take place in a private room, by your assigned female TA facilitator. Your assigned facilitator will work one-on-one with you for the entirety of this study. We want to make this experience as comfortable as possible. If at anytime you are uncomfortable or need a break, let us know and we will try to make accommodations. You are free to stop at anytime. After the physiological measures are complete, you will then work with your TA facilitator who will guide you through a process of identifying fitness objectives or goals for change. Based on your personal objectives, you will learn specific ways in which to measure your objectives. Then, you will fill out a questionnaire about this process. You will record your weekly fitness results in an electronic record-keeping document, and email it to your TA facilitator. Using this information, you will attend feedback meetings with the facilitator in order to maximize your fitness improvements. These meetings will take place over the phone. For the final meeting you will meet in this lab. At this time you will complete a series of questionnaires and the same physiological measurements of your height, weight, muscular strength and endurance, and a skinfold test will be recorded.

Location: Meetings will be held in the Human Capital and Diversity Laboratory, located in the Psychology building at UCF. Three feedback meetings will be conducted over the phone.

Time required: The total time requirement for this study is approximately 5.5 hours. There will be one initial system development session, lasting approximately 3 hours. There will be 4 weekly follow-up feedback sessions; the first three will last approximately 30 minutes each and the final feedback session will last approximately 1 hour. In between study sessions, you will complete the fitness activities you have planned and make note of your accomplishments.

Audiotaping: You will be audio taped during this study. If you do not want to be audio taped, you will not be able to participate in the study. Discuss this with the researcher or a research team member. If you are audio taped, the tape will be kept in a locked cabinet in the Principle Investigator's office. After the study, the tape will be transcribed and any identifying information will be removed. Then, the tape will be destroyed.

Risks: No risks are anticipated as a result of participating in this study. Should you experience an injury from exercising, you will be referred to the UCF Health Center for treatment and can discontinue participation in the study without penalty. Likewise, should you express that you are upset from participating in this study, you will be refer to the Student Counseling Center for treatment and can discontinue participation in the study without penalty.

Benefits: We cannot promise any benefits to you or others from your taking part in this research. However, possible benefits include personal lifestyle improvement.

Compensation or payment: For participation in the entire study you will be compensated 5.5 SONA credits. Credit for partial completion of the study will be distributed at .5 credits for every hour of participation. If you choose not to participate, you may notify your instructor and ask for an alternative assignment of equal effort for equal credit. There will be no penalty.

Confidentiality: Your identity will be kept confidential. You will be issued a participant ID that will be used to record your data. The recorded data and any identifying information will be kept separate in a locked, safe place. Once this study is finished all identifying information will be destroyed, and the data collected will be completely anonymous. At the end of each week, you will send emails to your TA facilitator indicating the number of exercises you performed that week. These emails will be kept confidential, and will be seen only by the research team. Your emails will not be printed or forwarded. Once the study ends, the account will be deleted and all emails destroyed. The researcher will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. When the study is done and the data has been analyzed, your information will be combined with information from other people who took part in this study. When the researchers write about this study to share what was learned with other researchers, they will write about this combined information. Your name will not be used in any report, so people will not know how you answered or what you did.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints, or think the research has hurt you, talk to Dorey Chaffee, Industrial/Organizational Psychology Program, College of Sciences, (386) 453-0893, (DoreyChaffee@knights.ucf.edu) or Dr. Barbara Fritzsche, Faculty Supervisor, Department of Psychology at (407) 823-4344, (bfritzsc@mail.ucf.edu).

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research &

Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901. You may also talk to them for any of the following:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You want to get information or provide input about this research.

Your signature below indicates your permission to take part in this research.

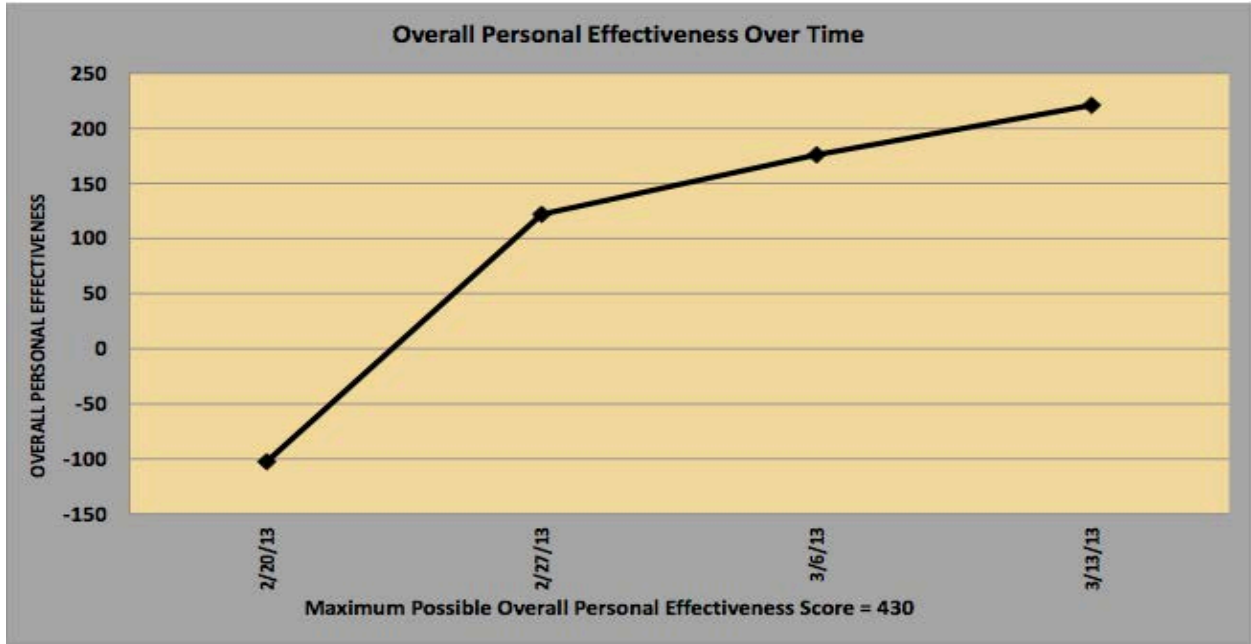
Name of participant

Signature of participant

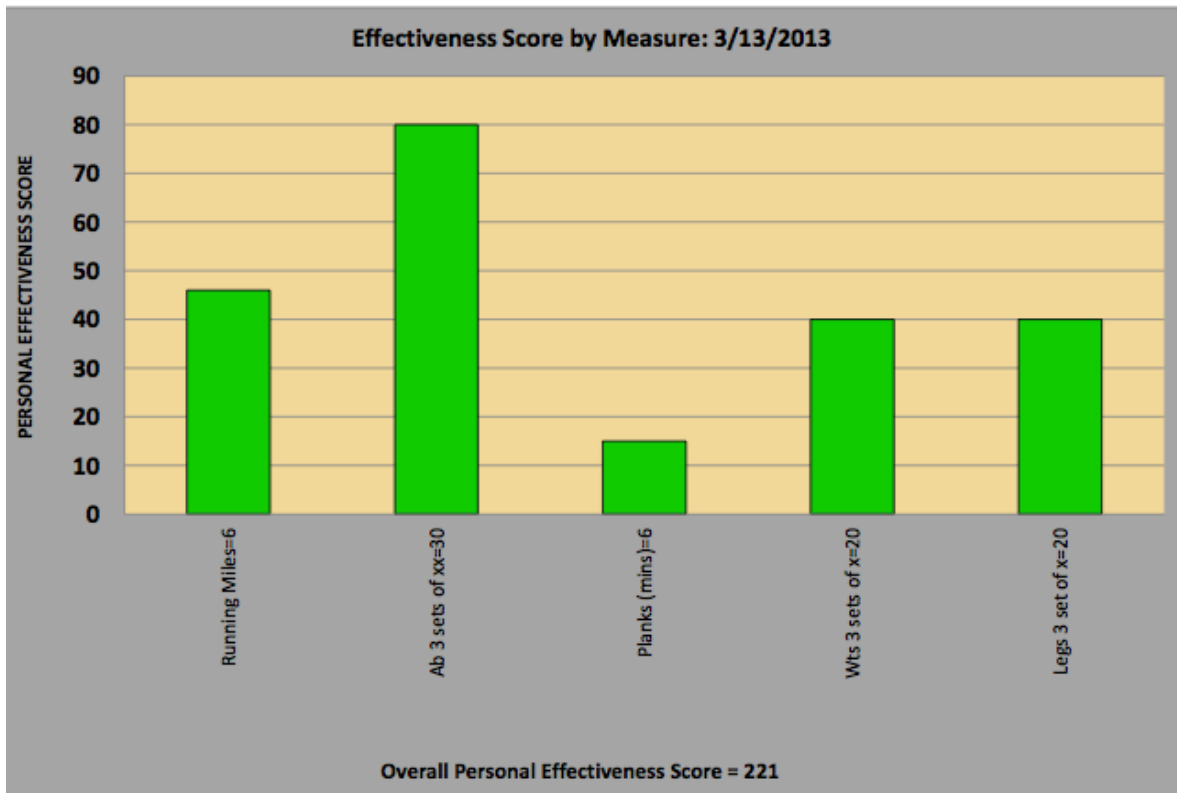
Date

APPENDIX B: EXAMPLE FEEDBACK REPORT

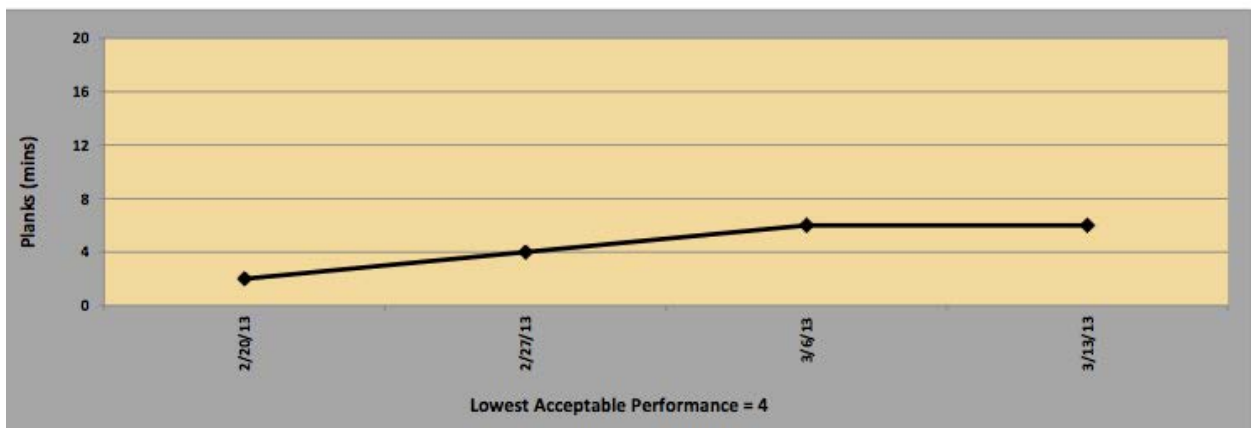
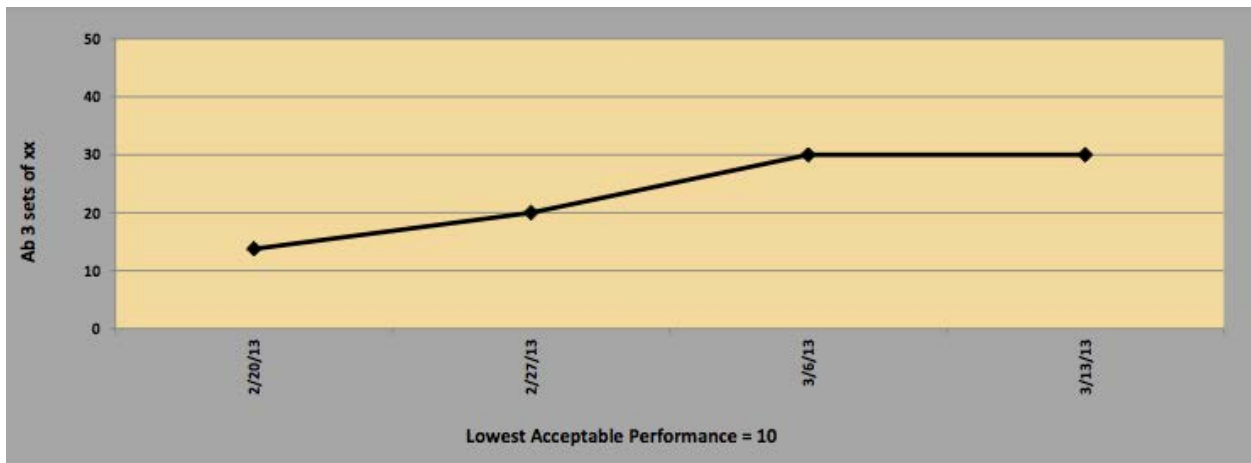
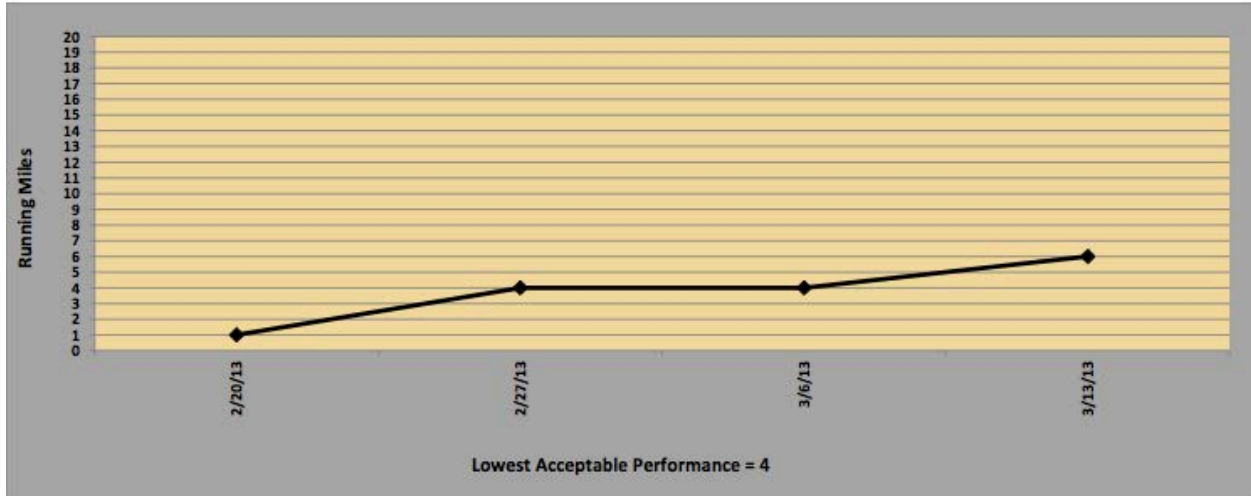
Graph 1. Overall Personal Effectiveness Over Time.

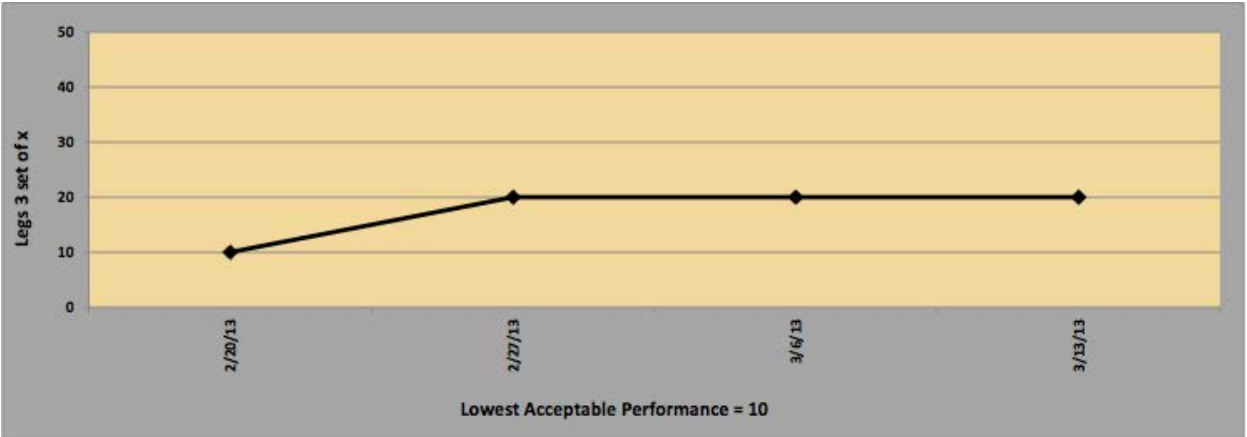
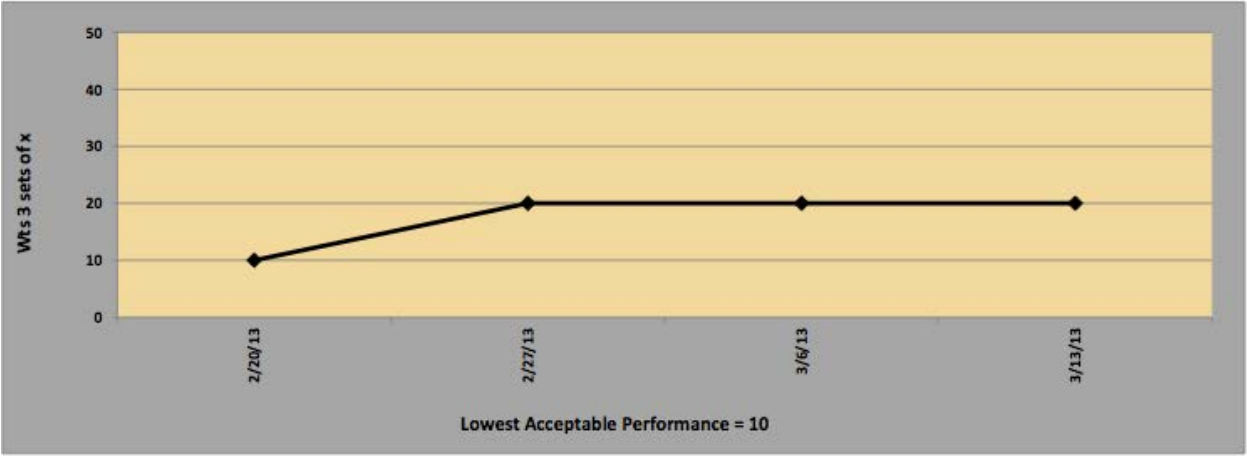


Graph 2. Effectiveness Score by Measure.

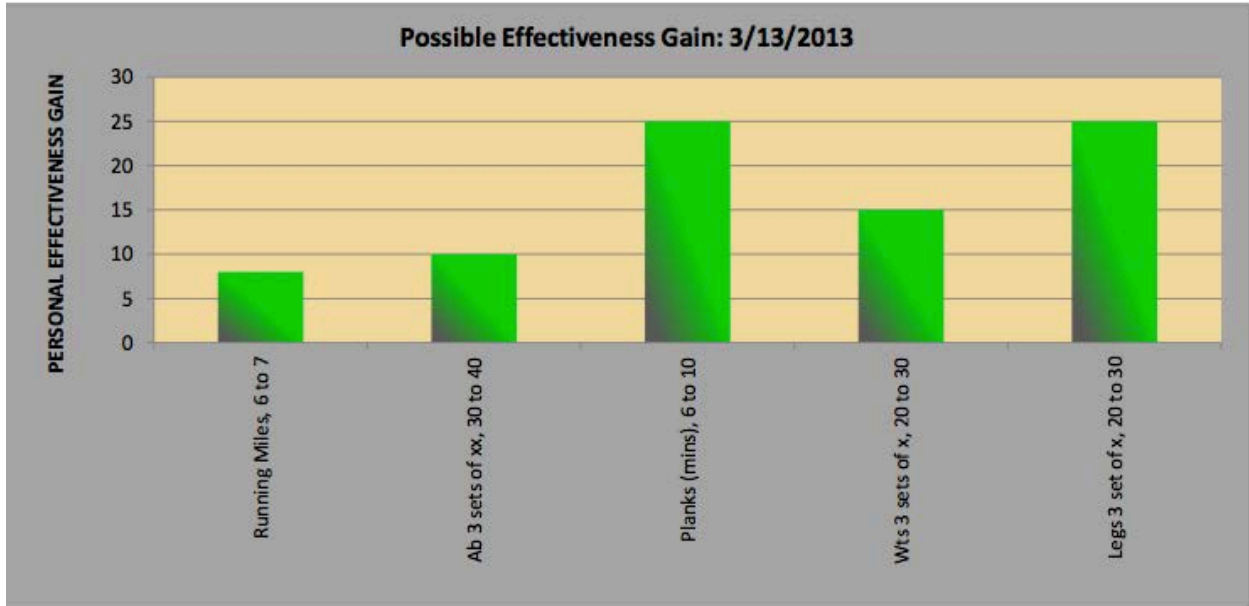


Graph 3. Performance on Each Measure Over Time.

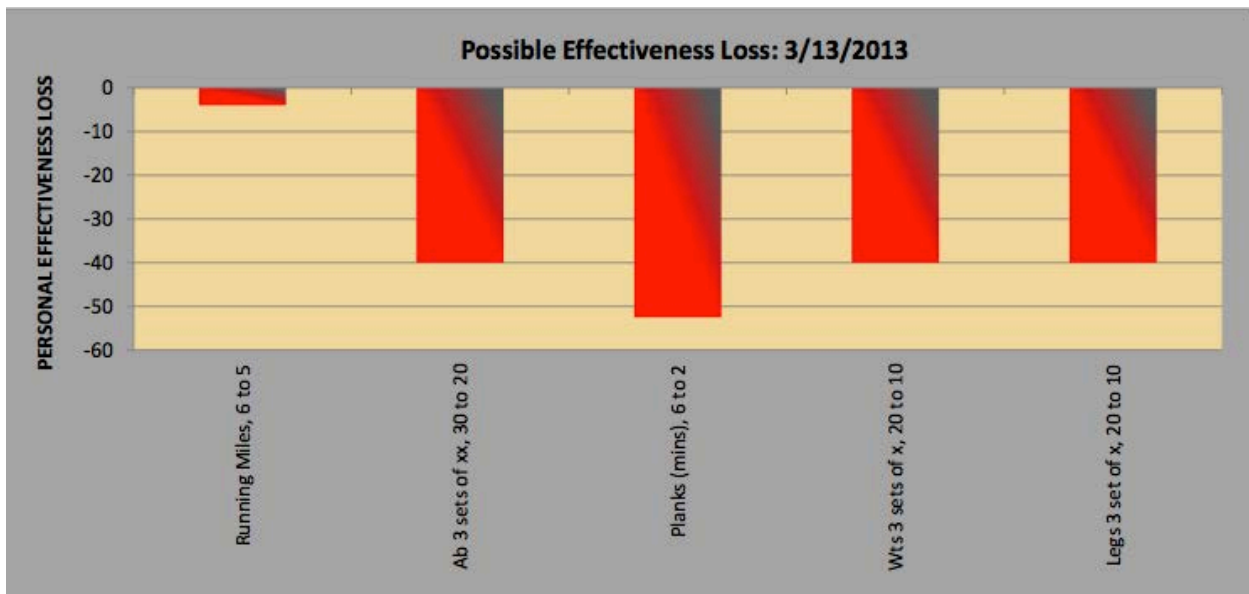




Graph 4. Possible Effectiveness Gains.



Graph 5. Possible Effectiveness Losses.



APPENDIX C: DEMOGRAPHICS

Please answer the following questions about yourself to the best of your ability.

1. Gender: Female Male

2. Age: _____

3. Years of Education Completed: _____

4. Ethnicity:

African American

American Indian or Alaska Native

Asian or Pacific Islander

Caucasian

Hispanic/Latino

Multiracial

Other (please specify): _____

APPENDIX D: ATTITUDES OF SYSTEM DEVELOPMENT

(Acceptance, Understanding, Ownership, Perceived Validity and Motivation)

Please indicate how strongly you agree or disagree with each statement.

1. I understand how the Truly Accomplished system works.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

2. The Truly Accomplish system will accurately measure my fitness performance.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

3. The fitness goals in the Truly Accomplished system are important to me.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

4. The Truly Accomplished system is valid.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

5. The Truly Accomplished system accurately reflects my fitness goals.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

6. The Truly Accomplished measurement system is fair.
- Ⓒ Strongly Disagree (1)
 - Ⓒ Disagree (2)
 - Ⓒ Neither Agree nor Disagree (3)
 - Ⓒ Agree (4)
 - Ⓒ Strongly Agree (5)
7. I know the expected level of fitness performance to achieve positive results.
- Ⓒ Strongly Disagree (1)
 - Ⓒ Disagree (2)
 - Ⓒ Neither Agree nor Disagree (3)
 - Ⓒ Agree (4)
 - Ⓒ Strongly Agree (5)
8. I am accountable for my fitness performance.
- Ⓒ Strongly Disagree (1)
 - Ⓒ Disagree (2)
 - Ⓒ Neither Agree nor Disagree (3)
 - Ⓒ Agree (4)
 - Ⓒ Strongly Agree (5)
9. The different fitness measures in the Truly Accomplished system accurately measure what they intend to measure.
- Ⓒ Strongly Disagree (1)
 - Ⓒ Disagree (2)
 - Ⓒ Neither Agree nor Disagree (3)
 - Ⓒ Agree (4)
 - Ⓒ Strongly Agree (5)

10. I am committed to using the Truly Accomplished system.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

11. The Truly Accomplished system is personalized for my fitness needs.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

12. Developing the Truly Accomplished system was worth my time.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

13. If I perform above the minimum expected level I will achieve desired results.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

14. I am in agreement with the Truly Accomplished system.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

15. I know what is expected of me to meet my fitness goals.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

16. I am confident in the Truly Accomplished system.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

17. How the Truly Accomplished system works makes sense.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

18. In the development of the Truly Accomplished system my opinion mattered.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

19. I understand how positive and negative performance is evaluated.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

20. I accept that the Truly Accomplished System will help me achieve my fitness goals.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

21. I am motivated to begin using the Truly Accomplished system.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

APPENDIX E: SATISFACTION WITH TRULY ACCOMPLISHED

Please indicate how strongly you agree or disagree with each statement.

1. Overall, I am satisfied with the Truly Accomplished process in helping me reach my selected fitness goals.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

2. I liked using the Truly Accomplished method.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

3. The Truly Accomplished process was worth the time and effort.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

4. Truly Accomplished was NOT a difficult process.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

5. The Truly Accomplished process helped me to achieve my fitness goals.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

6. I feel the Truly Accomplished process helped me to evaluate my fitness needs.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

7. I would recommend Truly Accomplished to friends wanting to improve their fitness ability.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

8. I would use Truly Accomplished to help me achieve goals in other areas of my life.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

9. I would like to continue using Truly Accomplished.

- Ⓒ Strongly Disagree (1)
- Ⓒ Disagree (2)
- Ⓒ Neither Agree nor Disagree (3)
- Ⓒ Agree (4)
- Ⓒ Strongly Agree (5)

APPENDIX F: SATISFACTION WITH LIFE SCALE

Please indicate how strongly you agree or disagree with each statement.

1. In most ways my life is close to my ideal.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

2. The conditions of my life are excellent.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

3. I am satisfied with my life.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

4. So far, I have gotten the important things I want in life.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

5. If I could live my life over, I would change almost nothing.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

REFERENCES

- American Council on Exercise. (2009). *Ace Lifestyle & Weight Management Consultant Manual, The Ultimate Resource for Fitness Professionals*. San Diego: American Council on Exercise.
- Ashwood, E. (2013). *Truly accomplished: Accomplish more of what matters to you*. Retrieved from <http://www.trulyaccomplished.com/about>
- Bobko, P., & Colella, A. (1994). Employee reactions to performance standards: a review and research propositions. *Personnel Psychology, 47*, 1-29.
- Cawley, B. D., Keeping, L. M., & Levy, P. E. (1998). Participation in the performance appraisal process and employee reactions: A meta-analytic review of field investigations. *Journal of Applied Psychology, 83*, 615– 633.
- Center for Disease Control (2011, September). About BMI for adults. *Centers for disease control and prevention*. Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71-75.
- Dipboye, R. L., & de Pontbriand, R. (1981). Correlates of employee reactions to performance appraisals and appraisal systems. *Journal of Applied Psychology, 66*, 248–251.
- Dixon, N. W. (2012). *Truly Accomplished: Effectiveness of a measurement and feedback*

- approach to lifestyle change* (Doctoral dissertation). University of Central Florida, Florida.
- Garrow, J., Webster, J. (1985). Quetelet's index (H/W²) as a measure of fatness. *International Journal Of Obesity*, 9(2), 147-153.
- Kanfer, R. (1990). Motivation theory and Industrial/Organizational psychology. In M. D. Dunnette and L. Hough (Eds.), *Handbook of industrial and organizational psychology. Volume 1. Theory in industrial and organizational psychology* (pp. 75-170). Palo Alto, CA: Consulting Psychologists Press.
- Lindner, M. (2009, January). What people are still willing to pay for. *Forbes*. Retrieved from http://www.forbes.com/2009/01/15/self-help-industry-ent-sales-cx_ml_0115selfhelp.html
- Locke, E. A., & Schweiger, D. M. (1979). Participation in decision- making: One more look. *Research in Organizational Behavior*, 1, 265– 340.
- Meyer, Paul (n.d.). *BrainyQuote*. Retrieved 21 June 2012, from <http://www.brainyquote.com/quotes/quotes/p/pauljmeye188705.html>
- National Council on Strength & Fitness (2012). A closer look at skinfold assessment. *National Council on Strength & Fitness*. Retrieved from <http://www.ncsf.org/enev/articles/articles-skinfoldassessment.aspx>
- Naylor, J. C., Pritchard, R. D., & Ilgen, D. R. (1980). *A theory of behavior in organizations*. New York: Academic Press.
- Pritchard, R. D. (2012). *The Truly Accomplished Success Meter Software: the manual (Version 2.0)*. Unpublished white paper.

Pritchard, R. D. (2012). Truly Accomplished Success Meter Software (Version 2.0)[Computer program written in Excel]. For more information contact Robert Pritchard at

RDPrichard@gmail.com or Elissa Ashwood at elissa.ashwood@trulyaccomplished.com

Pritchard, R. D. (1990). *Measuring and improving organizational productivity: A practical guide*. New York: Praeger Publishers.

Pritchard, R. D., & Ashwood, E. L. (2012). *Truly Accomplished and the science behind it*. Unpublished white paper.

Pritchard, R. D., & Ashwood, E. L. (2008). *A manager's guide to diagnosing and improving motivation*. New York: Routledge, Taylor & Francis Group.

Pritchard, R. D., Harrell, M., DiazGranados, D., & Guzman, M. J. (2008). The Productivity Measurement and Enhancement System: A meta-analysis. *Journal of Applied Psychology, 93*(3), 540-567.

Pritchard, R. D., Jones, S. D., Roth, P. L., Stuebing, K. K., & Ekeberg, S. E. (1989). The evaluation of an integrated approach to measuring organizational productivity. *Personnel Psychology, 42*(1), 69-115.

Prichard, R. D., Weaver, S. J., & Ashwood, E. L. (2012). *Evidence-based productivity improvement: A practical guide to the Productivity Measurement and Enhancement System*. New York: Routledge, Taylor & Francis.

Spector, P. E. (1986). Perceived control by employees: A meta-analysis of studies concerning autonomy and participation at work. *Human Relations, 39*(11), 1005-1016.

Taylor, M. S., Tracy, K. B., Renard, M. K., Harrison, J. K., & Carroll, S. J. (1995). Due process in performance appraisal: A quasi-experiment in procedural justice. *Administrative Science Quarterly*, 40, 495-523.

Thompson, W. R., Gordon, N. F., & Pescatello, L. S. (2009). *ACSM's guidelines for exercise testing and prescription* (8th ed.). Baltimore, MD: Hubsta Ltd.

U.S. Department of Health and Human Services, National Heart, Lung, and Blood Institute. (2013). *Calculate Your Body Mass Index*. Retrieved from <http://www.nhlbi.nih.gov/guidelines/obesity/BMI/bmicalc.htm>

Wallston, K. A., Wallston, B. S., & DeVellis, R. (1978). Development of the multidimensional health locus of control (MHLC) scales. *Health Education Monographs*, 6, 160-170.

Wright, N. E., Pritchard, R. D., van Tuijl, H., Bedwell, W. L., Weaver, S. J., & Fullick, J. M. (2010, April). Maximizing controllability in performance measures. Poster Session at the annual meeting of the Society for Industrial Organizational Psychology, Atlanta, Georgia.