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## Truly Accomplished: Effectiveness Of A Measurement And Feedback Approach To Lifestyle Change

Natalie Wright Dixon  
*University of Central Florida*

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TRULY ACCOMPLISHED: EFFECTIVENESS OF A MEASUREMENT  
AND FEEDBACK APPROACH TO LIFESTYLE CHANGE

by

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B.A. University of North Florida, 2005

A dissertation submitted in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy  
in the Department of Psychology  
in the College of Sciences  
at the University of Central Florida  
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2012

Major Professor: Robert D. Pritchard

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## ABSTRACT

Individuals' personal improvement efforts are pervasive and the benefits associated with successful self-improvement are both tangible (e.g., healthier lifestyles, more intimate relationships) and intangible (e.g., personal accomplishment, enhanced well-being). As evidenced by research on work-family spillover, self-improvement also has important implications for organizations, as there is considerable crossover between work and non-work domains. The current study tested the effectiveness of Truly Accomplished, an intervention designed to help individuals develop personalized systems for measuring and improving behavior, and examined the extent to which the outcomes associated with such behavior change exhibit positive spillover effects into the workplace.

Participants ( $N = 44$ ) experienced large gains in effectiveness ( $d = 2.93$ ). Effectiveness gain was predicted by conscientiousness ( $r = .40$ ), core self-evaluations ( $r = .42$ ), and psychological safety ( $r = .64$ ). Learning goal orientation and performance goal orientation interacted with perceived goal difficulty to predict effectiveness gain. Overall effectiveness gain was negatively related to stress and positively related to future change efficacy, job-related efficacy, and satisfaction with the intervention. Job satisfaction and job efficacy increased following feedback, providing some evidence of spillover.

Results have implications for individual behavior and attitude change, and its impact seems to extend into subjective well-being above and beyond actual behavior change. Evidence of spillover has implications for organizations, suggesting that TA may be used as a mechanism through which job-related outcomes can be improved.

## **ACKNOWLEDGMENTS**

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## **CHAPTER 1: INTRODUCTION**

Widespread desires for personal improvement are evident from the increased utilization of psychotherapy, popular psychology books, and self-help programs. Individuals frequently seek healthier lifestyles, more intimate relationships, stronger spirituality, or greater financial responsibility, and the benefits associated with these types of improvements are tangible and relatively proximal. However, positive change also offers more distal and intangible rewards, in that it may enhance perceptions of personal accomplishment, well-being, and self-efficacy.

Bandura (1997) noted, for example, that mastery experiences that attest to an individual's ability to make desired personal changes "produce a transformational restructuring of efficacy beliefs" (p. 53) which can generalize across life domains. Thus individual accomplishment, particularly accomplishments that are personally relevant, can provide a powerful experience that enhances efficacy perceptions and general well-being. Additionally, goal-striving that is driven by self-concordance and authenticity increases goal attainment and enhances perceptions of self-image (Sheldon & Kasser, 2001). Engaging in activities that are personally important and oriented toward intrinsic values (e.g., personal growth) has a positive impact on subjective well-being (Diener, 2000; Sheldon & Kasser, 2001). That is, when individuals align goals and activities with their fundamental values, they evaluate the quality of their lives more favorably.

Beyond individual outcomes, personal improvement has important implications for organizations. These implications are especially apparent in the Occupational Health Psychology literature, which examines organizational outcomes associated with improving health and reducing stress among workers (Sauter, Hurrell, Fox, Tetrick, & Barling, 1999). For instance, job stress influences physiological and mental health of employees, and also predicts critical

outcomes such as job satisfaction, organizational commitment, turnover intentions, and other withdrawal behavior (Podsakoff, LePine, & LePine, 2007). Employee health also has financial implications for organizations in terms of absenteeism and insurance costs (Sonnentag & Frese, 2003). For instance, depression, which is a primary symptom of occupational stress, costs U.S. organizations an estimated \$44 billion annually as a result of decreased job performance, and increased absences and other counterproductive work behaviors (Greenberg, Kessler, Nells, Finkelstein, & Berndt, 1996).

As evidenced by research on work-family spillover, which explores the ways in which emotions experienced in one domain carry over to other domains (Ford, Heinen, & Langkamer, 2007), the relationship between individual well-being and work outcomes is of critical importance. Spillover research frequently focuses on negative cross-domain effects, however. For instance, work-family conflict has been associated with decreased performance, job satisfaction, and marital satisfaction (Kossek & Ozeki, 1998; Judge, Ilies, & Scott, 2006), and work stress has been linked to negative outcomes at home, such as substance use (Frone, 2008) and reduced health of family members (Westman, 2002; Bakker et al., 2008). While relatively fewer studies examine positive aspects of cross-domain relationships, researchers have linked psychological well-being to job performance and positive organizational behavior (Cropanzano & Wright, 1999; Wright & Staw, 1999). Additionally, positive family-to-work spillover (e.g., marital satisfaction, parenthood, social support) predicts job satisfaction over time (e.g., Ford et al., 2007; Heller & Watson, 2005).

The purpose of the current study is to examine the effectiveness of Truly Accomplished (TA), an intervention designed to help individuals in making desired personal change, and to

examine the extent to which such positive behavior change exhibits spillover effects into the workplace. Developed by Elissa Ashwood and Robert Pritchard, TA aims to increase motivation to change and maximize satisfaction by aligning values, objectives, and behavior. Guided by a facilitator, an individual completes a series of steps in which he or she identifies desired areas for change and develops a personalized system for measuring and improving behavior. Although the TA steps are discussed more thoroughly in the Method section, I will review them here to aid in understanding the propositions that follow. A summary of the Truly Accomplished process is provided in Figure 1.

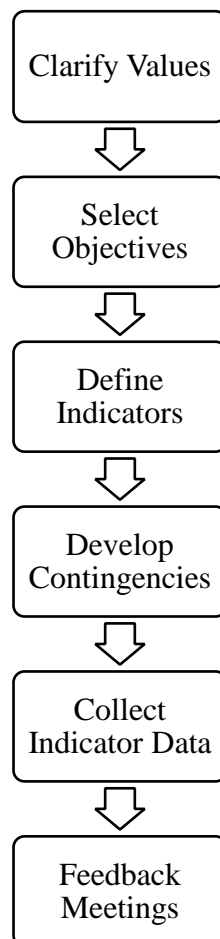


Figure 1. Summary of Truly Accomplished Process

### *Summary of Truly Accomplished Process*

The process begins as the individual clarifies his/her values by determining the areas of his/her life that are of the utmost importance (e.g., health, family, spirituality). These areas are translated into specific objectives for improvement. For example, objectives might include “Improve physical health” or “Strengthen family relationships.” Next, the individual develops indicators, or measures, for each objective. Example indicators might include “Number of 30-minute segments spent doing cardiovascular exercise per week” or “Percent of evening meals eaten with family per week.” It is important that indicators be written in a way that maximizes the individual’s control over the measures, and that the set of indicators for each objective fully captures that objective.

Next, the individual develops contingencies for each indicator. Contingencies are graphical representations of the relationship between the level of each indicator (i.e., how much of a result was produced) and effectiveness (i.e., how favorably that result is evaluated). In TA, effectiveness is the amount of value created for that person by that level of performance on the indicator. Contingencies depict the level of evaluation corresponding to each level of result the person achieves. Figure 2 presents some example contingencies. The contingency for exercise in the upper left of the figure shows amount of exercise on the horizontal axis and level of effectiveness on the vertical axis. The effectiveness score goes from negative scores which are well below minimum expectations through zero, which indicates meeting minimum performance expectations, to positive scores indicating performance above minimum expectations. The line shows what levels of exercise correspond to what levels of effectiveness.

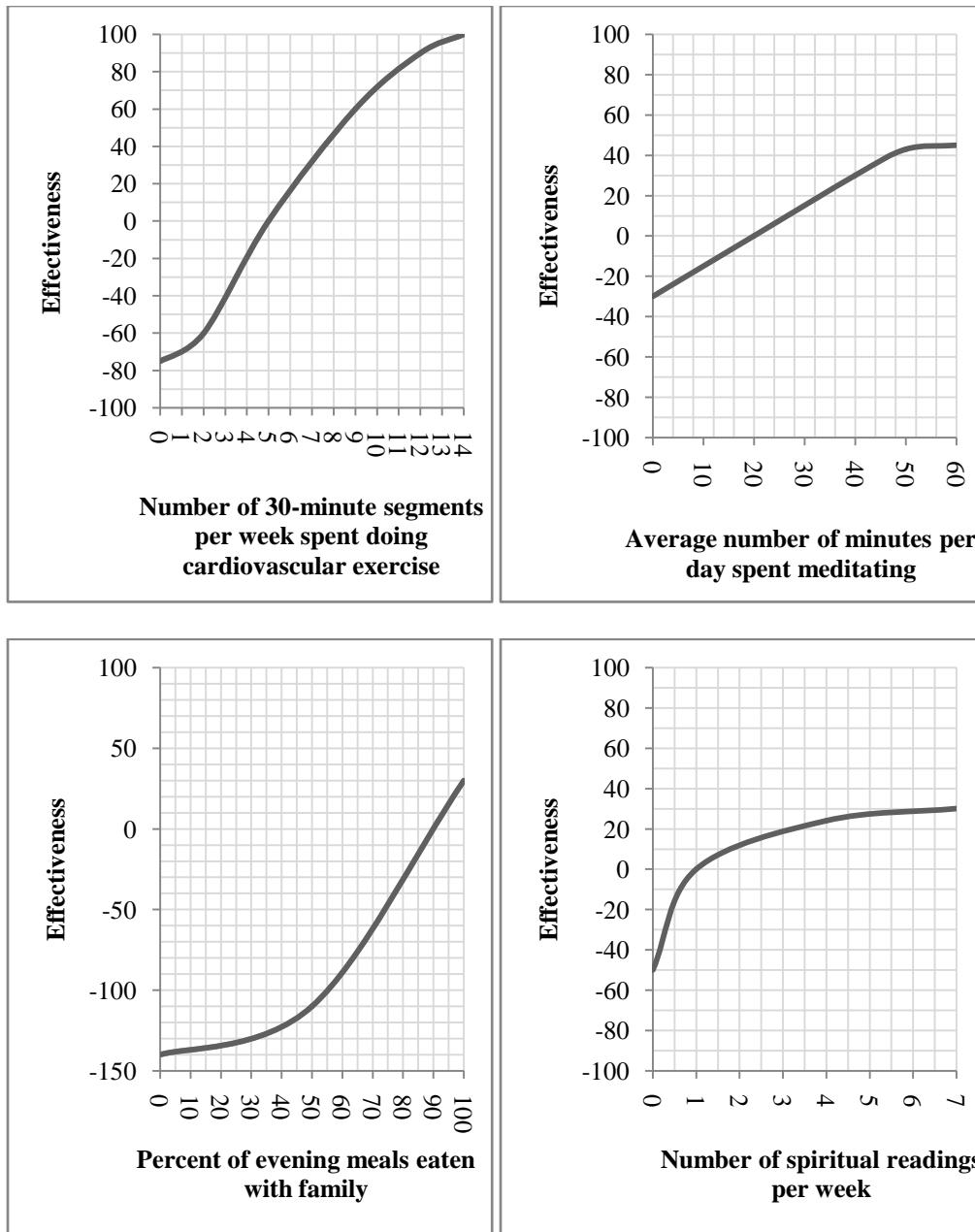


Figure 2. Example Contingencies

Contingencies are important for several reasons. First, they provide the individual with a clear understanding of the relative importance of each indicator. The greater the range in effectiveness scores between minimum and maximum indicator levels, the greater the



importance of the indicator. The top-left contingency in Figure 2 shows the relationship between the number of 30-minute segments of cardiovascular exercise per week and the individual's effectiveness. According to this sample contingency, zero 30-minute segments of cardiovascular exercise corresponds to an effectiveness score of -75, while fourteen 30-minute segments yields an effectiveness of +100. The range from lowest to highest indicator is -75 to +100, or 175 effectiveness points. The top-right contingency shows the relationship between average number of minutes per day spent meditating and the individual's effectiveness. The contingency shows that an average of zero minutes per day yields an effectiveness of -30, while 60 minutes yields an effectiveness of +45, for a range of 75 effectiveness points. Because the range of minimum and maximum effectiveness scores for the Cardiovascular Exercise indicator is greater (i.e., a range of 175), its relative importance is greater than the Meditation indicator (i.e., a range of 75).

Second, contingencies offer a way to prioritize between indicators. An indicator with a current performance level that falls on a steep point on the contingency curve should take priority over indicators with performance levels on flatter points of the contingency curve. Steeper curves indicate that even a minimal increase in the result leads to a large increase in effectiveness. In the example in Figure 2, a person who is currently spending 50 minutes a day meditating would not get any benefit from increasing meditation to 60 minutes a day. However, increasing from two to three 30-minute segments of cardiovascular exercise would yield a change in effectiveness of +20. Clearly, increasing cardiovascular exercise is the most beneficial choice between the two indicators. Thus if an individual needs to choose where to focus energy, he or she can examine the current level of performance and the shape of the graph to make the most valuable choice.

Contingencies capture non-linear relationships between results and evaluations of performance. The relationship between a person's output and the value of that output is not typically linear (Pritchard et al., 1989). For example, the top-right graph in Figure 2 shows the relationship between minutes per day spent meditating and the effectiveness level of that number of minutes. The horizontal axis shows number of minutes ranging from zero to 60 minutes per day. Effectiveness increases steadily from zero to 50 minutes per day. However, after 50 minutes the line levels off. This shows that increases beyond 50 are not as valuable as increases below 50. A point of diminishing returns is reached at 50 minutes of meditation per day.

Contingencies also allow an individual to understand expectations of performance. The zero effectiveness point on the contingency indicates the expected or minimum acceptable level of performance on each indicator. For example, in the top-left graph in Figure 2, five 30-minute segments of cardiovascular exercise per week corresponds to an effectiveness of zero; in the top-right graph, the zero effectiveness point is 20 minutes of meditation per day. If the individual achieves the expected levels of performance, they meet minimum expectations. Their evaluations would be neither good nor bad.

Finally, contingencies yield an overall effectiveness score, which is calculated as the sum of effectiveness scores for each indicator. This is possible because the person's score on each indicator is translated into a common scale. The overall effectiveness score conveys valuable information. A score of zero means that, overall the individual is meeting his or her minimum expectations. Thus, if the effectiveness score is positive, the person is exceeding expectations; if the score is negative, the person is below expectations. Because contingencies capture the relative importance of indicators, simply summing the effectiveness scores on each measure

offers an appropriate reflection of overall effectiveness. The overall effectiveness score can also be tracked over time to determine whether overall performance is increasing or decreasing.

Note that contingencies are unique to each individual, as one person's idea of what constitutes "good" or "bad" performance on an indicator may be very different from another person's evaluation of performance on the same indicator.

Once contingencies have been developed, the individual begins collecting indicator data. That is, they record their daily or weekly performance on each measure. Data are entered into a feedback report which calculates effectiveness on each indicator and overall effectiveness. Table 1 shows an example feedback report. The feedback report shows indicator data and effectiveness scores for the current data collection period, shown in the Current Period columns. For example, this week the person did 6 segments of exercise which, based on the contingency, corresponds to an effectiveness score of +17 somewhat above minimum performance. Overall effectiveness score is the sum of the effectiveness scores for all indicators, -1 in this example.

Feedback reports also contain priority information which, as discussed above, is derived from contingencies. Example priority information is provided in three right hand columns of Table 1. The first two of these columns show the projected effectiveness score if the person were to improve on that indicator to the amount shown in the Projected Indicator Level column. The far right column shows the gain in effectiveness that would occur if the person increased by that amount. Comparing these gain scores allows the person to determine what the priorities are for making improvements. In the example, the person would have the greatest gain in effectiveness by improving from 80% to 90% of evening meals eaten with family (i.e., effectiveness gain of +30), so that is the area on which to focus improvement efforts.

Table 1. Sample Feedback Report with Priorities

Indicator	<u>Current Period</u>		<u>Priority Information</u>		
	Indicator Level	Effectiveness Score	Projected Indicator Level	Projected Effectiveness Score	Gain in Effectiveness
Number of 30-minute segments spent doing cardiovascular exercise per week	6	+17	7	+32	+15
Percent of evening meals eaten with family per week	80%	-30	90%	0	+30
Average number of minutes per day spent meditating	20	0	30	+16	+15
Number of spiritual readings per week	2	+12	3	+19	+7
Overall Effectiveness		-1			

Finally, the individual meets with the facilitator to review his or her feedback report. This feedback meeting is an opportunity to gain information about performance, discuss priorities, and strategize for improvement.

### *The Current Study*

This study examines TA effectiveness by testing a model of individual difference antecedents, moderator variables, and individual and organizational outcomes. Primarily, the study addresses the following major research questions: (1) Will the intervention improve individuals' performance on their self-identified measures?; (2) Does it improve long-term

individual outcomes?; (3) Does the intervention exhibit positive spillover effects into the workplace?; and (4) Are there moderators that influence the effectiveness of the intervention?

### *Importance of Self-Improvement Efforts*

Clearly, self-improvement is important for individuals. Behavioral change interventions are aimed at improving clinical outcomes (e.g., substance abuse treatment, weight loss programs, illness prevention), decreasing stress and increasing healthy behavior among workers (e.g., employee wellness programs), and generally enhancing quality of life (e.g., improving time-management skills).

Many behavioral change approaches commonly used in the self help arena are neither driven by strong theoretical foundations nor backed by solid empirical evidence. Studies of commercial weight-loss programs, for example, are of poor quality and offer little support for their effectiveness (Tsai & Wadden, 2005). Similarly, research on the effectiveness of non-profit self-help programs (e.g., Twelve-Step Interventions) has been mixed and the soundness of its methodology is questionable (Ferri, Amato, & Davoli, 2006). Mental and physical health and well-being of workers is of critical importance to organizations in terms of insurance costs, absenteeism, and turnover. Thus employee wellness and lifestyle management programs (e.g., Employee Assistance Programs) are used in the workplace. While such programs have been shown to decrease stress and anxiety at work (Sonnetag & Frese, 2003), they are usually short-term and designed to manage work-family related issues rather than to help individuals make desired personal change. Additionally, many popular psychology self-help books aimed at increasing a person's effectiveness often outline a number of vague principles by which

successful people are presumed to live. While such principles seem reasonable at face value, there is little research on their validity.

Thus, a lack of sound theory and solid research surrounds many existing behavioral change interventions. As discussed in the following section, Truly Accomplished has been designed with a strong basis in both theory and research, and addresses implications from across multiple domains.

### *Review of the Theoretical and Empirical Foundations of TA*

The following section will examine the major concepts from which implications for behavior change can be derived. Concepts are drawn from the motivation, goal-setting, feedback, decision-making, occupational health, clinical, social, and cognitive psychology literatures. I will begin by summarizing each concept, including its theoretical bases and relevant empirical support. I will then outline the implications drawn from each concept for self improvement efforts and discuss the specific ways in which TA addresses each of these implications.

#### *Motivation*

The theoretical foundations of Truly Accomplished are the NPI theory of motivation (Naylor, Pritchard, & Ilgen, 1980), and a recent expansion by Pritchard and Ashwood (2008), which postulates that people are motivated by expectations of how effort applied across actions will satisfy their needs. The theory suggests five primary components of motivation. First, effort is applied to *Actions*. Actions include anything an individual does (e.g., exercising, talking, eating) which generates *Results*. For example, one result of applying energy to exercise is the amount of time at target heart rate. Results are measured (e.g., how many minutes at my target heart rate) and placed on a good-to-bad continuum to produce *Evaluations* (e.g., how good was it

for me to exercise for 30 minutes?). Evaluations then lead to *Outcomes* (e.g., weight loss). Outcomes are motivating to the extent that they satisfy an individual's needs. For example, weight loss will lead to the highest *Need Satisfaction* when it is perceived as important and valuable to the individual. In order for motivation to be high, all connections between these components must be high. In other words, motivation will be maximized when a person applies effort to actions which generate positively evaluated results, and when those evaluations lead to outcomes that satisfy the individual's needs.

Research on the Productivity Measurement and Enhancement System (ProMES; Pritchard, 1990) offers at least indirect support for NPI and the Pritchard-Ashwood models. ProMES is an intervention based on this motivation theory and is designed to improve the productivity of work units within organizations by reducing sources of uncontrolled variation in performance measures and providing useful feedback based on controllable measures. ProMES researchers also stress the importance of participation; that is, people should participate in the process of designing measures on which they will be evaluated, as participation leads to greater acceptance and understanding of the measures, and increases an individual's accountability for their performance (Wright, Pritchard, van Tuijl, Weaver, Bedwell, & Fullick, 2010). Clearly, this process is designed to maximize motivation, in that it clarifies which actions will produce valued results in order to gain satisfying outcomes. ProMES yields large productivity increases ( $d = 1.16$ ) across various jobs, types of organizations, and multiple countries, and these effects have been shown to last over time (Pritchard, Harrell, DiazGranados, & Guzman, 2008).

*Implications for behavior change.* Several implications for maximizing motivation arise from NPI and the Pritchard-Ashwood models and the research supporting them (see Table 2 for a

summary of these implications). The most general implication is that the connections between the motivation components should be maximized. More specifically, in order to maximize Action-to-Results connections (i.e., the degree to which changes in the level of effort exerted toward a given task leads to changes in the level of result produced), the individual must be able to complete the actions required to produce the desired results. This means the person must be *capable*, have *adequate resources and authority*, and be able to develop *effective strategies* to obtain the desired results (Pritchard, Weaver, & Ashwood, 2010). TA achieves this in the feedback meetings, which are designed to help individuals develop important skills and effective strategies for improvement, and to remove any roadblocks to success. The person must also be able to control how his or her effort is allocated to different actions. Thus it is important that feedback is given on aspects of the measure that are *controllable*; that is, people can control how variation in their actions leads to different results. TA addresses this by ensuring that indicators are developed so as to maximize the individual's control over the measure. Finally, the individual must know exactly *what results are desired*, and have a clear understanding of *how much of each result is produced* from a given level of effort. TA accomplishes this in several ways. Often an individual might have only a vague picture of the things they wish to work on. Through the process of aligning objectives with core values, the person is able to develop clear objectives which positively impact motivation (West & Anderson, 1996) and goal-setting (Locke & Latham, 2002). Additionally, developing indicators that are concrete and specific allows the individual to clearly define desired results.

Second, for motivation to be maximized, individuals must have clear Results-to-Evaluation connections. Specifically, the person must have a clear understanding of the *relative*



*importance* of achieving different results and be able to *identify priorities* for improvement. In TA, contingencies represent the connections between the results an individual produces and the evaluation he or she receives; they graphically depict the corresponding level of evaluation for each level of result the person achieves. The range of effectiveness scores on each indicator shows the relative importance. As discussed above, the greater the range between minimum and maximum effectiveness scores, the greater the indicator's relative importance. Additionally, the shape and slope of the contingency graph offer a way of prioritizing where to focus effort. Current performance levels that fall on steeper points of the contingency curve have a higher priority than those that fall on flatter points of the curve. For example, Figure 2 shows that increasing from three to four 30-minute segments of cardiovascular exercise per week is leads to larger gains in effectiveness than increasing from 50 to 60 minutes of meditation per day. This is because current performance on the cardiovascular exercise indicator (i.e., three 30 minute segments) falls at a steeper point on the curve than current performance on the meditation indicator (i.e., 50 minutes), which becomes relatively flat at the top. Finally, the individual must be able to identify the *expected level* of each result. The zero effectiveness point on the contingency graphs indicates the expected level of performance on each indicator. It is the level of performance at which the resulting evaluation would be neither good nor bad.

It is important that the feedback system includes *all important results* and that it provides both *descriptive and evaluative information* on these results. As noted above, a key aspect of system development is that all important aspects are included in the individual's set of objectives, and that each objective is fully captured by the set of indicators. TA provides descriptive feedback on results simply through measurement of the indicator (i.e., the objective

level of result that was achieved), while evaluative feedback is offered in the resulting effectiveness score (i.e., the subjective value of the level of result achieved). Finally, *evaluations must be known, valid, and perceived as valid*. Evaluations are known in TA through the use of effectiveness scores. Individuals develop contingencies themselves and collect their own indicator data; thus, if they know their results, they also know their evaluations. Validity and perceived validity can be easily assessed in TA. Essentially, the validity of effectiveness on a given indicator can be determined by comparing what the evaluation says to how the person subjectively feels. For example, suppose a person's result (e.g., jogging for 30 minutes twice a week) on a cardiovascular exercise indicator corresponds with an effectiveness score of -13. This indicates that jogging twice a week is evaluated as slightly negative. To assess the validity of this evaluation, the person must simply compare the system's evaluation to how they feel about their results. If the person subjectively evaluates that jogging twice a week has a positive impact on his or her effectiveness, the contingency for that indicator should be revised to increase the validity of the evaluation. This participative approach, whereby the individual can easily revise contingencies, helps increase perceived validity as well.

A third set of implications that can be drawn from the Pritchard-Ashwood theory of motivation is in regards to Evaluation-to-Outcomes connections. It is imperative that there is noticeable *variation in the favorableness of outcomes for good versus poor performance*. In other words, as evaluations become more favorable, outcomes increase. In TA, outcomes are increased both directly (e.g., through increased cardiovascular health) and indirectly (e.g., through satisfaction and feelings of accomplishment) as a result of positive evaluations. Individuals are motivated by, for example, seeing the benefits of greater health, but also through the evaluative

feedback received from improved effectiveness scores. It is also important that the relationship between levels of performance and the intrinsic and extrinsic outcomes one receives are *clear* and *consistent over time*. The transparency of the TA system and the participative nature of its development strengthen this clarity and consistency. In other words, TA ensures that individuals have unambiguous conceptions of the outcomes of good and poor performance.

The final set of implications from the Pritchard-Ashwood theory of motivation is in regards to the Outcome-to-Need Satisfaction connection. Specifically, it is essential that the outcomes a person receives actually *satisfy important needs*. As noted above, TA offers individuals the opportunity to achieve both intrinsic (i.e., satisfaction and accomplishment) and extrinsic (i.e., achievement of individualized objectives such as weight loss) outcomes. Most individuals experience need satisfaction from intrinsic outcomes such as accomplishment. Additionally, because TA is an individualized and participative intervention, the extrinsic outcomes they receive from positive evaluations will satisfy important needs unique to their system. Clearly, if a person did not value a particular outcome, they would presumably not include a measure of performance to achieve that outcome. Finally, it is critical that a person has *accurate expectations* about how satisfying a particular outcome will be. If a person has expectations that are not aligned with the actual level of need satisfaction, motivation will be lower. Because the system is transparent to the individual and stable over time, people are likely to have accurate expectations about future need satisfaction.

Table 2. Implications to Maximize Motivation

Component	Implication for Motivation
Action-to-Result Connections	<p data-bbox="407 443 1409 510"><i>Changes in the level of effort must be perceived as leading to changes in the level of the result produced.</i></p> <ul data-bbox="456 527 1409 810" style="list-style-type: none"> <li>- Person is capable of completing all required actions</li> <li>- Person has necessary resources (materials, tools, information, lack of other constraints, etc.) to complete the actions</li> <li>- Person has authority to complete the actions.</li> <li>- Person can develop effective task strategies.</li> <li>- Person has ability to control how effort is allocated to different actions.</li> <li>- Person understands what results are wanted.</li> <li>- Person knows how much of each result is generated.</li> </ul>
Result-to-Evaluation Connections	<p data-bbox="407 856 1357 924"><i>Changes in levels of output must be perceived as leading to changes in the level of the evaluations.</i></p> <ul data-bbox="456 940 1357 1115" style="list-style-type: none"> <li>- Person understands the relative importance of the results wanted.</li> <li>- Person knows the level of results that is expected.</li> <li>- Evaluations are valid and perceived as valid.</li> <li>- Both descriptive and evaluative feedback is given on results.</li> <li>- Feedback covers all important aspects (all evaluated results).</li> </ul>
Evaluation-to-Outcome Connections	<p data-bbox="407 1152 1401 1220"><i>Changes in the evaluation must be perceived as leading to changes in the amount of the outcomes.</i></p> <ul data-bbox="456 1236 1401 1304" style="list-style-type: none"> <li>- Consequences of good and poor performance are clear.</li> <li>- Consequences of good and poor performance are consistent over time.</li> </ul>
Outcome-to-Need Satisfaction Connections	<p data-bbox="407 1346 1317 1451"><i>Variation in the available outcomes should be perceived as resulting in changes in the level of need satisfaction. I.e., the outcomes should be important to the person.</i></p> <ul data-bbox="456 1467 1317 1528" style="list-style-type: none"> <li>- Outcomes satisfy important needs.</li> <li>- Person has accurate expectations of future need satisfaction.</li> </ul>

*Note.* Adapted from *Evidence-based Productivity Improvement: A Practical Guide to the Productivity Measurement and Enhancement System* (p. 59), by R. D. Pritchard, S. J. Weaver, and E. L. Ashwood, 2011. Reprinted with permission.

### *Goal-Setting*

Several other theories have important implications for behavior change. For example, the goal setting literature suggests several features of goals important for maximizing their effectiveness at improving performance. Specifically, goals should be difficult, specific, proximal, and self-set rather than assigned (Locke & Latham, 2002). Essentially, these features stress the importance of having a clear *understanding of priorities* because goal setting helps identify what things are important for good performance. Effective goal-setting also relies on *accurate and timely feedback* on performance, which increases an individual's ability to make necessary adjustments for improvement. The effectiveness of goal setting is greatly impacted by *goal commitment*, which can be enhanced through participation and control. While goals should be challenging, if they are too difficult they may be abandoned. Thus behavior change will be maximized when individuals set controllable goals with achievable outcomes.

While TA does not include a formal, public goal-setting component, it does address these implications of goal-setting theories. Specifically, TA helps individuals clarify priorities for improvement and form behavioral intentions. Intention formation is a type of informal goal-setting that refers to the individual's conscious intention to perform a particular task, or to improve performance on a task. In developing objectives and indicators, individuals begin to form intentions about which tasks they want to focus on. For example, developing objectives and indicators that target health behaviors, family relationships, and spirituality indicate that the person intends to focus on these areas. Individuals strengthen intentions during feedback meetings as they focus on developing specific strategies in order to improve performance on those tasks.

Additionally, TA helps increase goal commitment through the participative nature of its development. That is, because individuals develop measures for themselves, TA encourages ownership of the system, thereby increasing personal accountability and perceived controllability over results. Finally, TA incorporates accurate and timely feedback through regular feedback meetings with the facilitator.

### *Feedback*

The large body of feedback literature suggests that feedback is an effective performance improvement mechanism because it serves to motivate and guide individuals (e.g., Ilgen, Fisher, & Taylor, 1979). That is, by offering individuals specific knowledge of their results, feedback enhances the degree to which they are willing to exert effort toward certain tasks and helps them develop effective task strategies in order to optimize effort expenditure. The literature has identified several features of effective feedback systems. For example, the standards by which individuals are evaluated should be *realistic, clear, and developed through participation* (Taylor, Tracy, Renard, Harrison, & Carroll, 1995; Bobko & Colella, 1994). Feedback should be *specific and provided on a regular basis* (Taylor et al., 1995). Finally, it is important that feedback provides *valuable information* about behavior beyond what is already known by the individual (Ilgen et al., 1979), and that it is focused on the *learning and motivational aspects of the task*, rather than focused on the person (Kluger & DeNisi, 1996).

TA incorporates these features in several ways. First, measurement and evaluation standards are realistic and clear because they are defined by the individuals themselves through the development of contingencies. Feedback is based on objective results which are defined in evaluative terms (i.e., good vs. poor performance) in advance and is provided on a regular and

predictable schedule. TA feedback offers valuable information about behavior by providing both descriptive (i.e., the level of the result that was achieved) and evaluative (i.e., how good or bad that result is) information. Both the measured indicator level (the description) and the effectiveness score (the evaluation) are included in the feedback report. Finally, because the feedback provided in TA is based on objective results, it is focused on learning and motivational aspects of the task rather than on personal characteristics of the individual.

### *Participation in Decision-Making*

Research on participation in decision-making has shown that participation increases perceptions of fairness, acceptance of decisions, and goal commitment (Bobko & Colella, 1994; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1989; Cawley, Keeping, & Levy, 1998; Kanfer, 1990). As noted above, TA relies heavily on participation in that individuals are directly involved in the development of their systems. This participative approach is much more likely to positively impact behavior change than an intervention that is externally imposed. In addition, participation in group decision-making can enhance information-sharing, which may lead to increased creativity (West & Anderson, 1994). This information-sharing and creative idea generation is especially likely in TA group facilitations, both in the development phase and in group feedback meetings. As individuals share information within the group, appropriate measurement and evaluation standards, and more effective task strategies, can be developed.

### *Occupational Health Psychology*

Research in occupational health psychology stresses the importance of controllability in behavior change. Clearly, the degree to which a person can control the level of his or her output by varying the level of input will impact the extent to which change will occur. However,

*perceptions* of control, which may or may not be congruent with actual control, are often enough to increase an individual's commitment to behavioral goals (Semmer, McGrath, & Beehr, 2005). Perceived control has been empirically linked to positive outcomes such as motivation, performance, job satisfaction, commitment, involvement, feedback-seeking, and stress (Spector, 1986; Greenberger & Strasser, 1986). TA enhances perceived control through participation and feedback. That is, perceptions of control are presumed to be high in TA because individuals are active participants in the design of the system and receive specific, task-focused feedback needed to make adjustments to improve their performance. Additionally, as discussed above, indicators are designed so as to maximize actual controllability over results, by ensuring that the measures are largely uninfluenced by external sources of variance.

Work-Family spillover literature suggests that an individual's life is made up of multiple domains, and these domains cannot be treated as distinct (Ford, Heinen, & Langkamer, 2007). That is, cognitions and emotions experienced in one domain spill over into other domains. For example, afternoon job satisfaction predicts marital satisfaction in the evening (Heller & Watson, 2005). The notion of spillover is of great importance to behavior change interventions: Behavior in one domain cannot be changed in isolation from other domains. In other words, a person must consider the "big picture" of how domains fit together and the *relative importance* of different behaviors. TA addresses this issue of multiple domains through its use of contingencies. As noted above, contingencies help an individual understand the relative importance of multiple indicators and develop clear priorities for improvement at different levels of output.



## *Clinical Psychology*

Clinical psychology also offers foundations to behavior change. For example, the Transtheoretical Model of Change (Prochaska & DiClemente, 1982) is frequently used in the design of clinical interventions such as smoking cessation programs. The stage model of change posits that individuals vary in the extent to which they are ready for behavior change, falling along a continuum from contemplation of change to active change. Its basic assumption is that interventions should be unique to the individual and based on the individual's degree of readiness. This model has several implications for behavioral change intervention design. First, individuals should have a sufficient *willingness to change*; that is, the person must have at least reached the point of contemplating change. TA's participative nature incorporates this issue of change readiness. Rather than merely accepting externally-imposed objectives for change, individuals have complete discretion over the behaviors on which they will focus. Presumably, a person will only choose to focus effort toward changing behaviors on which he or she has sufficient willingness to change. Effective interventions should also be *specific* to and *controllable* by the individual and should include *individualized feedback* on performance. TA clearly achieves this, in that people create a personalized measurement system which includes specific, controllable indicators of each objective on which they are given individual feedback. Furthermore, the Transtheoretical Model suggests that individuals are *active participants* in their own behavior change rather than passive recipients of externally imposed intervention techniques. TA promotes participation throughout system development. That is, individuals are not assigned objectives or indicators, but rather guided through the process to clarify them and their relative importance.

### *Self-Regulation*

Theories of self-regulation also offer insight into effective behavior change. For example, Social Cognitive Theory (SCT; Bandura, 1989) focuses on the interaction between cognitions, environment, and behavior. The motivation for behavior change occurs when self-evaluations of desired and actual states are discrepant. According to SCT, the primary mechanism for performance improvement is *perceived competence*, and *feedback* is used to increase these efficacy perceptions. TA accounts for this in the feedback meetings. Specifically, through regular and accurate feedback, a person is able to gain an accurate understanding of his or her performance and to develop specific strategies for improvement. Following a string of successes, a person's self-efficacy increases which further improves performance. Ajzen's (1991) Theory of Planned Behavior further stresses the role of self-regulation in behavior change, particularly noting the importance of attitudes and intentions. Research shows strong positive relationships between attitudes and intentions ( $r = .87$ ) and intentions and behavior ( $r = .82$ ). In other words, behavioral change is an *intentional* process influenced through internally rather than externally controlled mechanisms. TA is a personalized measurement system that is developed through full participation by the individual. In defining objectives, the individual must intentionally decide the aspects of his or her life on which to focus, and in developing indicators, he or she outlines specific behaviors that are presumed to lead to positive outcomes. Following feedback meetings, intentions are strengthened as individuals learn strategies for continued improvement.

### *Conclusions from the Literature Review*

In sum, the body of theory and research offers important implications for behavioral change. As discussed above, TA's participative approach to creating controllable measures on

which individuals receive effective feedback appears to successfully address these implications. The focus of this study is to test whether it is as effective as its design suggests it should be.

*Proposed Model of TA Effectiveness and Study Hypotheses*

As noted above, the present study examines the effectiveness of TA by addressing the following primary research questions: (1) Will the intervention improve individuals' performance on their self-identified measures?; (2) Does it improve long-term individual outcomes?; (3) Does the intervention exhibit positive spillover effects into the workplace?; and (4) Are there moderators that influence the effectiveness of the intervention?

To address these issues, I first present a model which shows expected relationships between the study variables and then discuss the specific hypotheses that were tested. The proposed model is shown in Figure 3.

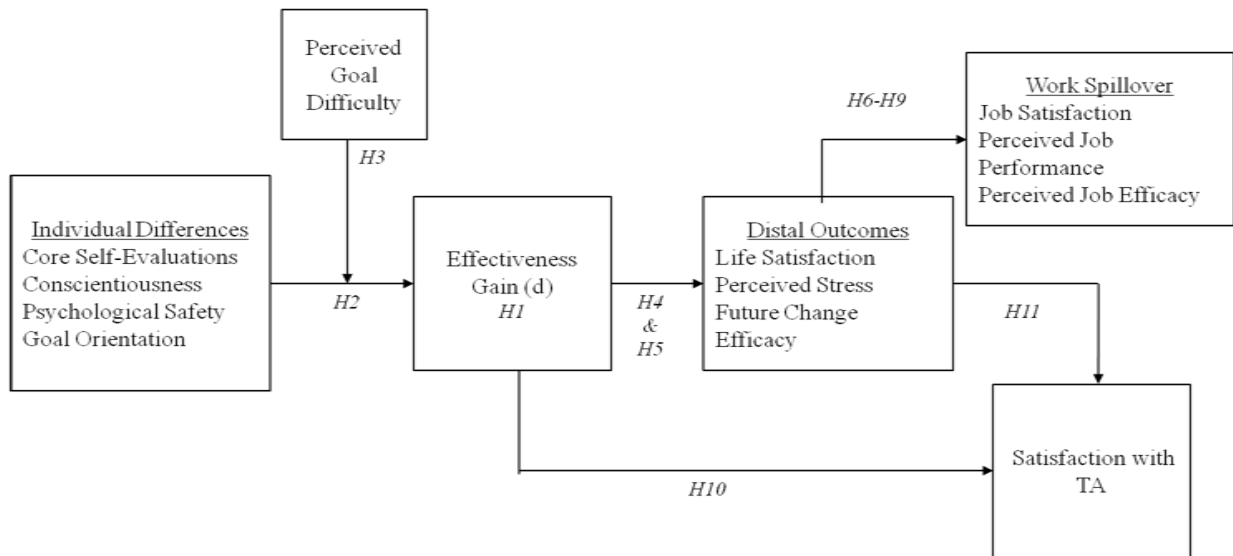


Figure 3. Hypothesized Model

### *Overall Effectiveness*

The effectiveness of the intervention is defined as the extent to which the TA intervention produces behavioral change between measurements from baseline to after feedback in the Overall Effectiveness Score. Specifically, TA Overall Effectiveness Score refers to the sum of individual effectiveness scores on each indicator. For example, in Table 1, effectiveness scores on each indicator are summed to calculate Overall Effectiveness for that data collection period as -1. Overall effectiveness is representative of behavior across the multiple measures. As such, changes in this score reflect overall behavioral change across the indicators. Research on ProMES, the foundation intervention from which TA is based, has shown that the productivity of work units was an average of 1.16 standard deviations higher after feedback than during baseline (Pritchard, Harrell, DiazGranados, & Guzman, 2008). One study examined the effects of removing feedback from ProMES. Productivity decreased dramatically when feedback meetings were not present, and quickly rose to previous levels when feedback meetings were re-established (Janssen, van Berkel, & Stolk, 1995).

Undoubtedly, the mere development of TA indicators and contingencies helps individuals clarify expectations and understand priorities. Nonetheless, feedback is the primary means through which TA behavior change is expected to occur, as feedback meetings are used to develop strategies for improvement and give individuals the opportunity to understand and overcome constraints to their behavior change. This leads to the following hypothesis:

*Hypothesis 1:* Overall Effectiveness after feedback will be significantly greater than Overall Effectiveness at baseline.

### *Antecedents*

The proposed model suggests several antecedents which are presumed to impact the extent to which individuals experience gains in effectiveness. In particular, the current study will examine conscientiousness, core self-evaluations, perceived psychological safety, and goal orientation.

*Conscientiousness.* Conscientiousness is a personality characteristic describing the tendency to show self-discipline, act dutifully, and strive for goal achievement (Costa & McRae, 1992). Conscientiousness has been linked with numerous positive outcomes, such as increased job performance (Barrick & Mount, 1991) and academic achievement (Wagerman & Funder, 2007). Conscientious individuals generally set more challenging goals and are more committed to them (Barrick, Mount, & Strauss, 1993; Hollenbeck & Klein, 1987). Thus it is expected that conscientious individuals will be more diligent in developing quality indicators and accurate contingencies, and that they will be disciplined and achievement-oriented following feedback, encouraging the development and implementation of more effective task strategies. Thus highly conscientiousness individuals should experience larger gains in overall effectiveness.

*Hypothesis 2a:* Level of conscientiousness will be positively related to gain in overall effectiveness score (*d*).

*Core self-evaluations.* Core self-evaluations (CSE) represent a broad personality trait which refers to an individual's positive self-regard (Judge & Bono, 2001). CSE taps a fundamental self-appraisal of an individual's effectiveness, capability, and general self-worth (Judge & Bono, 2001). This latent trait is composed of four well-established traits in the personality literature: Self-esteem, generalized self-efficacy, internal locus of control, and

emotional stability. *Self-esteem* is defined as the overall value an individual gives him/herself as a person. *Self-efficacy* is an individual's evaluations of his or her general competency across situations (Locke, McClellan, & Knight, 1996). *Locus of control* is the extent to which an individual attributes outcomes to internal or external forces. Finally, *emotional stability* is an individual's tendency to regulate his or her emotions across situations (Judge, Erez, Bono, & Thoresen, 2003).

CSE has been empirically linked to job satisfaction (Judge, Locke, Durham, & Kluger, 1998), job performance, motivation (Erez & Judge, 2001), goal-commitment (Bono & Colbert, 2005), and financial success (Judge & Hurst, 2008). Because individuals with high CSE feel competent at a variety of tasks, possess a sense of control over their own outcomes, and are able to effectively regulate their emotions, it is expected that they will be more likely to take personal responsibility for behavior change, approach challenges with confidence, and be more committed to their goals. Thus individuals with high CSE are expected to experience larger gains in overall effectiveness.

*Hypothesis 2b:* Level of core self-evaluations will be positively related to gain in overall effectiveness score (*d*).

*Perceived psychological safety.* Psychological safety refers to individual perceptions of trust and mutual respect for others (Edmondson, 1999). Individuals in psychologically safe environments feel confident that they will not be rejected or penalized for expressing opinions or emotions, and willingly accept suggestions from other group members. Psychological safety has been shown to impact information sharing (Tynan, 2005), innovation, speaking up, and team learning behavior (Edmondson, 1999; 2004). Emotional safety is also a primary predictor of

psychotherapy effectiveness because it leads to voluntary self-disclosure (Farber, Berano, & Capobianco, 2004). Thus it is expected that individuals who feel psychologically safe in the TA setting will be less likely to censor their emotions, more open to the facilitation experience in general, and should therefore experience larger gains in overall effectiveness than individuals who perceive low psychological safety within the TA intervention.

*Hypothesis 2c:* Level of perceived psychological safety will be positively related to gain in overall effectiveness score (*d*).

*Goal orientation.* Goal orientation refers to an individual's preferences for learning or performance goals in achievement contexts (Payne, Youngcourt, & Beaubien, 2007). Individuals with a learning goal orientation (LGO) are motivated to achieve in order to gain knowledge or acquire a skill, while individuals high in performance goal orientation (PGO) view achievement as an end itself. LGO has been consistently linked with positive outcomes such as learning, academic performance, task performance, and job performance, while PGO is generally negatively related to these outcomes (Payne et al., 2007). Individuals with a learning orientation also tend to set more difficult goals (Payne et al., 2007), seek greater amounts of feedback (VandeWalle & Cummings, 1997), and develop more effective learning and task strategies (Dweck & Elliot, 1983) than individuals with a performance orientation.

Because they are motivated by the improvement process and opportunities for personal growth, individuals who approach the TA process with a learning orientation are expected to engage in more feedback-seeking, develop more effective task strategies, and to possess higher levels of task persistence than those with a performance orientation. On the other hand, individuals with a performance orientation are motivated by appearing successful, and are

therefore expected to set less difficult goals and avoid negative feedback. This leads to the following hypotheses:

*Hypothesis 2d:* Learning goal orientation will be positively related to gain in overall effectiveness score (*d*).

*Hypothesis 2e:* Performance goal orientation will be negatively related to gain in overall effectiveness score (*d*).

### *Perceived Goal Difficulty*

Perceived goal difficulty refers to an individual's perception of the overall difficulty level of his or her TA system. The goal-setting literature suggests that moderately difficult goals produce higher levels of goal attainment than simple goals (Locke & Latham, 2002). Thus level of perceived goal difficulty is expected to moderate the relationship between individual difference antecedents and overall effectiveness score. Specifically, when goal difficulty is high, individuals who are conscientious, have a positive self-regard, feel emotionally safe, and are oriented toward learning, difficult goals will be perceived as a challenge and an opportunity. Thus these individuals are expected to strive harder to attain their goals. On the other hand, for individuals with a performance goal orientation, high levels of goal difficulty are expected to further decrease feedback-seeking behaviors, encourage individuals to discount negative feedback, and should therefore strengthen the negative relationship between PGO and gain in effectiveness score.

*Hypothesis 3:* Perceived goal difficulty will moderate the relationship between overall gain in effectiveness and (*a*) conscientiousness, (*b*) core self-evaluations, (*c*) psychological safety, (*d*) learning goal orientation, and (*e*) performance goal orientation,



such that for individuals with a high perceived goal difficulty these relationships with overall effectiveness will become stronger than for people with a lower perceived goal difficulty.

### *Distal Outcomes*

The hypotheses above regarding overall effectiveness score address proximal behavior change; if behavior changes, overall effectiveness score changes. The proposed model also suggests that in addition to the benefits of this immediate behavior change, behavior change will be related to more distal individual outcomes. The present paper focuses on three such outcomes: perceived stress, life satisfaction, and future change efficacy.

*Perceived stress.* Perceived stress is the degree to which various aspects of a person's life are perceived as mentally, emotionally, or physically strained. Perceived stress can result from a number of sources. For example, failing to understand what behaviors lead to desired results, having a lack of clarity in how to achieve particular outcomes, and perceiving a lack of control over results, can contribute to a person's stress level. To the extent that TA helps a person clarify expectations and standards, increases perceived control, and encourages the development of effective task strategies, the intervention's effectiveness is expected to decrease the person's overall level of perceived stress.

*Hypothesis 4a:* Gain in overall effectiveness score ( $d$ ) will be negatively related to perceived stress after feedback.

*Hypothesis 5a:* Level of perceived stress after feedback will be lower than level of perceived stress before system development.

*Life satisfaction.* Life satisfaction is an overall sense of happiness and well-being across multiple life domains (e.g., family, work). Judge, Bono, Erez, and Locke (2005) found that goal attainment, particularly attainment of value-congruent goals, is positively related to life satisfaction. In other words, when individuals attain goals that are intrinsically important to them, they will experience an overall subjective sense of well-being and positive regard for their lives. Because people's TA systems are aimed at areas of their life that are the most salient to them, and may be areas in which the most improvement is needed, it is expected that successfully improving behavior in these areas will lead to increased life satisfaction.

*Hypothesis 4b:* Gain in overall effectiveness score (*d*) will be positively related to life satisfaction after feedback.

*Hypothesis 5b:* Level of life satisfaction after feedback will be greater than level of life satisfaction before system development.

*Future change efficacy.* Future change efficacy refers to an individual's evaluations of his or her ability to make future behavioral changes on their own. In other words, it addresses the extent to which a person expects to succeed in making desired changes in the future, beyond the current TA context. Future change efficacy is distinct from generalized self-efficacy. Generalized self-efficacy refers to an individual's general sense of competency across situations, whereas future change efficacy refers specifically to the context of behavior change.

Future change efficacy can also be distinguished from task-specific self-efficacy in that becoming competent to make behavioral changes is more complex than gaining competency on a particular task. That is, future change efficacy does not refer to a person's feelings of competency regarding a specific objective or indicator; rather, it refers to a person's general

beliefs about whether he or she is capable of making personal improvements. It is expected that successful behavior change through the TA process will translate into generalized feelings of efficacy regarding future behavior change.

*Hypothesis 4c:* Gain in overall effectiveness score (*d*) will be positively related to future change efficacy after feedback.

*Hypothesis 5c:* Level of future change efficacy after feedback will be greater than level of future change efficacy before system development.

### *Work Spillover Effects*

As evidenced by research on work-family spillover, the relationship between individual well-being and work outcomes is of critical importance. The proposed model suggests that distal individual outcomes (i.e., stress, life satisfaction, and future change efficacy) will partially mediate the relationship between effectiveness gain and three job outcomes (i.e., job satisfaction, perceived job performance, and job efficacy). That is, the degree to which individuals experience increased life satisfaction, change efficacy, and decreased stress, will explain spillover effects between effectiveness gain and job outcomes. Because individuals choose personalized objectives for their TA system, it is not expected that effectiveness will lead directly to work outcomes unless the objectives specifically target the work domain. However, the positive effects associated with behavior change are likely to exhibit positive spillover effects on job satisfaction, perceptions of performance, and job-related efficacy beliefs. For example, while exercise is unlikely to impact a person's job satisfaction directly, increased levels of physical activity are expected to lower stress levels, which may subsequently improve a person's overall work attitudes.

*Hypothesis 6:* Level of (a) job satisfaction, (b) perceived job performance, and (c) job efficacy will be greater after feedback than before system development.

*Hypothesis 7:* The relationship between effectiveness gain and job satisfaction will be mediated by post-feedback levels of (a) stress, (b) life satisfaction, and (c) future change efficacy.

*Hypothesis 8:* The relationship between effectiveness gain and perceived job performance will be mediated by post-feedback levels of (a) stress, (b) life satisfaction, and (c) future change efficacy.

*Hypothesis 9:* The relationship between effectiveness gain and job efficacy will be mediated by post-feedback levels of (a) stress, (b) life satisfaction, and (c) future change efficacy.

#### *Satisfaction with TA*

Satisfaction with TA refers to the degree to which the individual is satisfied with the TA intervention. While it is expected that effectiveness gain (i.e., the degree to which behavior actually changed) directly impacts the level of satisfaction with TA, the model also proposes that this relationship is at least partially mediated by individual outcomes. In other words, the relationship between proximal behavior change and satisfaction with TA is partially explained by the degree to which an individual experiences some improvement in terms of increased life satisfaction, decreased stress, and enhanced efficacy for future change.

*Hypothesis 10:* Gain in overall effectiveness score (d) will be positively related to satisfaction with TA.

*Hypothesis 11:* The relationship between gain in overall effectiveness score and satisfaction with TA will be partially mediated by post-feedback levels of (a) stress, (b) life satisfaction, and (c) future change efficacy.

## CHAPTER 2: METHOD

### *Participants*

A power analysis to determine the required sample size showed that 44 participants were necessary to achieve power of 0.80 and effect size of 0.65. According to Cohen's (1988) criteria for effect sizes, 0.2 constitutes a small effect, 0.5 a medium effect, and 0.8 a large change. The *a priori* effect size is halfway between a medium and large effect. This decision was based on ProMES research, which shows an average effect size of 1.16 across 83 studies, and these effects held for different countries, organizations, and types of jobs. As discussed above, TA and ProMES are comparable in their methodology and theoretical foundations (i.e., Pritchard and Ashwood's motivation theory), thus a fairly large effect size was expected in the current study.

Several methods were used to recruit participants. First, a list of prospective participants was generated through communication with personal and professional colleagues. These individuals were then contacted via email with information regarding the TA process and the specific requirements of participation in the study. This method yielded the majority of participants ( $n = 29$ ). Second, participants ( $n = 10$ ) were recruited following TA presentations delivered at meetings of two local civic organizations. The remaining participants ( $n = 7$ ) were recruited from a local educational organization following informational materials sent via email.

The attrition rate was low. Two participants (4.35%) completed system development, but did not begin feedback. Because no indicator data were available for these individuals, they were excluded from final analyses. All participants who began the system completed feedback. The final sample ( $N = 44$ ) was 75% female, with a mean age of 43 and a range from 23 to 64. All participants were employed full-time (30+ hours per week;  $M = 41.34$ ). Sixty-six percent of

participants were employed in the professional or educational fields, with the remaining 34% in service, sales, or manufacturing industries. Participation was entirely voluntary and all participants received informed consent. The consent document is included in Appendix A.

Each participant completed a facilitator-led system development session, lasting approximately three hours, followed by four feedback sessions lasting approximately 30 minutes each. In all cases, the author was the facilitator. Feedback sessions were held every two weeks. Each step in the TA process is detailed below.

### *Design*

The current study employed a pre-post design, with no control group. The decision to omit a control or comparison group was made for several reasons. First, individuals in control or comparison groups cannot be measured on indicators. These data are not available. In order to have data on indicators, the intervention would have to be partially completed, i.e., the indicator development phase completed. This would make the comparison with the experimental groups problematic. Another option would be to collect just outcome data such as life satisfaction, job satisfaction and stress. Without any intervention, this would essentially be looking at changes over time in these variables. If such changes occurred, especially any increases, I would be hard put to say such increases were typical and should be the baseline against which intervention changes were compared. So this approach is not particularly valuable. Another reason for not using control or comparison groups is the purpose of the research is not to compare this intervention to some other intervention. The purpose is to determine whether this intervention improves the person's effectiveness and other outcomes. Additionally, the pre-post design has been used in most published ProMES studies. Finally, according to a meta-analysis of 83

ProMES studies (Pritchard, Harrell, DiazGranados, & Guzman, 2008), 18 studies included comparison or control groups. When measuring these comparison groups on raw output measures, only negligible non-significant changes in performance were observed ( $d = .01$ ). Thus, it was determined that comparing intervention to control or comparison groups in this study would offer little practical utility.

### *Steps in Truly Accomplished*

Truly Accomplished is an interactive yet standardized process. Facilitator and participant roles during each stage of the intervention are detailed in Table 3.



Table 3. Facilitator and Participant Roles

TA Step	Facilitator Role	Participant Role
Clarify Values	<ul style="list-style-type: none"> <li>- Ask participants: “How do you want to feel?”</li> <li>- Verify that each response is actually a feeling</li> <li>- Verify that each feeling is driven by personal desires (rather than by others)</li> </ul>	<ul style="list-style-type: none"> <li>- Create list of feelings</li> <li>- Define what each feeling means</li> </ul>
Select Objectives	<ul style="list-style-type: none"> <li>- Define objectives</li> <li>- Explain that objectives should be aligned with values</li> </ul>	<ul style="list-style-type: none"> <li>- Create list of objectives</li> <li>- Tie each objective to a feeling listed previously</li> </ul>
Define Indicators	<ul style="list-style-type: none"> <li>- Define indicators and give examples</li> <li>- Explain features of good vs. bad indicators</li> <li>- Discuss possible measures, asking questions to ensure their controllability</li> </ul>	<ul style="list-style-type: none"> <li>- Generate possible measures and discuss with facilitator</li> </ul>
Complete Contingency Worksheet	<ul style="list-style-type: none"> <li>- Guide participant through Contingency Worksheet</li> <li>- Define Minimum, Maximum, and Expected performance</li> <li>- Explain purpose of ranking and assigning effectiveness scores to performance levels</li> <li>- Ask questions to ensure accuracy of indicator values and effectiveness scores</li> </ul>	<ul style="list-style-type: none"> <li>- Complete Contingency Worksheet with facilitator</li> <li>- Identify Minimum, Maximum, Expected levels of performance</li> <li>- Rank Maximum and Minimum indicator performance</li> <li>- Assign Effectiveness scores to Maximum and Minimum values for each indicator</li> </ul>
Develop Contingency Graphs	<ul style="list-style-type: none"> <li>- Create blank graph, editing x- and y-axis values according to Contingency Worksheet</li> <li>- Plot Minimum, Expected, and Maximum points</li> <li>- Explain three common shapes, giving examples of what each represents</li> </ul>	<ul style="list-style-type: none"> <li>- Draw shape of the line between Minimum Expected and Maximum performance</li> <li>- Draw shape of the line between Minimum Expected and Minimum performance</li> </ul>
Collect Indicator Data	<ul style="list-style-type: none"> <li>- Input data provided by participant into feedback report</li> <li>- Generate feedback report</li> </ul>	<ul style="list-style-type: none"> <li>- Record daily performance on each indicator</li> <li>- Tally weekly performance and provide data to facilitator</li> </ul>
Feedback Meetings	<ul style="list-style-type: none"> <li>- Interpret Effectiveness Values and discuss priorities</li> <li>- Ask participant to brainstorm on improvement strategies</li> </ul>	<ul style="list-style-type: none"> <li>- Reflect on week’s performance</li> <li>- Generate strategies for improvement</li> </ul>

### *Clarify Values*

At the beginning of the system development process, participants are guided through an exercise that asks them to identify the ways in which they would like to feel at the end of their lives (e.g., *Accomplished, Connected, Regretless*). The purpose of this exercise is to help individuals clarify personal values and reinforce the importance of living in accordance with these values. Following this exercise, individuals have a greater understanding of what is important, and are able to recognize that in order to accomplish the desired feelings at the end of their lives they must act in ways that are congruent with these end-states.

### *Select Objectives*

Based on this list of feelings, the participants are guided through the process of selecting objectives. Objectives are the areas of a person's life which they desire to improve. They should be stated clearly, so that if exactly that objective was accomplished, the person would benefit. It is important that the selected objectives are consistent with the previously identified values and that the set of objectives captures the important aspects of the individual's life. Initially, a person may generate a somewhat lengthy list of objectives. For the purpose of this study, only one or two objectives were selected from this more comprehensive list in order to keep the number of objectives manageable. These may be areas in which a person has previously attempted change without complete success. As shown in Table 4, objectives may include things like improving physical health, becoming more spiritual, or improving personal relationships.

Table 4. Example Objectives and Indicators

Objectives	Indicators
Improve physical health	<ul style="list-style-type: none"> <li>- Number of 30-minute segments spent doing cardiovascular exercise per week</li> <li>- Average number of calories from fat per day</li> <li>- Average ounces of alcohol per day</li> </ul>
Strengthen family relationships	<ul style="list-style-type: none"> <li>- Percent of evening meals eaten with family per week</li> </ul>
Reconnect with spirituality	<ul style="list-style-type: none"> <li>- Average number of minutes per day spent meditating</li> <li>- Number of spiritual readings per week</li> </ul>

### *Define Indicators*

Indicators are specific measures of behavior that reflect how well the objective is being met. That is, indicators define the quantifiable ways in which success on each objective are measured. If a selected objective is, for example, to improve physical health, indicators may include minutes at target heart rate per week, number of ounces of alcohol per day, or percent of calories from fat per day. Table 4 provides a list of example indicators. The facilitator guides participants through the process of developing valid measures of behavior.

It is important that indicators are written in a way that maximizes the individual's control over the measure and minimizes uncontrollable or external sources of variance in the measure. For example, a participant in the current study wanted to better manage her finances. Like most individuals, she had little control over things like her current income level, mortgage and car payments, and expenses related to her daily commute to work. After discussion, she realized that a large portion of her expenses went toward disposable items which were largely under her control. By measuring more controllable aspects of her finances, such as the percentage of non-

restaurant meals eaten per week and the total dollars spent on disposables (e.g., convenience store items), she was able to maximize her level of control over an area of her life that initially seemed externally controlled.

In addition, the data needed for each indicator should be reasonably efficient to collect. The set of indicators for each objective should fully capture the essence of that objective. In other words, all important aspects of the objective should be measured by the set of indicators. It is the role of the facilitator to help the person ensure that each of these criteria for indicators is met.

### *Develop Contingencies*

The basics of contingencies were described above. Contingencies are graphical representations of the relationship between the amount of the indicator being done and its contribution to a person's effectiveness. They operationalize the Results-to-Evaluations connections in the Pritchard-Ashwood (2008) motivation model. Figure 2 provides some examples of contingencies. Developing contingencies requires the facilitator to guide the participants through a series of steps. These are described below. In all cases, the facilitator explains the step and helps the person come up with accurate values.

*Identifying maximum, minimum, and expected levels.* The facilitator guides individuals through the steps using a Contingency Worksheet. A sample worksheet is provided in Table 5. First, the individual determines the maximum and minimum values for each indicator. The maximum value refers to the highest level that the indicator could ever be, if everything was ideal. The minimum value is the lowest point that the indicator could ever realistically be. The range of minimum to maximum indicator values becomes the x-axis on the contingency graph.

Table 5 shows that the minimum possible value for the indicator *Number of 30-minute segments of cardiovascular exercise per week* is 0, while the maximum is 14. This indicates that while the person could do no cardiovascular exercise at all, he or she could also do up to seven hours of cardiovascular exercise per week. Next, the person sets the minimum expected value. This is the zero effectiveness point (i.e., the point that is neither good nor bad), which is defined as minimally acceptable performance. Table 5 shows that the minimum expected level for the cardiovascular exercise indicator is 5, while the minimum expected level for the meditation indicator is 20.

Table 5. Example Contingency Worksheet

Indicator	Max Level	Min Level	Min Expected Level	Rank of Max	Eff. Score: Max	Rank of Min	Eff. Score: Min
Number of 30-minute segments spent doing cardiovascular exercise per week	14	0	5	1	+100	2	-75
Percent of evening meals eaten with family per week	100%	0%	90%	3	+30	1	-140
Average number of minutes per day spent meditating	60	0	20	2	+45	4	-30
Number of spiritual readings per week	7	0	1	3	+30	3	-50

*Establishing effectiveness values.* Next, the individual ranks the value of the maximum and minimum indicator levels. To rank the maximums, the individual is asked to imagine that all indicators are at the minimum expected level and to subjectively compare the degree to which moving from the expected to the maximum level on each indicator would be beneficial. In other words, if all indicators were at the acceptable level, which one would add the most value to the person's effectiveness if it was increased to the maximum level? This indicator receives a maximum rank of 1. In Table 5, the cardiovascular exercise indicator has a maximum rank of 1, which indicates that increasing from five (i.e., expected level) to 14 (i.e., maximum level) 30-minute segments adds the most benefit to the person's effectiveness. The process is repeated for each of the remaining indicators until all maximum indicator levels have been ranked.

Similarly, to rank the minimum levels, the person is asked to evaluate which indicator would be most detrimental to his or her effectiveness if it fell from the minimum expected level to the minimum level. The participant is asked if all indicators were at the acceptable level, which one would harm his/her effectiveness the most if it decreased to the minimum level? This indicator receives a minimum rank of 1. Table 5 shows that *Percent of evening meals eaten with family* has a minimum rank of 1, which indicates that decreasing from 90% (i.e., minimum expected level) to 0% (i.e., minimum level) would be the most detrimental to the person's effectiveness. The process is continued for the remaining indicators until all minimums are ranked.

The next step requires the person to assign effectiveness values to the maximum and minimum indicator levels. Effectiveness is based on the ranks, i.e., the maximum of the indicator ranked 1 receives a maximum effectiveness score of +100. In Table 5, for example, the cardiovascular exercise indicator received a maximum rank of 1; therefore, it receives a maximum effectiveness score of +100. Each subsequent indicator receives an effectiveness score in relation to the first indicator. That is, the indicator ranked 2 receives an effectiveness of, for example, 75 if the maximum of that indicator is 75% as valuable as the indicator ranked 1, or an effectiveness of 50 if it is half as important. In Table 5, the Meditation indicator received a maximum rank of 2; a maximum effectiveness score of 45 indicates that increasing to the maximum level of that indicator is 45% as valuable as increasing to the maximum level of the Cardiovascular Exercise indicator. Note that the indicators regarding Family Meals and Spiritual Readings both had maximum ranks of 3. This indicates that the value of increasing to the

maximum level on those indicators is equal in comparison to the maximum level of the cardiovascular exercise indicator.

Effectiveness of minimum levels are negative, and are assigned in the same way, with one exception: If the indicator with a minimum ranked 1 is *more detrimental* to effectiveness than the maximum ranked 1 is *beneficial*, then it can receive an effectiveness score that reflects this (e.g., -200 if it is twice as detrimental, -150 if it is 1.5 times more detrimental, etc.). For example, the bottom left graph in Figure 2 shows a minimum effectiveness score of -140. This indicates that eating 0% of evening meals with family is 1.4 times as detrimental to the person's effectiveness as the maximum level of Cardiovascular Exercise (maximum effectiveness of +100) is beneficial to his or her effectiveness.

*Drawing the contingency.* Facilitators then guide participants through the process of plotting contingencies graphically. For each indicator, the maximum and minimum indicator values correspond to the highest and lowest level of effectiveness, respectively. The minimum expected level on each indicator becomes the zero effectiveness point. These three points are plotted on the contingency graph first, as shown in Figure 4. The final step is to connect the points on the graph by drawing the perceived relationship between the expected and maximum level (i.e., the top half of the graph) and the expected and minimum levels (i.e., the bottom half of the graph).



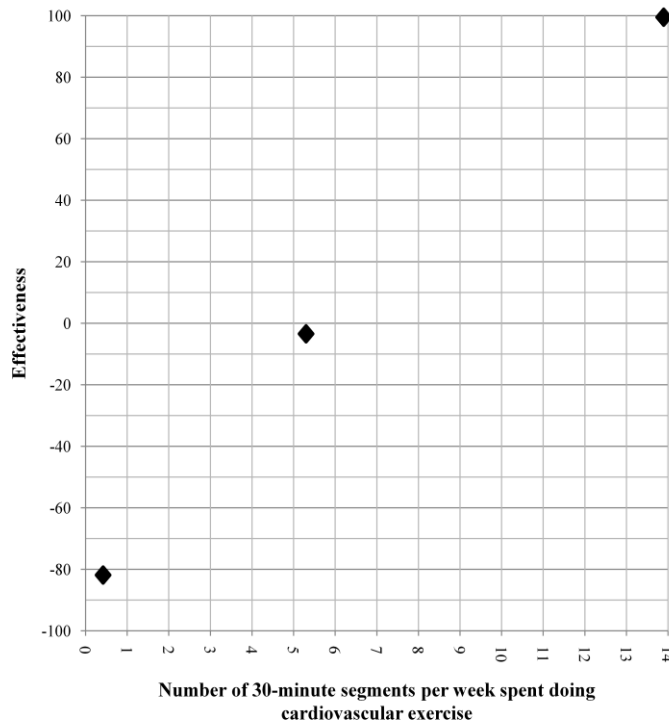


Figure 4. Contingency Template with Maximum, Minimum, and Expected Levels

There are three common shapes of these relationships. A *linear* relationship indicates that for each gain in the level of the indicator, there is an equal gain in effectiveness. For example, in Figure 2, the contingency in the top right shows a linear increase in effectiveness from 0 to the expected level of 20. This means that each additional minute spent meditating (from 0 to 20) leads to an equal gain in the person’s effectiveness. A *diminishing returns* curve indicates large gains in effectiveness, followed by a decrease toward the maximum level of the indicator. In other words, after a point, less value is added by increasing the amount of that indicator. The lower right contingency in Figure 2 shows an example of a diminishing returns curve. The flatness of the top portion of the graph suggests that after 3 or 4 spiritual readings very little effectiveness will be gained from any additional readings. A *critical mass* curve indicates very

little gain in effectiveness until a person reaches substantial levels of the indicator. In other words, the payoff does not occur until the person reaches fairly high levels of the indicator. The graph at the bottom left of Figure 2 shows an example of critical mass. The graph suggests that effectiveness will be low until a person is eating around 50 percent of evening meals with his or her family, at which point effectiveness increases rapidly.

Each of these shapes was explained in detail to participants. The facilitator gave examples and explanations on what a given shape means in terms of the relationship between indicator performance and effectiveness. Approximately 60% of participants understood the contingency process from the beginning, while the remaining participants typically required some practice. Practice often led participants to revise the first few contingencies after gaining a greater understanding and becoming more comfortable with the process. All participants understood the meaning of the graphs by the conclusion of contingency development.

Once all contingencies are drawn, the person has a graphical representation of how effective any given level of performance will be. That is, for each possible level of an indicator, the individual has a clear understanding of the corresponding level of effectiveness.

#### *Collect Indicator Data*

Once the person has finished the steps above, the feedback portion of the intervention begins. In this step, individuals record information about their behavior, i.e., their scores on the indicators. To do this, individuals make judgments or counts each day. For example, each day the person records the number of 30-minute segments of cardiovascular exercise completed and the number of minutes they meditated. Daily indicator data were recorded and sent to the

facilitator at the end of each week. The initial week of data collection (i.e., behavior without feedback) made up the baseline measure for each indicator.

### *Feedback Reports*

The facilitator entered indicator data into a spreadsheet which was used to generate a weekly feedback report. Table 6 and Table 7 show feedback reports for two participants in the current study. The report provides a weekly effectiveness score for each indicator and an overall weekly effectiveness score across indicators. Feedback reports also contain historical data which allows the person to see changes in their behavior over time.

The feedback reports also include information on priorities from the contingency graphs to enable individuals to work on the areas that will provide them with the largest increase in effectiveness. Projected indicator levels were established by determining the next most logical and meaningful incremental increase from current performance. For example, Table 6 shows current performance at 5 days per week taking a multivitamin, and a projected indicator level of 6 days. In this case, one day increments were most logical; smaller increments (e.g., half-days) would not be meaningful and larger increments (e.g., two days) would fail to capture the projected gain experienced from taking a multivitamin one extra day per week. For indicators with less clear incremental increases, priority gain values were set to approximately 10-15% of current performance. For example, Table 7 shows current performance at 35 minutes per week exploring spiritual interests. Projected indicator levels were set to 40 minutes per week, which is approximately a 15% increase in performance.

Table 6. Participant A: Feedback Report with Priorities

Indicator	<u>Week 1</u>		<u>Week 2</u>		<u>Week 3 (Current)</u>		<u>Priority Information</u>		
	Indicator Level	Eff. Score	Indicator Level	Eff. Score	Indicator Level	Eff. Score	Projected Indicator Level	Projected Eff. Score	Gain
Number of one hour segments of physical activity per week	5	+25	5	+25	5	+25	6	+45	+20
Number of times eating seafood per week	0	-65	1	0	1	0	2	+35	+35
Average number of ounces of water per day	20	-16	20	-16	48	+15	56	+20	+5
Number of days per week taking multivitamin	3	-4	2	-8	5	+5	6	+8	+3
Overall Effectiveness		-60		+1		+45			

Table 7. Participant B: Feedback Report with Priorities

Indicator	<u>Week 1</u>		<u>Week 2</u>		<u>Week 3 (Current)</u>		<u>Priority Information</u>		
	Indicator Level	Eff. Score	Indicator Level	Eff. Score	Indicator Level	Eff. Score	Projected Indicator Level	Projected Eff. Score	Gain
Number of minutes reading spiritual literature per week	20	+5	50	+25	60	+35	60	+35	0
Number of 45-minute yoga sessions per week	1	-100	2	-70	4	+30	5	+55	+25
Number of meditation sessions per week	1	-30	1	-30	4	+30	5	+50	+20
Number of minutes per week reading/searching to explore spiritual interests per week	60	+75	75	+80	35	0	40	+40	+40
Overall Effectiveness		-50		+5		+95			

### *Feedback Meetings*

Following the initial week of baseline data collection, the facilitator and participant met weekly to review the feedback report and discuss progress. If the individual improved, the facilitator helped him/her identify which actions were beneficial and what the individual could do to continue improving. If the individual did not improve, the facilitator helped him/her identify what changes could be made to improve the following week. Thus feedback meetings were a means for the individuals to obtain knowledge of their results as well as an opportunity to improve task strategies.

### *Post-Feedback Follow-up*

In order to provide on-going support to participants, an optional bi-weekly conference call was held between the facilitator and TA “graduates.” These calls were designed to address any particular issues or challenges individuals may have been facing, and to share with the group general experiences and successes.

### *Role of the Facilitator*

The facilitator guides individuals through each of the above steps. As an expert on the measurement and feedback techniques on which TA is based, it is the role of the facilitator to assist the individual in developing valid objectives and indicators, to help the individual determine appropriate contingencies, and to provide informative and effective feedback.

The facilitator helps the individual choose appropriate levels of specificity for objectives and indicators, and to guide them toward creating controllable measures. The facilitator does not act as a therapist or life coach, but does aim to provide a comfortable and safe environment in

which the individual can openly discuss personal issues and goals. The facilitator must balance between offering objective guidance and actively participating in the process with the individual.

### *Measures*

Data were collected at three points in time: Prior to system development (Time 1); following completion of system development – when all objectives, indicators, and contingencies are completed – (Time 2); and following feedback (Time 3). A timeline of data collection is shown in Figure 5. All self-report measures are shown in the Appendices. Each of the measures and its timing are discussed below.

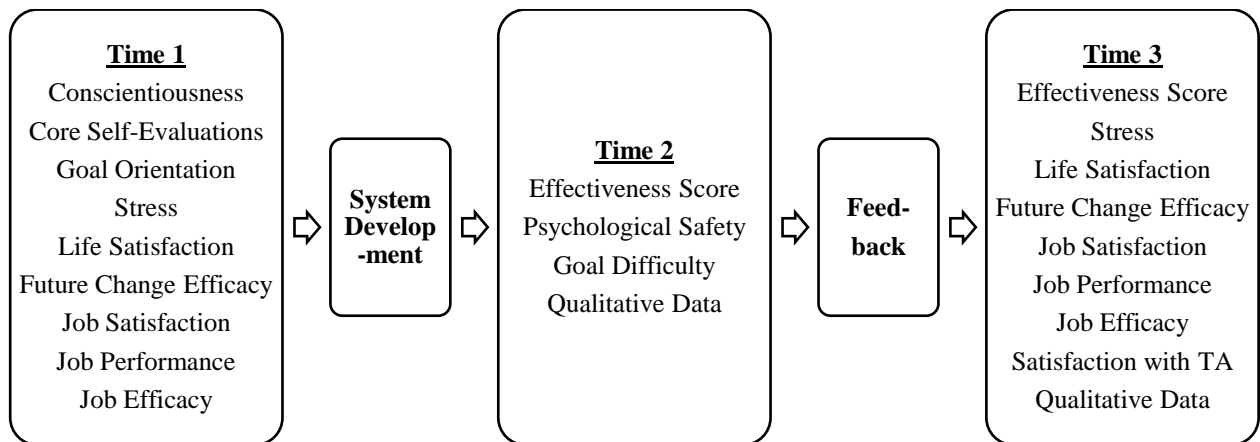


Figure 5. Data Collection Timeline

### *Overall Effectiveness*

A single index of effectiveness for each individual was first calculated as the sum of effectiveness scores across multiple indicators of performance. In Table 6 and Table 7, overall effectiveness scores for the Current period are +45 and +95, respectively. An overall effect size (*d*) was then calculated for each individual; the difference between mean overall effectiveness

during feedback and mean overall effectiveness during baseline, divided by the pooled standard deviation. This effect size is an index of the amount of gain in the person's overall effectiveness score and was used as the dependent variable for system effectiveness in subsequent analyses.

The more traditional method of calculating  $d$  divides the difference between Time 2 and Time 1 means by the pooled standard deviation, where the standard deviation is calculated across individuals at Times 1 and 2. This calculation assumes that both Time 1 and Time 2 measures are identical for all individuals in the sample (e.g., the same cognitive ability test, job satisfaction questionnaire, or performance on the same task). In the current study, however, the measure of effectiveness (i.e., mean performance under feedback) is not the same for each person. Each individual has a unique system with varying numbers of measures and contingencies with varying ranges. This produces different possible values for the overall effectiveness measure, the measure used in calculating  $d$ . An overall effectiveness score of +136, for example, does not mean the same thing across individuals. For an individual with few measures and contingencies with smaller ranges, +136 might represent very high performance, near the maximum possible. For another person with many measures and contingencies with larger ranges, it would represent much lower performance. Thus the traditional calculation of  $d$  is not appropriate in the current study.

The purpose of calculating overall effectiveness as an effect size rather than simply using level of effectiveness score as the dependent variable was to reduce error related to variation in the number of indicators a person includes in his or her system. An individual could have a higher overall effectiveness score simply because he or she has more indicators. The higher effectiveness score in this case is not necessarily indicative of the person's superior performance;



rather, it is simply a byproduct of a greater number of indicators. Calculating the effect size of each individual's effectiveness is a more appropriate method of capturing behavior change because it is based solely on the specific indicators in that person's system and not a function of number of indicators.

### *Individual Differences*

All individual difference measures were collected prior to the first system development meeting (Time 1). Conscientiousness was measured using Goldberg's Big 5 Mini Markers (Saucier, 2002), comprised of eight self-report checklist items (e.g., *Cautious, Organized, Meticulous*;  $\alpha = .74$ ). Core self-evaluations were measured using Judge et al.'s (2003) 12-item Core Self-Evaluations Scale ( $\alpha = .87$ ). Items are rated on a five-point scale, and include "*I've felt hopeful about the future*" and "*I have little control over the things that happen to me (Reverse Coded).*"

Psychological safety was measured using an adaptation of Edmondson's (1999) seven-item measure of psychological safety ( $\alpha = .79$ ). Items are adapted to measure general aspects of psychological safety within the TA context, rather than beliefs of emotional safety and trust within the team context. Rated on a five-point scale, example items include "*It is safe to take risks in this environment,*" and "*I fear I will be rejected for being different (reverse coded).*" Individual perceptions of psychological safety were collected at Time 3.

Button et al.'s (1996) 16-item scale was used to measure learning and performance goal orientation. PGO (e.g., *The things I enjoy the most are the things I do the best*;  $\alpha = .82$ ) and LGO (e.g., *The opportunity to do challenging work is important to me*;  $\alpha = .77$ ) were each assessed with eight items rated on a five-point scale, and were collected at Time 1.

### *Perceived Goal Difficulty*

Perceived goal difficulty was measured with a single self-report item (*Overall, how would you describe the difficulty level of your system?*) rated on a five-point scale, and was collected at Time 2.

### *Distal Outcomes*

Distal outcome variables were measured prior to the first system development meeting (Time 1) and again following feedback (Time 3). Stress was assessed using the 10-item Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983;  $\alpha = .89$ ). An example item from the PSS is: *In the last month, how often have you felt that you were on top of things?* Life Satisfaction was measured by the five-item Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985;  $\alpha = .80$ ). An example item from the SWLS is: *In most ways, my life is close to my ideal.* Future change efficacy was assessed with a single item asking participants to rate the degree to which they felt confident in their ability to successfully change other behaviors in the future.

### *Work Spillover*

Job satisfaction was measured using a three-item overall satisfaction scale ( $\alpha = .84$ ) from the Motivation Assessment System (MAS; Pritchard, personal communication). The items ask the individual to rate their job satisfaction in general. Perceived job performance (*In general, how would you rate your job performance?*) and perceived job efficacy (*Overall, how would you describe your potential for performing well on your job in the future?*) were each assessed using a single item on a five point Likert-type scale. To assess any change in work-related variables, these measures were collected at Time 1 and Time 3.

### *Satisfaction with TA*

Satisfaction with TA was assessed with a three-item self-report measure (e.g., *Overall, I am satisfied with the TA process*;  $\alpha = .72$ ) rated on a five-point Likert-type scale. Satisfaction with TA was measured following feedback (Time 3).

### *Qualitative Measures*

Following system development (Time 2) and feedback (Time 3), a random sample of 15 participants reported their perceptions of the intervention, including how valuable various aspects of the intervention were. For example, participants reported their perceptions of the value of stating objectives, creating indicators, developing contingencies, collecting indicator data, and holding feedback meetings. Qualitative data were collected via interviews with the facilitator. A formal content analysis of participant responses was not performed. Rather, responses were summarized in an attempt to better understand the process and suggest testable hypotheses for future research.

## CHAPTER 3: RESULTS

Descriptive statistics and intercorrelations for all study variables are shown in Table 8. Means fell within an acceptable range, generally clustering around 3.00 to 3.50 on a five-point scale. Mean psychological safety ( $M = 3.94$ ), LGO ( $M = 3.84$ ), post-feedback job satisfaction ( $M = 3.86$ ), and post-feedback job performance ( $M = 4.11$ ) were somewhat higher. Standard deviations each fell below 1.0, indicating relatively similar responses across participants. Additionally, alpha levels of multiple-item scales ranged from .72 and .89, indicating sufficient internal consistency reliability.

Table 8. Means, Standard Deviations, and Intercorrelations of all Study Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. D	2.93	1.25	--													
2. Cons.	3.57	.59	.40**	.74												
3. CSE	3.68	.61	.42**	.37*	.87											
4. P. Saf.	3.94	.48	.64***	.22	.42**	.79										
5. LGO	3.84	.44	.21	.58***	.40**	.08	.77									
6. PGO	3.57	.49	-.54***	-.16	-.18	-.43**	-.24	.82								
7. G. Diff.	3.52	.82	.70***	.53***	.33*	.49**	.33*	-.31*	--							
8. Stress	2.48	.69	-.35*	-.34*	-.54***	-.29	-.23	.29	-.14	.89						
9. LS	3.37	.70	.12	.11	.47**	.24	.21	-.17	.03	-.45**	.80					
10. FCE	3.66	.81	.50***	.40**	.30	.26	.15	-.09	.55***	-.21	.19	--				
11. JS	3.86	.92	.23	.46**	.36*	.13	.13	-.08	.25	-.11	.34*	.23	.84			
12. JP	4.11	.66	.09	.41**	.17	-.03	.30	.22	.28	-.19	.19	.27	.26	--		
13. J.Eff.	3.70	.90	.50**	.39**	.34*	.31*	.21	-.18	.43**	-.19	.14	.38*	.42**	.31*	--	
14. TA Sat	3.49	.58	.34*	.33*	.39**	.22	.10	-.01	.35*	-.30*	.56***	.79***	.34*	.27	.14	.72

*Note.* Coefficient alpha reported in the diagonal. D = Effectiveness Score; Cons. = Conscientiousness; P. Saf. = Psychological Safety; G. Diff. = Goal Difficulty; LS = Life Satisfaction; FCE = Future Change Efficacy; JS = Job Satisfaction; JP = Job Performance; J.Eff. = Job Efficacy; TA Sat = Satisfaction with Truly Accomplished. *N* = 44. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

### *Participants' TA Systems*

Table 9 shows objectives and indicators for two participants' completed TA systems. As noted above, participants were limited to one or two objectives ( $M = 1.57$ ;  $SD = .50$ , range = 1 to 2), which yielded between three and six indicators per system ( $M = 4.34$ ;  $SD = .91$ , range = 3 to 6). Examination of participants' systems showed that objectives and indicators typically fell within six categories: Health (25 objectives, 67 indicators), Social, Family, and Intimate Relationships (16 objectives, 33 indicators), Work and Professional Development (11 objectives, 24 indicators), Hobbies and Leisure (10 objectives, 27 indicators), Spirituality (5 objectives, 14 indicators), and Finances (2 objectives, 5 indicators).

Table 9. Two Completed Truly Accomplished Systems

Participant	Objective	Indicator
A	Increase physical activity	Number of one hour segments of physical activity per week
	Improve diet	Number of times eating seafood per week Average number of ounces of water per day Number of days per week taking multivitamin
B	Spiritual growth	Number of minutes reading spiritual literature per week
		Number of 45-minute yoga sessions per week
		Number of meditation sessions per week
		Number of minutes per week reading/searching to explore spiritual interests per week

System development typically took between two and four hours ( $M = 2.82$ ,  $SD = .66$ ), with the majority of time spent creating indicators (approximately one hour and 30 minutes). Clarifying values and developing objectives took between 30 and 45 minutes, while developing

contingencies took between 45 minutes and one hour. All participants completed the system development phase in a single session.

### *Overall Effectiveness*

The first hypothesis addressed the effectiveness of TA for proximal behavior change. Figure 6 shows mean overall effectiveness scores across all participants over time. The mean level of effectiveness at baseline was -90 ( $SD = 99.16$ ), well below the minimum level of expected performance, an effectiveness score of 0. The graph shows nearly linear increases from baseline to feedback completion, with a mean level of effectiveness at the final feedback period of 61.30 ( $SD = 75.72$ ).

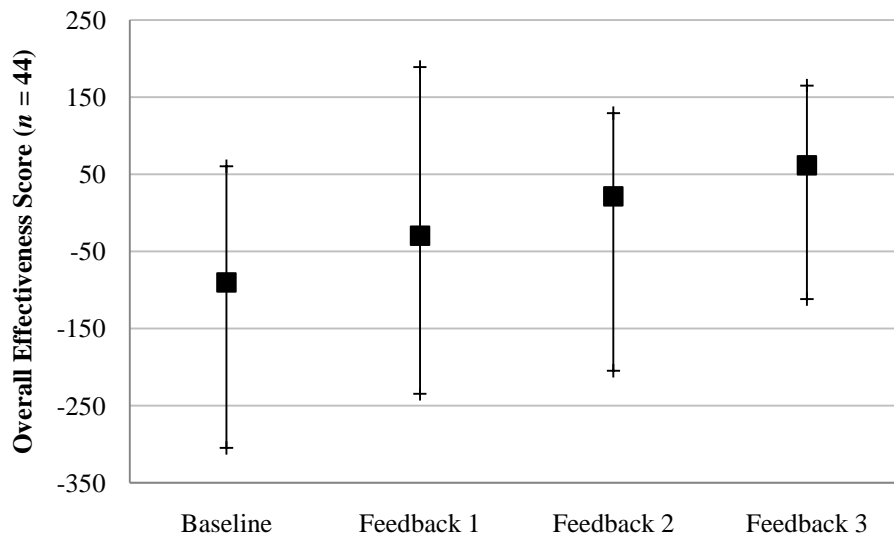


Figure 6. Mean Overall Effectiveness Scores over Time

Figure 7 shows the percent of maximum possible effectiveness scores over time. This is calculated as the actual overall effectiveness score divided by the maximum possible overall

effectiveness score. The percent of maximum helps account for the number of indicators in each system and the maximum effectiveness score for each indicator.

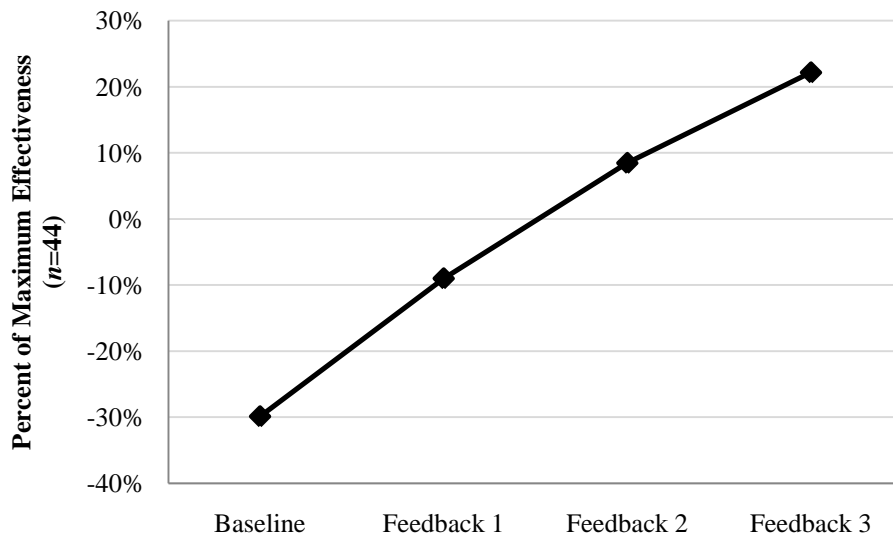


Figure 7. Percent of Maximum Possible Effectiveness Scores over Time

While the trend is by definition identical to that in Figure 6, it indicates participants' performance in more absolute terms. Baseline performance was 30% of the way between minimum acceptable performance and the worst possible performance. The highest level of performance was well above minimum acceptable, but only 22% of the way between minimum acceptable and maximum performance.

Figure 8 shows the frequency distribution of effect sizes for all participants. All effect sizes were positive, indicating that all participants experienced some positive behavior change. Effect sizes ranged from .58 to 6.42.



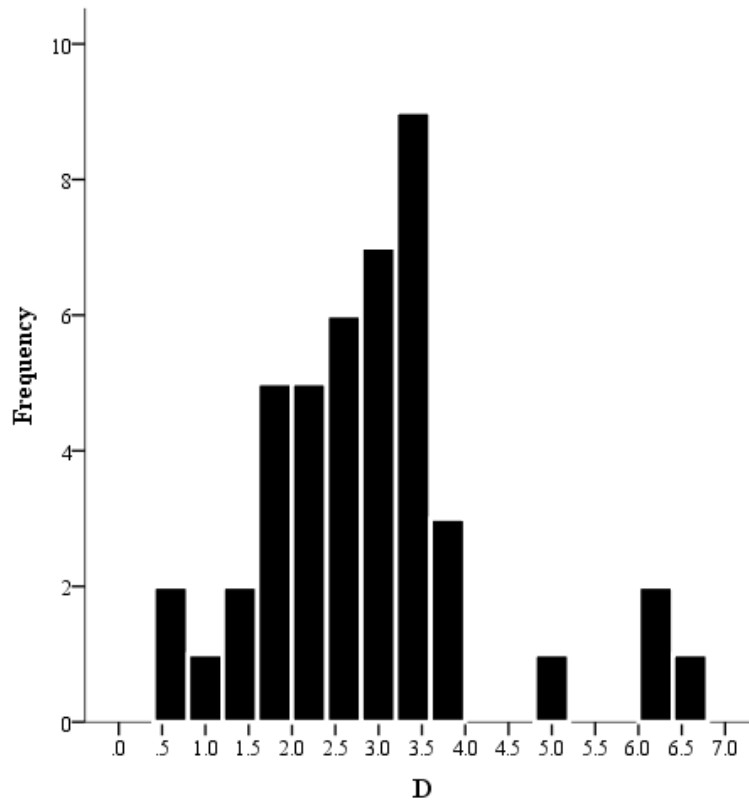


Figure 8. Frequency Distribution of Individual Effect Sizes

To test Hypothesis 1, which proposed an increase in effectiveness from baseline to feedback, effect size was computed (Cohen's  $d$ ) for each individual, as described above. The mean of individual effect sizes ( $d = 2.93$ ) indicated a large increase in effectiveness over the three feedback periods. Additionally, a repeated measures  $t$ -test comparing overall effectiveness score at baseline with effectiveness after feedback completion showed significant differences,  $t(43) = 12.10, p < .001, \omega^2 = .77$ . Thus Hypothesis 1 was supported.

To explore the possibility that the effects of feedback dropped off over time, I first examined effectiveness scores across the three feedback periods and determined that four individuals had scores that dropped by ten percent or more in the final feedback period. I then

conducted a paired samples t-test comparing the final feedback period to the mean of feedback periods 1 and 2. Effectiveness at feedback period 3 was significantly higher than effectiveness during feedback periods 1 and 2, indicating no meaningful drop-off.

Although no formal hypotheses regarding gender differences were made, males had lower mean gains in overall effectiveness ( $M = 2.26$ ;  $SD = .91$ ) than females ( $M = 3.15$ ;  $SD = 1.28$ ), and these differences were statistically significant,  $t(42) = -2.13$ ,  $p < .05$ ,  $\eta^2 = .10$ .

### *Individual Differences*

Hypothesis 2 proposed positive relationships between individual difference variables and effectiveness gain. Correlations showed significant relationships between effectiveness gain and conscientiousness ( $r = .40$ ,  $p < .01$ ), core self-evaluations ( $r = .42$ ,  $p < .01$ ), psychological safety ( $r = .64$ ,  $p < .001$ ), and performance goal orientation ( $r = -.54$ ,  $p < .001$ ). Learning goal orientation was not significantly related to effectiveness gain ( $r = .21$ , *n.s.*). Thus Hypotheses 2a, 2b, 2c, and 2e were supported, while Hypothesis 2d was not.

To assess the overall relationship between the individual differences predictors, multiple regression analysis was conducted to determine the amount of variance accounted for by these variables as a whole. Results from the regression showed that the five predictors explained 58% of variance in effectiveness gain ( $R^2 = .58$ ,  $F(5,38) = 10.27$ ,  $p < .001$ ).

### *Goal Difficulty*

Hypothesis 3, which proposed an interaction between goal difficulty and each individual difference variable, was tested using moderated multiple regression with individuals' effect sizes as the dependent variable and predictor variables centered prior to analysis. A summary of results from the moderation analysis is provided in Table 10.

Table 10. Summary of Regression Analysis Results

Independent Variable	Standardized Beta	t
Step 1: Predictor Variables		
Conscientiousness	.02	.18
Core Self-Evaluations	.06	.62
Psychological Safety	.28	2.39**
Learning Goal Orientation	.08	.63
Performance Goal Orientation	-.20	-1.91
Step 2: Moderator		
Goal Difficulty	.41	3.21**
Step 3: Interaction Terms		
Conscientiousness x Goal Difficulty	-.16	-1.34
Core Self-Evaluations x Goal Difficulty	.16	1.47
Psychological Safety x Goal Difficulty	-.17	-1.44
LGO x Goal Difficulty	.34	2.60*
PGO x Goal Difficulty	-.22	-2.08*

Note. Dependent variable: Effectiveness Gain (*d*); \* $p < .05$ . \*\* $p < .01$ .

The regression model was significant,  $F(11,32) = 11.78, p < .001$ . There were main effects for goal difficulty ( $\beta = .41, p < .01$ ) and psychological safety ( $\beta = .28, p < .02$ ).

The moderation analyses showed only LGO ( $\beta = .34, p < .05$ ) and PGO ( $\beta = -.22, p < .05$ ) to have significant interactions with goal difficulty. Figure 9 provides a graphical representation of the LGO interaction. The graph represents the relationship between

effectiveness gain and low and high levels of LGO. The horizontal axis represents low (one standard deviation below the mean) and high (one standard deviation above the mean) values of goal difficulty. When LGO is high, goal difficulty has a strong positive relationship with effectiveness gain. When LGO is low, goal difficulty has little impact on effectiveness gain. Thus, Hypothesis 3d was supported.

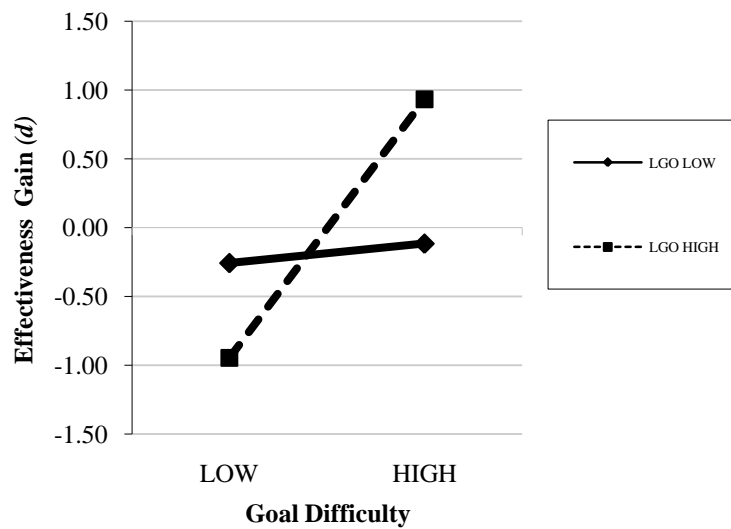


Figure 9. LGO-Goal Difficulty Interaction

The interaction between PGO and goal difficulty was also significant. Figure 10 provides a graphical representation of the interaction between PGO and goal difficulty. The graph represents the relationship between effectiveness gain and low and high levels of PGO. The horizontal axis represents low (one standard deviation below the mean) and high (one standard deviation above the mean) levels of goal difficulty. When PGO is low, perceived goal difficulty has a strong positive impact on effectiveness gain. When PGO is high, the relationship between goal difficulty and effectiveness gain is positive, but less strong. Hypothesis 3e was supported.

Overall, there was partial support for Hypothesis 3. Goal difficulty interacted with LGO and PGO, but not with conscientiousness, core self-evaluations, or psychological safety.

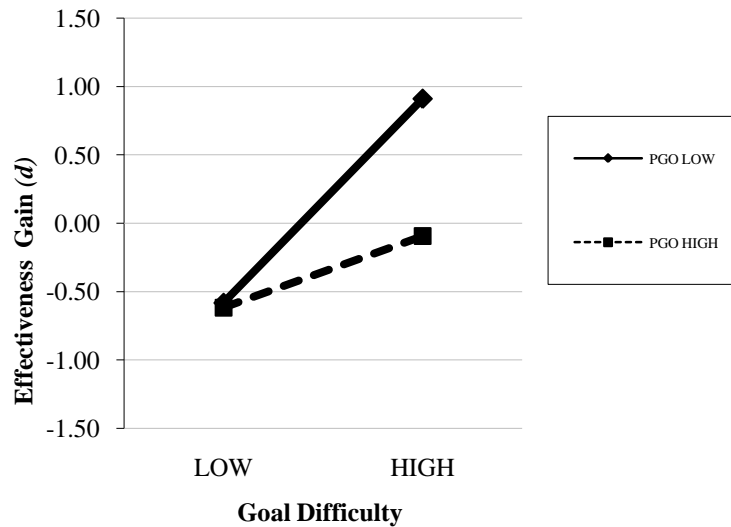


Figure 10. PGO-Goal Difficulty Interaction

#### *Distal Outcomes*

Hypothesis 4 proposed relationships between effectiveness gain and distal individual outcome variables, and was tested with Pearson's Bivariate Correlation analysis. In support of Hypotheses 4a and 4c, gain in effectiveness was negatively associated with perceived stress ( $r = -.35, p < .05$ ) and positively associated with future change efficacy ( $r = .50, p < .001$ ).

Hypothesis 4b was not supported, as gain in effectiveness had non-significant relationships with life satisfaction ( $r = .12, n.s.$ ).

Hypothesis 5, which proposed that the level of each outcome variable (i.e., perceived stress, life satisfaction, and future change efficacy) would be greater after feedback than prior to system development, was tested with repeated measures *t*-tests. In support of the hypotheses,

perceived stress was significantly lower at Time 3 ( $M = 2.48$ ,  $SD = .69$ ) than Time 1 ( $M = 2.68$ ,  $SD = .76$ ),  $t(43) = -5.14$ ,  $p < .001$ ,  $\omega^2 = .37$ . Life satisfaction increased significantly from Time 1 ( $M = 3.30$ ,  $SD = .75$ ) to Time 3 ( $M = 3.37$ ,  $SD = .70$ ),  $t(43) = 3.93$ ,  $p < .001$ ,  $\omega^2 = .25$ . Likewise, future change efficacy was significantly higher at Time 3 ( $M = 3.68$ ,  $SD = .74$ ) than Time 1 ( $M = 3.45$ ,  $SD = .66$ ),  $t(43) = 3.17$ ,  $p < .01$ ,  $\omega^2 = .17$ . According to Cohen's (1988) guidelines for interpreting omega squared, .01 represents a weak relationship, .06 represents a moderate relationship, and .14 is a strong association. Thus, the effect size for each distal outcome constitutes a large effect.

### *Work Spillover*

Hypothesis 6, which proposed that the level of each work outcome (i.e., job satisfaction, perceived job performance, and job efficacy) would be greater after feedback than prior to system development, was tested with repeated measures  $t$ -tests. Job satisfaction was significantly higher at Time 3 ( $M = 3.86$ ,  $SD = .92$ ) than Time 1 ( $M = 3.80$ ,  $SD = .91$ ),  $t(43) = 2.21$ ,  $p < .05$ ,  $\omega^2 = .08$ . Job efficacy also increased significantly from Time 1 ( $M = 3.50$ ,  $SD = .93$ ) to Time 3 ( $M = 3.68$ ,  $SD = .88$ ),  $t(43) = 2.23$ ,  $p < .05$ ,  $\omega^2 = .08$ . Hypothesis 6b was not supported, as perceptions of job performance were not significantly different at Times 1 and 3,  $t(43) = 1.35$ ,  $n.s.$ ,  $\omega^2 = .02$ . However, results suggest some evidence of spillover, as Hypotheses 6a and 6c were supported.

Hypotheses 7, 8, and 9 proposed that individual outcome variables would mediate the relationship between gain in effectiveness and job outcomes. Baron and Kenny (1986) outline several conditions which must be satisfied in order to test for mediation. First, the predictor must be significantly related to the outcome variable. Job efficacy was the only job outcome that met

this criterion. Neither job satisfaction nor perceived job performance was significantly related to effectiveness gain, therefore Hypotheses 7 and 8 could not be tested. Second, the predictor must be significantly related to the mediator. Perceived stress and future change efficacy were each related to effectiveness gain. Third, the mediator must be significantly related to the outcome. Future change efficacy was significantly related to job efficacy therefore the initial conditions for mediation analyses were met.

According to Baron and Kenny (1986), mediation can be established if the relationship between overall effectiveness and job efficacy decreases (partial mediation) or becomes non-significant (full mediation) when controlling for future change efficacy. However, effectiveness gain remained a significant predictor of job efficacy when accounting for the effects of the tested mediator. Additionally, the variance explained by future change efficacy was not significant ( $\beta = .17, n.s.$ ) therefore Hypothesis 9 was not supported.

#### *Satisfaction with TA*

The mean level of satisfaction was 3.49 on a scale with a maximum of 5. The three satisfaction items addressed the participant's overall satisfaction with the TA process, whether it was worth the time, and its degree of helpfulness. Analysis of the responses to these items indicated that 78 percent of responses agreed or strongly agreed that they were satisfied with the system, while 0 percent disagreed or strongly disagreed. Females tended to rate the TA process more favorably ( $M = 3.60; SD = .51$ ) than did males ( $M = 3.16; SD = .68$ ), and these differences were statistically significant,  $t(42) = 2.25, p < .05, \omega^2 = .09$ .

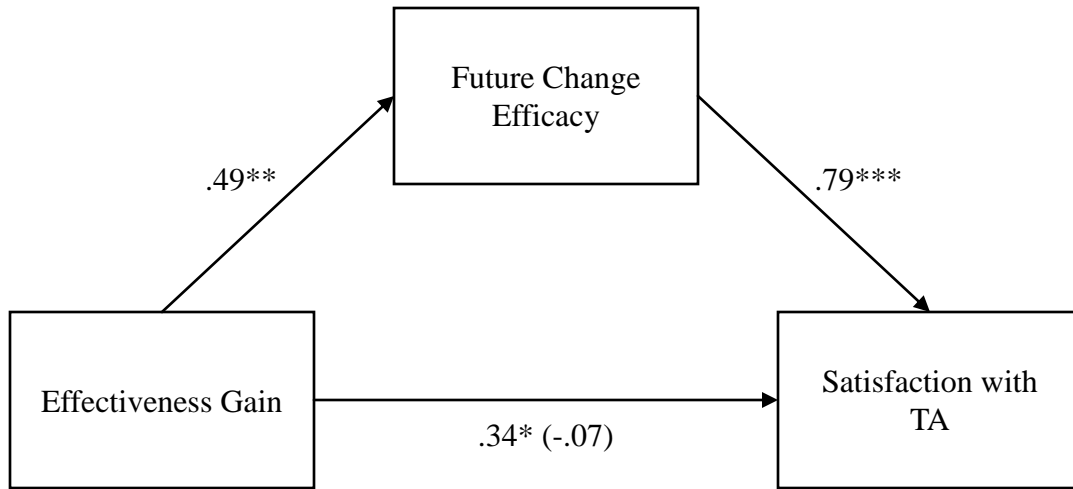
Hypothesis 10 proposed that gain in overall effectiveness would be positively related to satisfaction with TA, and was tested using Pearson's Bivariate Correlation analysis. Satisfaction

with TA was positively associated with gain in effectiveness ( $r = .34, p < .05$ ), thus supporting Hypothesis 10.

Hypothesis 11 proposed that individual outcomes would mediate the relationship between gain in effectiveness and satisfaction with TA. This hypothesis was tested following Baron and Kenny's (1986) process for mediation analyses, described above. In accordance with the first requirement, effectiveness gain was significantly related to satisfaction with TA. Second, I tested the relationship between effectiveness and each mediator (i.e., stress, life satisfaction, and future change efficacy). Only perceived stress and future change efficacy were significantly related to effectiveness gain. Next, I tested the relationship between each mediator and satisfaction with TA while controlling for effectiveness. Finally, I estimated the relationship between effectiveness gain and satisfaction with TA while controlling for the mediators.

As noted above, mediation is evident if the relationship between overall effectiveness and satisfaction with TA decreases or becomes non-significant when accounting for the effects of the mediators. In support of Hypothesis 11c, future change efficacy fully mediated the relationship between gain in effectiveness score and satisfaction with TA. As illustrated in Figure 11, the standardized regression coefficient between effectiveness gain and satisfaction with TA ( $\beta = .34, p < .05$ ) decreased significantly when controlling for future change efficacy ( $\beta = -.07, n.s.$ ). In other words, the extent to which effectiveness gain impacts an individual's efficacy perceptions regarding future behavior change explains the degree to which an individual is satisfied with TA.





*Note.* Standardized beta coefficients for the relationship between Effectiveness Gain and Satisfaction with i-Count-Ability as mediated by Future Change Efficacy. The standardized regression coefficient between Effectiveness Gain and Satisfaction with ICA when controlling for Future Change Efficacy is shown in parentheses. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Figure 11. Effectiveness Gain-Satisfaction with TA Mediation Analysis Results

### *Qualitative Analysis*

Several trends emerged from the qualitative analysis. In general, the entire TA process was well-received. Individuals felt that they made important changes as a result of the intervention. Many stated that they “felt” even better than the numbers showed, suggesting that the process itself has an impact on subjective well-being beyond observable changes in indicator levels. Individuals generally considered the process “powerful” or “eye-opening,” particularly in regards to the process of aligning objectives with core values. Recognizing that their current behavior was more aligned with external demands rather than internal motivations provided a compelling and often emotional experience for individuals. For example, one participant has decided to enter into early retirement after realizing that the amount of time and effort she was allocating toward work was interfering with her core values. She noted that this realization

initially occurred while clarifying values during system development, and was strengthened upon seeing indicator information during the first feedback session.

Individuals frequently reported that their objectives and indicators were aimed at behaviors they had targeted for change in the past. Furthermore, they reported a sense of renewed confidence after finally succeeding at making changes that had previously seemed impossible. For example, one participant quit smoking after 20 years of failed attempts. Another began a weight loss plan which has remained effective months following TA feedback.

Participants were asked to explain how valuable different steps in the TA process were. In general, individuals tended to evaluate clarifying values most favorably, noting that this step provided a springboard of sorts to motivate behavior change. Participants also found developing contingencies and reviewing feedback reports helpful, noting that these steps made TA seem less theoretical and more concrete. Most individuals also noted that developing indicators was the most difficult step in the process, but acknowledged the importance of creating quality controllable measures.

Gender differences in regards to expectations about TA were also apparent. Specifically, males tended to report greater pre-post differences in subjective feelings about TA. That is, males more so than females reported that they did not give much merit to the TA process until after its completion. Several male participants indicated that they felt confident in their ability to make desired behavior changes and those changes would be unrelated to TA. Following feedback, however, males weighted the influence of TA feedback more heavily. Female participants, on the other hand, tended to have positive expectations about TA throughout the

process. Perhaps the above finding that females experienced greater gains in effectiveness than males is due in part to these differing expectations at the beginning of the TA process.

Approximately 30 percent of interviewed individuals expressed interest in group-based system development, noting that such an environment would provide additional motivation and support for following through with objectives. Individuals also felt that group members could aid in providing informal feedback throughout the week, before formal feedback with the facilitator. Indeed, groups may provide individuals with a sense of collective motivation that is absent in one-on-one facilitations, and this should be explored in future studies.

Individuals also noted that it was helpful for them to set up daily reminders on their mobile phones or electronic calendars prompting them to record their progress. This is an important issue that is not likely unique to the current study. That is, in the “real world” individuals have multiple demands competing for their time and attention. Despite a genuine motivation to record indicator data consistently and accurately, individuals’ resources are spread thin. A simple reminder can help ensure regular and accurate data collection.

## CHAPTER 4: DISCUSSION

### *Summary of Findings*

Overall, results provide support for the effectiveness of Truly Accomplished as a lifestyle improvement system. Results also suggest several specific antecedents and outcomes associated with effectiveness gain. In this section, I will discuss each finding and its practical implications.

#### *Overall Effectiveness*

Results showed that individuals' overall effectiveness scores increased greatly from baseline to feedback completion. The mean effect size for the current study was 2.93. As shown in Figure 6, the mean effectiveness score under baseline was -90, while the mean effectiveness score under feedback was +17. This effect is 3.6 times greater than Cohen's (1988) criteria for a large effect (i.e., .8).

An effect size of 2.93 means that, on average, individuals improved by 2.93 standard deviations from the mean. If we assume a normal distribution, this is equivalent to increasing to the 98<sup>th</sup> percentile of baseline measures of effectiveness. In other words, what was the 98<sup>th</sup> percentile of effectiveness at baseline became the mean level of effectiveness under feedback.

In comparison, effect sizes for goal-setting interventions typically range from .40 to .82, depending on the level of goal difficulty, specificity, and task complexity (Locke & Latham, 2002). The mean effect size for feedback interventions is .41 (Kluger & DeNisi, 1996). Participation in decision making has shown effects on performance between .42 and .51 (Wagner, 1994). Finally, mean effect sizes for incentives to increase performance (i.e., money, feedback, and social recognition) are .51 (Stajkovic & Luthans, 2003).

The mean effect size for TA was considerably larger than the mean found in the ProMES meta-analysis ( $d = 1.16$ ). There are several possible explanations for this. First, the ProMES meta-analysis synthesized results from 83 studies, and effect sizes varied across studies from -2.53 to +5.37 (Pritchard, Harrell, DiazGranados, & Guzman, 2008). Therefore the current study's effect size, albeit large, falls within the expected range.

Second, ProMES systems address a more complete spectrum of work issues, including areas of the job in which work units are already succeeding. TA, on the other hand, focuses solely on areas of an individual's life which he or she wishes to improve. Presumably, these are areas with the greatest potential for improvement. In the current study, participants were limited to one or two specific objectives. If individuals were to develop systems that covered all domains of their lives, including areas in which they were already succeeding, effect sizes would be more conservative, and thus more directly comparable to ProMES effect sizes. However, the practical utility of this is questionable. That is, an individual would get little benefit from measuring performance on behaviors which he or she is not in need of changing.

Additionally, TA's focus is at the individual level while ProMES typically focuses on the group. The individual level of analysis implies a natural increased level of control and personal accountability. For example, group-level process loss, such as social loafing, is not a factor at the individual level; the individual is fully accountable for his or her actions and is therefore more likely to take ownership of the effort he or she exerts toward meeting TA objectives.

Finally, because TA objectives and indicators are self-concordant, there is a greater likelihood that the individual will be intrinsically motivated to meet objectives. Certainly, ProMES helps work units become accountable for team objectives, and individuals' jobs are of

critical importance. However, there is also considerable variation in values between individuals. Because TA is developed for that specific individual, objectives and indicators are guided by internal rather than external demands, making TA effectiveness more proximal to the individual.

The program seems to impact motivation by helping to transform vague goals into tangible and attainable objectives. When beginning the program, individuals often believed they had a clear sense of what was important to them. In many cases, they began the first session with established ideas about issues they wanted to address. However, developing concrete measures, determining specific levels of good, bad, and acceptable behavior, and clarifying priorities between measures seems to have helped individuals reframe their values in more objective and manageable terms, thereby increasing commitment to their system and overall motivation to change.

#### *Relationship between Individual Differences and Effectiveness Gain*

As predicted, conscientiousness, core self-evaluations, and psychological safety were each positive significant predictors of gain in effectiveness score. Performance goal orientation was negatively associated with effectiveness gain. This suggests several implications for the use of TA. First, it is important to remember that a key aspect of TA's effectiveness is the degree to which individuals possess these personality characteristics. Clearly, TA effectiveness requires a reasonable level of commitment and diligence on the part of the individual, which can be enhanced by beliefs of self-competence. In practice, it is important to consider such individual differences when predicting whether the system will be effective for a given individual.

These findings also suggest the importance of the participant-facilitator relationship and social exchanges within the TA environment, as perceptions of psychological safety may be

influenced by the characteristics of both the participant and the facilitator. In other words, while psychological safety is impacted by characteristics of the individual, there may also be specific ways in which the facilitator influences the degree to which participants feel safe in the TA environment. For example, individuals may prefer a facilitator who they perceive as similar to them. Female participants may feel safer with a female rather than a male facilitator. Individuals who are parents may prefer facilitators with children. Such similarity may foster beliefs that the facilitator understands and identifies with the participant, thereby increasing a person's degree of candidness. Future research should examine issues of similarity and other characteristics of the facilitator in order to inform facilitator selection practices.

Contrary to expectations, no significant relationship was found between learning goal orientation and effectiveness gain. One possible explanation for LGO's non-significant relationship with effectiveness gain is the presence of one or more moderators which change the nature of the relationship. The interaction effects of perceived goal difficulty are discussed below.

#### *Moderating Effects of Perceived Goal Difficulty*

As expected, perceived goal difficulty significantly moderated the relationships between both learning and performance goal orientation and effectiveness gain. The significant interaction helps account for the lack of main effect for LGO on effectiveness gain, suggesting that the LGO's ability to predict effectiveness gain is impacted by the extent to which an individual perceives his or her objectives as difficult. In particular, when goal difficulty is high, LGO is positively related to effectiveness gain and PGO is negatively related to effectiveness gain; when goal difficulty is low, LGO is negatively related to effectiveness gain and PGO is

unrelated to effectiveness gain. For both LGO and PGO, high levels of goal difficulty were related to greater gains in effectiveness than low levels of goal difficulty. These findings suggest that individuals should be encouraged to set goals that they perceive as more difficult, especially when they are high in LGO.

One explanation for the lack of significant interaction between goal difficulty and the other three predictors is that the moderating variable was measured as perceived rather than actual goal difficulty. It is possible that highly conscientious individuals, those with high CSE, and those who experience high psychological safety are simply likely to perceive goals as less difficult. That is, because they feel competent and have the self-confidence that contributes to goal attainment, they may underestimate the level of difficulty of their goals, which may account for the lack of interaction. Future research should use objective measures of goal difficulty to explore its effects on the relationship between individual differences and effectiveness gain.

#### *Relationship between Effectiveness Gain and Distal Outcomes*

Levels of life satisfaction and future change efficacy were significantly higher, and levels of stress significantly lower, following the TA process. Although pre-post mean differences appeared relatively small, omega squared data indicates a large proportion of variance attributed to the treatment. Specifically, the TA process accounted for 37 percent of variance in stress, 25 percent of variance in life satisfaction, and 17 percent of variance in future change efficacy. As noted above, each of these constitutes a large effect (Cohen, 1988).

Effectiveness gain was significantly associated with stress and future change efficacy. The effectiveness-life satisfaction relationship was not significant, which may be explained by the relatively static nature of life satisfaction. Interestingly, however, life satisfaction was



significantly higher after TA feedback. One explanation for statistically significant pre-post differences could be the existence of a more proximal and dynamic mediating variable impacting the relationship. For example, the relationship could be mediated by perceived stress; that is, to the extent that effectiveness gain decreases levels of perceived stress, life satisfaction increases.

To test this possibility, I conducted a post hoc mediated regression analysis. Because effectiveness gain and life satisfaction were not significantly related, the first condition of Baron & Kenny's (1986) criteria (i.e., a significant relationship between the predictor and outcome) was not met. However, some researchers (e.g., Hayes, 2009; Preacher & Hayes, 2008; Zhao, Lynch, & Chen, 2010) argue that there need not be a significant zero-order effect of the predictor on the outcome variable to establish mediation. Post hoc analyses indicated that perceived stress does in fact mediate the relationship between gain in effectiveness score and life satisfaction. The standardized regression coefficient between effectiveness gain and life satisfaction decreased when controlling for perceived stress, and the effects of the mediator became significant ( $\beta = -.46, p < .01$ ).

It is also important to note the possible impact of other untested mediators. As noted above, individuals often reported in qualitative interviews that their subjective evaluations of their progress were higher than indicated by effectiveness scores. In other words, life satisfaction may have improved as a result of *striving* toward objectives rather than *achieving* objectives. Since overall effectiveness score is essentially an objective measure of goal attainment, subjective evaluations regarding the process of goal striving may not be fully captured. Presence of such a mediator would help explain why life satisfaction may have increased following TA feedback, despite no direct correlation between effectiveness gain and life satisfaction.

### *Relationship between Effectiveness Gain and Job Outcomes*

While effectiveness gain was positively correlated with job efficacy, the proposed model whereby this relationship was mediated by individual outcome variables was not supported. Although the mediation model was not significant, pre-post measures of both job satisfaction and job efficacy were significantly different. Estimates of effect size indicate that TA feedback accounted for 8 percent of variance in job satisfaction and 8 percent of variance in job efficacy. According to Cohen (1988), each of these constitutes a medium association.

One possible explanation for pre-post differences in job satisfaction and job efficacy might have been the influence of other system-related variables not tested in this study. For example, individuals with one or more indicators directly targeting work-related behaviors might have experienced larger gains in work-related outcomes as a result of increased effectiveness. To test this, I coded each indicator by type and examined correlations between effectiveness gain and job outcomes for individuals with one or more work-related indicators. The relationship between job efficacy and effectiveness gain was significant for these individuals ( $r = .59, p < .05, n = 12$ ). However, an independent samples t-test revealed no significant differences in mean levels of job efficacy after feedback for those with one or more work-related indicators and those with none. Results of a multiple regression analysis showed a significant relationship between effectiveness gain and job efficacy when controlling for number of work indicators, ( $\beta = .44, p < .01$ ). However, inclusion of number of work indicators as a covariate does not improve estimates of the relationship between effectiveness gain and job efficacy. Thus, number of work indicators does not appear to impact spillover.

### *Satisfaction with TA*

Overall, participants were satisfied with the TA process. As noted above, the intervention often gives people a chance to address issues which they have previously been unsuccessful at changing. Succeeding at such tasks seems to give individuals a renewed sense of self-confidence and motivation, thereby leading to increased levels of satisfaction with the system.

Females tended to be more satisfied with the system than males. There are several possible explanations for this finding. First, it is possible that females rated TA more favorably because the facilitator was of the same gender. As discussed above, future studies should explore the influence of participant-facilitator similarity, particularly in terms of gender. Additionally, women experienced greater overall gains in effectiveness than men, potentially as a result of differing expectations between genders (i.e., women had higher initial expectations about the intervention than men). These differential effectiveness gains may have contributed to overall satisfaction levels at the end of the intervention.

Furthermore, women may simply be more likely to seek self-improvement and therefore be more satisfied with such interventions. Research indicates that females are more likely to engage in self-improvement behaviors (e.g., Kurman, 2006), which may be explained in part by gender roles. For instance, males with traditional attitudes about masculinity are significantly less likely to seek professional help for physical or psychological issues (Good, Dell, & Mintz, 1989; McCarthy & Holliday, 2004). Women are more likely to participate in self-help programs such as Weight Watchers and Alcoholics Anonymous, and tend to benefit more from participation in such programs (Broom & Dixon, 2008; Timko, Moos, Finney, & Connell, 2002).

Effectiveness gain was significantly associated with satisfaction with TA, and this relationship was fully mediated by future change efficacy. This finding suggests that efficacy perceptions about future behavior change impact TA satisfaction above and beyond actual levels of current behavior change. Actual behavior change (i.e., effectiveness gain) impacts beliefs about future successful self-improvement, which in turn impacts the degree to which individuals were satisfied with the program.

### *Subjective Reactions to the Intervention*

Overall, the intervention process ran smoothly. Individuals were excited about developing their systems and, as discussed above, were generally pleased with the intervention process and their completed systems. As a facilitator, it was very satisfying and encouraging to witness actual changes in individuals' behavior and in their subjective responses each week.

One struggle that should be addressed is the method of conducting feedback meetings. In the current study, feedback meetings were held primarily face-to-face. However, this seemed to present problems for some individuals in terms of time commitments and scheduling conflicts. Throughout the study, several feedback sessions were held over the phone when it was more appropriate to do so. I found this method to be equally effective at helping the person identify priorities for the week and determine task strategies, while relieving the burdens associated with scheduling face-to-face meetings. Additional methods, such as video conferencing, should be explored in the future, while specifically comparing the effectiveness of these various methods of feedback.

A particularly useful improvement that could be made is the technological enhancement of data collection and feedback report methods. Specifically, an online data entry system

accessible only by the participant and facilitator would improve the ease with which individuals track their daily behavior, and would also assist the facilitator in preparing feedback reports. In the current study, the individual recorded daily behavior and reported weekly to the facilitator. The facilitator then manually input the indicator data and determined the corresponding effectiveness score for each indicator. While this method was adequate, it was at times tedious for both participant and facilitator. The utility of an online system should be explored in the future, particularly in regards to whether individuals would find this preferable to manual methods of data collection and whether it produces more accurate records of behavior.

#### *Practical Implications*

Overall, TA appears to be an effective system for self-development and behavior change. Results offer several implications for practice. First, when implementing a TA intervention, it is important to consider individual personality characteristics. Specifically, conscientiousness, core self-evaluations, and goal orientation must be considered when making predictions about its effectiveness. Additionally, facilitators must recognize their influence throughout the process, and strive to maintain objectivity while fostering an environment of trust and openness. Goal difficulty is also important; individuals should be encouraged to set difficult goals, especially when they have a learning goal orientation.

While the current study did not find direct evidence of spillover, work outcomes seem to have been at least indirectly impacted. Job satisfaction and job-related efficacy each increased following TA feedback. Additionally, effectiveness gain was significantly associated with job-related efficacy. These results provide initial support for the notion that behavior change can exhibit positive spillover effects into the workplace.

## *Limitations*

### *Baseline Data Collection*

An important issue arises in regards to accurate collection of baseline data. First, people may be inclined to begin improving on their measured behaviors before feedback begins. It is possible that motivation will increase substantially following development of the system; in other words, merely identifying areas that need to be improved may encourage behavior change. Thus the measure of change from “baseline” (i.e., the week following system development) to post-feedback may be an underrepresentation of TA’s true effects. One option to deal with this is to have people recall recent indicator data. However, this is problematic because people are unlikely to remember how they performed on each indicator in the weeks prior to facilitation; therefore the first week following system development must form the baseline. A similar issue has been addressed in regards to PromES research (Pritchard, Harrell, DiazGranados, & Guzman, 2008). Indeed some increases in productivity did occur before feedback began; that is, the process has a positive impact on productivity in and of itself. However, large increases in productivity still occurred under feedback despite this initial increase (Pritchard et al., 2008). Similarly, in TA, it is expected that despite some immediate change in behavior due to clarification of objectives and expectations, change occurred as a result of feedback.

### *Feedback Duration*

The current study employed four feedback periods. It may be argued that, while participants experienced proximal behavior change (i.e., improved performance on their indicators), four weeks is not sufficient time to make long-term behavioral changes. Baseline performance was 30% of the way between minimum acceptable performance and the worst

possible performance. The highest level of performance was well above minimum acceptable, but only 22% of the way between minimum acceptable and maximum performance. It is expected that a greater number of feedback periods would lead to further gains in effectiveness, and participants would subsequently experience more distal outcomes associated with long-term behavior change.

It is also important to consider that the four-week span of the study may be representative of field settings in which individuals have a limited amount of time and resources to allocate toward an intervention. For example, cost is a significant factor for both individuals and organizations initiating an employee's participation in the program, and these concerns may limit the number of feedback sessions.

#### *Long-Term Intervention Effects*

It is also critical to note the importance of tracking long-term intervention outcomes. It is possible that the effects of feedback could appear strong at first but drop off after a longer time period. People's subjective feelings regarding circumstances or situations adapt fairly quickly to change (Diener, 2000). Brickman and Campbell (1971) refer to this phenomenon as the "hedonic treadmill." For example, Suh, Diener, and Fujita (1996) found that the effects of major life changes, such as being fired or promoted, lost their impact on well-being in less than three months, at which time subjective well-being returned to near baseline. Although there was no evidence of immediate drop-off across three feedback periods, the current study's duration may not have been able to fully capture long-term dynamic responses to behavior change. This also underscores the importance of revisiting and adjusting objectives, indicators, and contingencies over time.

In a follow-up survey conducted approximately 6 months after feedback completion, participants were asked to evaluate TA's lasting impact on their behavior by simply categorizing the effects as positive, negative, or neutral. Response rate for this survey was 70% ( $n = 31$ ). Seventy-seven percent ( $n = 24$ ) of respondents reported that TA had a positive impact, while 23% ( $n = 7$ ) said the lasting impact was neutral. No participants felt that TA had a negative impact on their behavior. Additionally, 19% ( $n = 6$ ) of respondents stated that they were still actively using their TA system, or some adaptation of the original system.

### *Self-Report Measures*

All measures in the current study were self-report. This is an obvious limitation, as it presents common method bias, which can inflate correlations between predictor and outcome variables. In the current study, the outcome variable (i.e., effectiveness gain) is dependent on the participants' self-report of his or her performance on each indicator. Additionally, effectiveness values of each level of performance are set by the participant during contingency development. However, the ultimate determinant of a TA system's validity is the individual's perception. That is, the ultimate criterion is whether the individual is satisfied with his or her improvement. The validity of the process, therefore, is determined by an individual's evaluation of his or her subjective feelings.

### *Single-Item Measures*

Several variables were also measured using single-item scales. This is a potential problem, particularly for variables that showed little or no effects, such as job performance and job efficacy. If reliability is low or if all important aspects of perceived job performance were not captured, the measure's deficiency would have failed to capture any relationships with



effectiveness gain. Future studies should consider using multiple-item scales that measure various facets of the construct (i.e., task and contextual performance) and ratings from multiple sources (i.e., self, supervisors, and peers) in order to fully capture measures of constructs such as job performance.

### *Social Desirability*

It is possible that individuals do not accurately report indicator data, i.e., they fake good. It is the role of the facilitator to help foster a psychologically safe environment in which individuals feel comfortable being open and honest. However, individuals are driven to present themselves in a favorable light which may lead them to respond in socially desirable ways (Fisher, 1993).

Social desirability presents two issues. First, it is important that individuals choose personally relevant objectives, rather than choosing objectives that might be deemed by others (e.g., spouse, peers, the facilitator) as important. Second, the drive for positive social presentation could lead individuals to exaggerate their success on indicators.

These possibilities may be reduced in several ways. First, simply explaining the importance of choosing objectives that are aligned with personal values and truthfully reporting indicator data may encourage an individual to behave self-concordantly. Most people will likely recognize that there is nothing to gain from faking. Additionally, after the time and energy invested into the system development process, individuals are more likely to take accountability for their behavior and therefore report it accurately.

Furthermore, measuring more long-term and concrete outcomes may help determine levels of impression management, while also encouraging the individual to accurately report

indicator data. For example, while weight loss may not qualify as a controllable indicator of health behavior, it can help determine whether a person is behaving as healthfully as he or she reports. Future research should address the individual and situational determinants of impression management in reporting indicator data and explore the use of supplemental objective outcome measures to increase accurate reporting.

### *Impact of the Facilitator*

The current study employed a single facilitator for all participants. This presents several issues. First, the facilitator was also the author, who clearly had a vested interest in the outcome of the study. However, possible demand characteristics would not be eliminated by instead utilizing a number of other trained facilitators. It is reasonable to assume that most facilitators are likely to expect the program to be successful. Use of a single facilitator also raises the question of whether the effects of the intervention were attributed to something specific about that facilitator. These issues should be addressed in future research.

It is also important to consider the possible indirect impact of the facilitator on individuals' choices of objectives and indicators. As discussed above, individuals may respond differently based on the perceived participant-facilitator similarity. Additionally, however, the facilitator should be cognizant of possible biases related to influencing objective and indicator choice. For example, it seems a harmless facilitation tactic to give examples of objectives and indicators from previous systems. Indeed, such illustration may help the individual understand how to create valid indicators. However, the facilitator biases the process if examples of indicators are received as suggestions. Future research should explore the impact of different facilitators and their characteristics on individuals' choices of objectives and indicators.

### *Impact of Attention*

It is important to recognize the potential impact of attention on the effects of the intervention. That is, behavior change may have occurred as a result of simply receiving encouragement from the facilitator, rather than as a result of the system development and feedback processes. Future research should explore this possibility by randomly assigning participants to comparison groups. For example, comparing TA to other self-improvement approaches and including a control group (i.e., one hour of encouragement a week) would help determine the extent to which effects can be attributed to TA.

A post hoc analysis was conducted to determine the relationship between overall effectiveness gain and total time spent on system development. Analyses revealed no significant relationships ( $r = .12, n.s.$ ). The length of feedback meetings was nearly identical for all participants, thus there is no indication that effects were solely attributable to time spent with the facilitator.

### *Generalizability*

Because individuals in the current sample (i.e., voluntary participants in a self-improvement program) are expected to be highly interested in self-improvement, concerns with generalizability arise. For example, the program may be inherently more attractive for individuals with high conscientiousness, high core self-evaluations, or learning goal orientation. If individuals were not prepared and motivated to make behavioral changes, they presumably would not have chosen to participate in the program. Individuals are expected to exhibit greater variability in clinical or organizational settings, where therapists or employers have initiated their

participation in the program, and future studies should explore the effectiveness of the program under these alternative conditions.

### *Future Directions*

#### *Work Spillover*

While results suggest some practical value to organizations regarding employee behavior change, future research should continue to explore the specific organizational outcomes associated with positive behavior change, and the mechanisms through which positive spillover occurs. Specifically, potential moderators may impact whether positive outcomes spill over into the workplace. For example, motivation, work constraints, and social support may influence the degree to which positive outcomes such as reduced stress impact work attitudes.

All outcomes in the current study were self-reported. Future studies should extend outcome variables to include others' perceptions of the individual (i.e., supervisor or peer ratings), as noticeable changes in attitudes toward others may be expected as a result of outcomes such as reduced stress. Additionally, future research should explore the impact of TA on job performance by utilizing objective measures of task and contextual performance. For example, outcomes such as reduced stress may increase organizational citizenship behaviors and reduce absenteeism, and each of these work outcomes can be measured objectively.

Finally, future studies should examine long-term work outcomes. It is possible that spillover effects may grow over time. That is, work attitudes may not change immediately following reduced stress or increased efficacy beliefs. However, the impact of behavior change on well-being and work attitudes may intensify and become apparent over time. In other words,

positive attitudes generalize into the workplace only after long-term behavior change has been achieved.

### *Group-Based Facilitations*

One trend that emerged from the qualitative analysis was individuals' interest in group-based facilitations. Social psychology theories suggest that group facilitations may be beneficial to intervention effectiveness. Because group members are part of a unique, shared experience, each person develops both individual accountability and a sense of accountability toward the group. Groups provide social support, which has been consistently linked to effective behavior change (e.g., Durantini et al., 2006). Participative group discussion allows for greater creativity and innovation due to increased information-sharing and diversity of perspectives (West & Anderson, 1996), which is likely to aid in the development of task strategies during feedback meetings. Furthermore, theories of self-presentation and impression management suggest that an individual will be motivated in part because of inherent desires to portray himself/herself in a positive light (Baumeister, 1982). Similarly, theories of cognitive dissonance suggest that when a person publicly takes ownership of an idea, he or she is more likely to display behavior consistent with that idea in order to avoid conflict (Festinger, 1957).

Despite these possible benefits, however, group-based facilitations present several challenges. First, it is expected that system development in a group setting would be significantly more time-consuming, and would therefore become a greater commitment for individuals. Additionally, the issues of social desirability discussed above may become more likely under the pressure of the group setting, limiting its effectiveness for individuals who do not accurately report indicator data. The group setting may also be less effective if individuals are working on

multiple dissimilar issues. Thus it may be beneficial to organize TA groups by objective type so that discussions are focused on similar issues. Finally, it is unclear whether individuals would experience greater benefits from facilitations with in-tact groups (i.e., work teams, groups of friends) or randomly formed groups.

Future research should evaluate the practical value of group TA facilitations, including the factors that impact its effectiveness. For example, as noted above, the benefits of group-based system development, such as group discussion and strategy development, would be maximized when all group members are focused on similar objectives. Post hoc analyses indicated several broad and recurring categories of objectives which could be used to guide offerings of group TA sessions. These categories included health, family and social relationships, work, hobbies and leisure, and spirituality.

### *The Impact of Moods*

Future research should also explore the impact of within-person variation in moods on attitudes and decision-making regarding TA behaviors. Affective Events Theory (AET; Weiss & Cropanzano, 1996) proposes relationships between daily events, moods, and behavior, and these relationships have often been tested using experience sampling methods (ESM; Miner, Glomb, & Hulin, 2005). ESM is a well-established method of capturing within-person fluctuation in moods, typically via palmtop computers or similar devices. Utilization of such techniques could help shed light on the extent to which these momentary fluctuations influence decisions regarding behavior change. This is important, as behavior change is more than tallies at the end of the day or week. Rather, successful change requires continued attention and commitment. Understanding how moods and daily events influence individual's decisions to behave in ways that are

consistent with their TA objectives or to utilize effective task strategies will greatly advance our understanding of how and why TA is effective.

### *Post-Feedback Follow-Up Strategies*

As discussed above, the current study offered bi-weekly conference calls to individuals who had completed TA feedback. However, few participants utilized this service. Over the course of data collection, six individuals participated in at least one conference call, and only two of these individuals participated in more than one call. In qualitative interviews, participants revealed that they felt confident that they had the skills to continue working on their own and did not find a conference call particularly useful. Future research may benefit from an analysis of the individual difference characteristics that predict whether individuals will or will not participate, and also explore whether an online community may be preferable.

### *Conclusions*

TA appears to be an effective intervention for lifestyle behavior change. Its effects on individual behavior and attitudes are significant, and its impact seems to extend into subjective well-being above and beyond actual behavior change. Further, evidence of spillover suggests that TA can be used as a mechanism through which job-related outcomes can be improved, without directly targeting job outcomes. Industrial-Organizational psychologists should recognize the importance of improving individual health and well-being outside the workplace, as these changes may positively impact work outcomes.

## **APPENDIX A: IRB APPROVAL LETTER**





University of Central Florida Institutional Review Board  
 Office of Research & Commercialization  
 12201 Research Parkway, Suite 501  
 Orlando, Florida 32826-3246  
 Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

## Approval of Human Research

**From:** UCF Institutional Review Board #1  
 FWA00000351, IRB00001138

**To:** Natalie Wright

**Date:** May 26, 2011

Dear Researcher:

On 5/26/2011, the IRB approved the following human participant research until 5/25/2012 inclusive:

Type of Review: UCF Initial Review Submission Form  
 Project Title: I-Count-Ability: Effectiveness of a Measurement and Feedback Approach to Lifestyle Change  
 Investigator: Natalie Wright  
 IRB Number: SBE-11-07688  
 Funding Agency:  
 Grant Title:  
 Research ID: N/A

The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form cannot be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 5/25/2012, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in IRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Kendra Dimond Campbell, MA, JD, UCF IRB Interim Chair, this letter is signed by:

Signature applied by Joanne Muratori on 05/26/2011 03:31:35 PM EDT

IRB Coordinator

## **APPENDIX B: INFORMED CONSENT**

## Truly Accomplished: Effectiveness of a Measurement & Feedback Approach to Lifestyle Change



### Informed Consent

Principal Investigator: Natalie Wright Dixon  
Faculty Supervisor: Robert D. Pritchard, PhD

**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. You have been asked to take part in this research study because you have expressed interest in our health and lifestyle improvement program. You must be 18 years of age or older to be included in the research study.

The person doing this research is Natalie Wright Dixon of the University of Central Florida's Department of Psychology. Because the researcher is a Doctoral student, she is being guided by Dr. Robert Pritchard, a UCF faculty supervisor in the Department of Psychology.

#### 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 a lifestyle improvement intervention.

**What you will be asked to do in the study:** You will first complete a series of questionnaires. You will then work with a facilitator who will guide you through a process of identifying values and objectives for change. Based on your personal objectives, you will learn to develop specific ways in which to measure your objectives. You will attend feedback meetings with the facilitator in order to maximize your personal improvements. At the end of the study, you will complete another series of questionnaires. You do not have to answer every question or complete every task.

**Time required:** The total time requirement for this study is approximately 5 hours. There will be one initial system development session, lasting approximately 3 hours. There will be four follow-up feedback sessions lasting approximately 30 minutes each.

**Audio or video taping:** You will not be audio or video taped in this study.

**Risks:** There are no reasonably foreseeable risks or discomforts involved in taking part in this study. There is only a slight risk of breach of confidentiality. You do not have to answer every question or complete every task. You will not lose any benefits if you skip questions or tasks. Your identity will be kept strictly confidential. Any documents revealing your identity will be stored in a locked cabinet to which only the researcher will have access.

**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:** There is no compensation or other payment to you for taking part in this study. If you are a student at UCF, it is possible that extra credit may be offered for your participation, but this benefit is at the discretion of your instructor. 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. If you complete only a portion of the study, you will receive partial credit, the amount of which will correspond with the number of hours you participated.

**Confidentiality:** Your identity will be kept confidential. 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. For example, your name will be kept separate from the information you give, and these two things will be stored in different places. Your information will be assigned a code number. The list connecting your name to this number will be kept in a locked file cabinet or in a password protected computer. When the study is done and the data have been analyzed, the list will be destroyed. 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. There are times when the researcher may have to show your information to other people. For example, the law may require the researcher to show your information to a court or to tell authorities if the researcher believes you have abused a child or are in danger to yourself or to someone else. Also, the researcher may have to show your identity to people who check to be sure the research was done right. These may be people from the University of Central Florida or state, federal or local agencies or others who pay to have the research done.

**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: Natalie Dixon, Doctoral Student, Department of Psychology, UCF College of Sciences, (386) 336-1452, ([nataliewdixon@gmail.com](mailto:nataliewdixon@gmail.com)) or Dr. Robert Pritchard, Faculty Supervisor, Department of Psychology at (407) 823-2233 ([rdpritchard@gmail.com](mailto:rdpritchard@gmail.com)).

**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, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826, (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 C: CONSCIENTIOUSNESS**

Please use the following list of common traits to describe yourself as accurately as possible. Describe yourself as you see yourself IN GENERAL at the present time.

	Very Inaccurate	Moderately Inaccurate	Neither Accurate nor Inaccurate	Moderately Accurate	Very Accurate
1. Absent-Minded	1	2	3	4	5
2. Cautious	1	2	3	4	5
3. Disorganized	1	2	3	4	5
4. Efficient	1	2	3	4	5
5. Indecisive	1	2	3	4	5
6. Meticulous	1	2	3	4	5
7. Organized	1	2	3	4	5
8. Perfectionistic	1	2	3	4	5

## **APPENDIX D: CORE SELF-EVALUATIONS**

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

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I have little control over the things that happen to me (RC)	1	2	3	4	5
2. There is little I can do to change many of the important things in my life (RC)	1	2	3	4	5
3. I feel that I am a person of worth, on an equal basis with others	1	2	3	4	5
4. I feel that I have a number of good qualities	1	2	3	4	5
5. All in all, I am inclined to feel that I am a failure (RC)	1	2	3	4	5
6. I feel I do not have much to be proud of (RC)	1	2	3	4	5
7. I wish I could have more respect for myself (RC)	1	2	3	4	5
8. I've been depressed (RC)	1	2	3	4	5
9. I've felt hopeful about the future	1	2	3	4	5
10. What happens to me in the future mostly depends on me	1	2	3	4	5
11. What happens to me is of my own doing	1	2	3	4	5
12. When I make plans, I am almost certain to make them work.	1	2	3	4	5



## **APPENDIX E: PSYCHOLOGICAL SAFETY**

Please indicate how strongly you agree or disagree with each statement regarding the TA environment.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. If I make a mistake, it will be held against me. (RC)	1	2	3	4	5
2. I feel comfortable bringing up problems and tough issues.	1	2	3	4	5
3. I fear I will be rejected for being different. (RC)	1	2	3	4	5
4. It is safe to take risks in this environment.	1	2	3	4	5
5. It is difficult for me to ask for help. (RC)	1	2	3	4	5
6. I do not feel as if my efforts will be undermined by others.	1	2	3	4	5
7. The facilitator appreciates my unique experiences.	1	2	3	4	5

## **APPENDIX F: LEARNING GOAL ORIENTATION**

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

	Very Inaccurate	Moderately Inaccurate	Neither Accurate nor Inaccurate	Moderately Accurate	Very Accurate
1. The opportunity to do challenging work is important to me.	1	2	3	4	5
2. When I fail to complete a difficult task, I plan to try harder the next time I work on it.	1	2	3	4	5
3. I prefer to work on tasks that force me to learn new things.	1	2	3	4	5
4. The opportunity to learn new things is important to me.	1	2	3	4	5
5. I do my best when I'm working on a fairly difficult task	1	2	3	4	5
6. I try hard to improve on my past performance.	1	2	3	4	5
7. The opportunity to extend the range of my abilities is important to me.	1	2	3	4	5
8. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.	1	2	3	4	5

## **APPENDIX G: PERFORMANCE GOAL ORIENTATION**

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

	Very Inaccurate	Moderately Inaccurate	Neither Accurate nor Inaccurate	Moderately Accurate	Very Accurate
1. I prefer to do things that I can do well rather than things that I do poorly	1	2	3	4	5
2. I'm happiest at work when I perform tasks on which I know that I won't make any errors.	1	2	3	4	5
3. The things I enjoy the most are the things I do the best.	1	2	3	4	5
4. The opinions others have about how well I can do certain things are important to me.	1	2	3	4	5
5. I feel smart when I do something without making any mistakes.	1	2	3	4	5
6. I like to be fairly confident that I can successfully perform a task before I attempt it.	1	2	3	4	5
7. I like to work on tasks that I have done well on in the past.	1	2	3	4	5
8. I feel smart when I can do something better than most other people.	1	2	3	4	5

## **APPENDIX H: LIFE SATISFACTION**

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

---

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. In most ways my life is close to my ideal.	1	2	3	4	5
2. The conditions of my life are excellent.	1	2	3	4	5
3. I am satisfied with my life.	1	2	3	4	5
4. So far, I have gotten the important things I want in life.	1	2	3	4	5
5. If I could live my life over, I would change almost nothing.	1	2	3	4	5



## **APPENDIX I: PERCEIVED STRESS**

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

	Never	Rarely	Sometimes	Frequently	Very Often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	1	2	3	4	5
2. In the last month, how often have you felt that you were unable to control the important things in your life?	1	2	3	4	5
3. In the last month, how often have you felt nervous and “stressed”?	1	2	3	4	5
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	1	2	3	4	5
5. In the last month, how often have you felt that things were going your way?	1	2	3	4	5
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	1	2	3	4	5
7. In the last month, how often have you been able to control irritations in your life?	1	2	3	4	5
8. In the last month, how often have you felt that you were on top of things?	1	2	3	4	5
9. In the last month, how often have you been angered because of things that were outside of your control?	1	2	3	4	5
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

## **APPENDIX J: FUTURE CHANGE EFFICACY**

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

- |   |                   |          |                            |       |                |
|---|-------------------|----------|----------------------------|-------|----------------|
| 1. I am confident that I can make other changes in my life in the future. | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|-------------------|----------|----------------------------|-------|----------------|

## **APPENDIX K: JOB SATISFACTION**

Please answer the following questions about your job satisfaction.

- |   |                   |              |                      |           |                  |
|---|-------------------|--------------|----------------------|-----------|------------------|
| 1. All things considered, are you satisfied with your job?          | Yes               | No           |                      |           |                  |
| 2. How satisfied are you with your job in general?                  | Very Dissatisfied | Dissatisfied | Moderately Satisfied | Satisfied | Highly Satisfied |
| 3. Overall, how would you describe your satisfaction with your job? | Very Low          | Low          | Moderate             | High      | Very High        |

**APPENDIX L: SATISFACTION WITH TRULY ACCOMPLISHED**

Please indicate how strongly you agree or disagree with each of the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Overall, I am satisfied with the Truly Accomplished process.	1	2	3	4	5
2. The Truly Accomplished process is not really worth the time. (RC)	1	2	3	4	5
3. The Truly Accomplished process was helpful to me.	1	2	3	4	5



## **APPENDIX M: QUALITATIVE MEASURES**

1. How valuable did you find each of the following Truly Accomplished steps?
  - a. Clarifying values (i.e., “How do you want to feel?” exercise)
  - b. Stating objectives
  - c. Creating indicators
  - d. Developing contingencies
  - e. Collecting indicator data
  - f. Reviewing feedback reports at feedback meetings
2. Do you feel that Truly Accomplished was a good value for the time and effort you spent?
3. Would you repeat Truly Accomplished in the future with new objectives or indicators?
4. Would you recommend Truly Accomplished to a friend?
5. How likely do you think it is that you will work on your objectives long-term (i.e., after you are no longer meeting with a facilitator)?
6. What did you like best about the experience?
7. What improvements in the process could be made?

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