Running title: ATTRIBUTIONS AND EFFICACY EXPECTATIONS

Please reference this paper as:

Rees, T. (2007). Main and interactive effects of attribution dimensions upon efficacy expectations in sport. *Journal of Sports Sciences, 25,* 473-480. doi:10.1080/02640410600703063

Main and interactive effects of attribution dimensions upon efficacy expectations in sport

Key words: attributions, controllability, stability, efficacy expectations

Submitted: 4th November, 2005

Re-submitted: 17th January, 2005

Abstract

In this study the main and interactive effects of attribution dimensions upon efficacy expectations in sport were examined. A sample of 162 participants (102 males; 60 females) from various sports, aged 20.93 years (s=3.39), and ranging in standard from club to international level, completed the Causal Dimension Scale II (McAuley *et al*., 1992) in relation to their most recent performance. They then completed a 7-item measure of efficacy expectations in relation to their up-coming performance. The key predictors of efficacy expectations were stability and personal control, but their function differed after more or less successful performances. After more successful performances, attributions to stability and personal control were associated with main effects upon efficacy expectations, in a positive direction; after less successful performances, attributions to stability and personal control were associated with an interactive effect upon efficacy expectations. The form of this effect was such that participants were more likely to have high efficacy expectations only when they viewed the cause of their performances as both personally controllable *and* stable.

Introduction

A central premise within attribution research is that there is a dimensional structure underlying the explanations people give for events and, by categorising explanations into dimensions, one can better understand those explanations. According to Weiner (1985), explanations may be assigned to a combination of three principal attribution dimensions: locus of causality, stability and controllability. The locus of causality dimension refers to whether a cause is located inside or outside the person (internal or external attributions); the stability dimension refers to whether the cause will remain stable or might change over time (stable or unstable attributions); the controllability dimension refers to whether the cause is viewed as controllable or uncontrollable. Weiner outlined that following success or failure all three attribution dimensions affect a variety of common emotional experiences, but that stability alone is the key to influencing expectancy of success. Stable attributions lead to increased perceptions of certainty regarding future outcomes; unstable attributions lead to increased perceptions of uncertainty.

In sport, only a few researchers have examined Weiner's prediction for the influence of stability on expectancy of success. Biddle *et al*. (2001) and Hardy *et al*. (1996) suggested that controllability might be more important than stability. For example, in a paper by Grove and Pargman (1986), three experiments were conducted to test whether stability was the key dimension predicting future expectations. In these experiments, participants were instructed that success would be due to either effort (assumed to be an unstable attribution) or ability (assumed to be a stable attribution). Following success, expectancy of future success should be high, if attributions are made

to stable causes (ability). Following failure, expectancy of future success should be low if the same stable attribution to ability is made. It would be functional, and lead to higher expectancy of success being maintained following failure, if attributions were made to things that could change (unstable attributions to effort). What Grove and Pargman found was that effort led to the highest expectancy in both failure and success conditions. They speculated that this result could be explained by focusing attention upon the controllability dimension rather than the stability dimension - personal control is more possible over effort than over ability. They wrote, "If one assumes that individuals will expect to do better under conditions where perceived control is high rather than low . . . then the pattern of results obtained in these studies is understandable" (p. 93).

Rees *et al*. (2005) have since proposed that research in sport should focus upon main effects of controllability, together with interactive effects of controllability and stability upon efficacy expectations. This is underpinned by at least three key points that are briefly outlined here. First, researchers in sport have suggested that controllability is a key dimension upon which attention should be focussed (e.g., Biddle *et al*., 2001; Hardy *et al*., 1996), and controllability is considered the most important attribution dimension in the general social psychology research of Anderson and colleagues (e.g., Anderson and Riger, 1991). Attributing an event to a controllable cause leads to expectations of control over events in the future. In sport, controllability may also be of greater psychological significance than locus of causality. The positive associations often observed between controllability and locus of causality (e.g., Ingledew *et al*., 1996; McAuley *et al*., 1992; Crocker *et al*., 2002) suggest that people may feel there is

much overlap between where a cause lies and by whom it is controlled. According to relapse prevention (Marlatt and Gordon, 1985), following a lapse in some positive behaviour, stable and uncontrollable attributions, whether they are internal or external, will lead to lowered self-efficacy or expectations of success and a greater probability of total relapse. Compared with locus of causality, controllability may therefore be a more important dimension to focus upon.

Second, whilst controllability relates to whether the cause is controllable or uncontrollable, the nature of stability is somewhat different, in that it deals with the *generalisability* of the cause to a future event. For example, a performer who has lost a tennis match might say, "There was nothing I could do about it" (an uncontrollable attribution), together with "and I never will be able to do any better" (a stable attribution). Another might say, "I lost because my strategy was poor today" (a controllable attribution), "but things will be different next time" (an unstable attribution). This latter reaction would reflect a *personal changeability* tendency (see, e.g., Schoenemann and Curry, 1990). As Schoenemann and Curry highlighted, most people take responsibility for both success *and* failure, but in a way that makes failure reversible and under personal control.

Third, the focus of much attribution research has been upon individual, additive, or composite effects of attribution dimensions upon outcomes. Carver (1989) outlined, however, that the most appropriate strategy for examining the style of thinking outlined above would be to test for interactive effects of attribution dimensions. This would allow an examination of whether, for example, the impact of whether a cause for failure

was seen as controllable or uncontrollable might differ depending on whether it was also seen as stable or unstable (cf. Ingledew *et al*., 1996).

The primary aim in the present study was to examine the main effect of controllability, together with the interactive effect of controllability and stability upon efficacy expectations. Also, the main effects of two other attribution dimensions (including locus of causality), together with interactive effects (always involving the stability dimension) upon efficacy expectations, were examined. No specific rationale is forwarded for effects of these other dimensions, but their inclusion may provide additional evidence with which to examine the proposals that controllability and stability are the key attribution dimensions predicting efficacy expectations.

The assessment in the present study of efficacy expectations rather than success expectations is a slight modification to Weiner's (1985) theory. Success (or outcome) expectations are taken to be beliefs that certain behaviours will bring about a desired result. Efficacy expectations are beliefs about one's ability to perform those behaviours successfully. Kirsch (e.g., 1985) has nonetheless argued that success expectations and self-efficacy are operationally equivalent, and attribution concepts do figure in self-efficacy theory (e.g., Bandura, 1997). Previous performances affect self-efficacy and this relationship is moderated by attributions. In other words, people's perceptions of the causes of past performances influence their subsequent judgements about their capabilities. Furthermore, a major way to change self-efficacy is by intervening in the process of making attributions (Fősterling, 1988; Gist and Mitchell, 1992). Biddle (1993) concluded that research addressing the attributions and self-efficacy link was a priority for sport psychology. As self-efficacy is considered to be such a key

determinant of high-level sports performance (Feltz and Lirgg, 2001), as well as a key variable for enhancing *all* aspects of human performance (Druckman, 2004), the assessment in this study of efficacy expectations seems entirely reasonable. In this research it was predicted that attributions to controllable causes would be associated with higher efficacy expectations (Bandura and Wood, 1989). This effect might, however, be moderated by stability attributions.

Method

Participants

Participants included 162 (60 female, 102 male) athletes, mean age 20.93 years (*s*=3.39), competing in association football (*n*=20), field hockey (*n*=14), lacrosse (*n*=17), rugby union (*n*=53), swimming (*n*=36), and tennis (*n*=22). The standard of performance of the participants ranged from club (*n*=18) through county (*n*=42), regional (*n*=25), national (*n*=61), and international (*n*=16) level.

Procedure

The study was approved by a university ethics committee blind review and participants provided informed consent. Recruitment of participants was opportunistic (convenience sample), with data collected on one day at the site of a competition or match. One hour prior to that day's performance (e.g., a rugby match or a tennis match), participants were asked to recall their most recent performance. With this performance in mind, they were then asked the question, "To what extent was this performance successful for you?" with responses on a 5-point scale ranging from 1 (not at all) to 5 (completely). An open-ended statement then required participants to write down the single most important reason for how they performed. In relation to this reason,

participants completed a measure of attributions, followed by a measure of efficacy expectations in relation to the up-coming match or competition.

Measures

Attributions. The Causal Dimension Scale II (CDSII: McAuley *et al*., 1992) was used to assess participants' attributions for their most recent performance. The CDSII assesses four attribution dimensions: personal control, external control, locus of causality and stability. In scale revision, McAuley *et al*. divided the controllability subscale into personal and external control. Controllability, as outlined in the introduction to this paper, is reflected in the personal control subscale. There are 12 semantic differential scales (3 per dimension), with ratings from 1 to 9. Subscale scores can therefore range from 3 to 27, with higher values representing attributions that are more internal, stable, personally controllable and externally controllable. McAuley *et al*. reported Cronbach's alpha internal reliability coefficients for the four dimensions as follows: locus of causality 0.60 to 0.71, stability 0.66 to 0.68, personal control 0.72 to 0.90, and external control 0.71 to 0.92. In the present study, values ranged from 0.66 to 0.82 in the more successful condition, and from 0.72 to 0.87 in the less successful condition (see Table 1).

Efficacy expectations. In relation to the up-coming match or competition, participants filled out a 7-item measure of efficacy expectations, written for this study. As Bandura (1997) noted, for self-efficacy research a "one-measure-fits-all" approach to assessment has only limited explanatory and predictive value; Scales should be tailored to the particular domains of functioning that are the object of interest. In constructing the measure of efficacy expectations, reference was made to Bandura (1997) and

Bandura's (2005) Guide for Constructing Self-Efficacy Scales. The measure was first constructed and scrutinised for content and face validity by the study author and two other sport psychology researchers (from within the School of Sport and Health Sciences at the University of Exeter, and from the School of Sport, Health, and Exercise Sciences at the University of Wales, Bangor). To this end, these three researchers drew upon their combined consultancy experience of more than 40 years working with sportspeople such as those in the present study. Items were preceded by the statement, "With reference to today's performance, to what extent do you feel confident that you can . . . ," with response options ranging from 1 (not at all) to 5 (completely). This satisfies the criterion that self-efficacy items should reflect "can do" statements, rather than "will do" statements (which would reflect intention). The items were: stay calm despite the pressure; stay focused on the most important parts of your performance; mobilise all your resources for this performance; perform well, even if things get tough; raise the level of your performance if you have to; stay motivated throughout your performance; and perform to your capability. Cronbach's alpha internal reliability coefficients for this measure were 0.80 in the more successful condition, and 0.85 in the less successful condition (see Table 1).

Analyses

Correlations and hierarchical regression analyses were used to examine the relationships of attribution dimensions with efficacy expectations. In the hierarchical regression analyses, the independent variables were entered in a three-step process. First, either personal control, locus of causality, or external control was entered. Second, stability was entered. Third, the product of the two preceding variables was entered (this

is the interaction term). The significance of increments in explained variance in efficacy expectations over and above the variance accounted for by those variables already entered into the equation, as well as the sign of the regression coefficients, was then assessed at each step. Jaccard *et al*. (1990) emphasised that the independent variables should be centred prior to the formation of product terms. In this study's analyses all the independent variables were standardised (with a mean of 0 and standard deviation of 1), thereby centring them, before any product terms were computed, and the unstandardised solution was then examined. An alpha level of 0.05 was used for all statistical tests.

Results

The mean score for participants in relation to the question "To what extent was this performance successful for you?" was 3.23 (s=0.99). Based upon this result and the frequency data for this item, participant responses of 4 and 5 (n=72) were considered high (hereafter termed more successful performances), and participant responses of 1, 2, and 3 (n=90) were considered low (hereafter termed less successful performances). A MANOVA indicated a significant difference in the scores of participants on the CDSII attribution dimensions between more and less successful conditions (Wilks' Lambda=0.90, $F_{4, 157,} = 4.45$, $P<0.01$). Follow-up discriminant function analysis suggested that the salient variables (standardised structure coefficients greater than 0.30 in absolute value, which Pedhazur, 1982, regards as meaningful) were locus of causality (standardised structure coefficient 0.79), stability (0.80), and personal control (0.67), and not external control (0.01). Compared with less successful performances, more successful performances were seen as more internal, stable and personally controllable. (The descriptive statistics are in Table 1.) All analyses were conducted separately for

more and less successful conditions. Internal consistency coefficients, means and standard deviations for all scales in this study are in Table 1. Internal consistency was satisfactory (i.e., >0.70) for all scales apart from stability attributions in the more successful condition (0.66).

After more successful performances, there were significant positive correlations between stability and efficacy expectations, and between personal control and efficacy expectations (Table 1). In the hierarchical regression analyses (Table 2), there was a significant main effect for personal control upon efficacy expectations (R^2 = 0.10, b = 0.16, P = 0.01). Over and above the variance accounted for by personal control, stability added a further and significant amount of variance (R^2 = .07, b = .14, P = .02). There were no significant main effects for locus of causality or external control, and no significant interactions. These relationships suggest that participants had higher efficacy expectations when they viewed the cause of their performances as under personal control on the one hand, and as stable on the other.

After less successful performances, there were no significant correlations between attribution dimensions and efficacy expectations (Table 1). In the hierarchical regression analyses (Table 2), there were no main effects for personal control, locus of causality or external control upon efficacy expectations. There was one significant main effect for stability (over and above the variance accounted for by locus of causality) upon efficacy expectations (R^2 = .05, b = .15, P = .04). There were two significant interactions (Figure 1). These were for the interaction of personal control and stability attributions upon efficacy expectations (R^2 = .12, b = .22, P = .00), and for the interaction of locus of causality and stability attributions upon efficacy expectations (R^2

= .08, *b* = .15, *P* = .01). Given that the zero-order correlation of stability with efficacy expectations was non-significant, and the main effect of stability was a significant *change* in variance over and above the variance accounted for by locus of causality, the primary influence of stability in the less successful condition appears to be in its interaction with personal control and locus of causality.

Discussion

It would appear that the key variables in relation to efficacy expectations are stability and personal control, but their function differs after more or less successful performances. After more successful performances, attributions to stability and personal control are associated with main effects upon efficacy expectations: higher levels of personal control and higher levels of stability are associated with higher efficacy expectations. After less successful performances, attributions to stability and personal control are associated with interactive effects upon efficacy expectations: participants are more likely to have high efficacy expectations, only when they view the cause of their performance as both personally controllable *and* stable. In part then, this set of results offers evidence that the proposals from Weiner (1985) with regard to stability and from sport psychology with regard to controllability are equally tenable. It also offers evidence that a more developed picture may be gleaned by focussing upon main effects of controllability, together with interactive effects of controllability and stability upon efficacy expectations (Rees *et al*., 2005).

This brings us to the interpretation of the significant interaction of personal control and stability. Why, after less successful performances, should efficacy expectations be higher when personal control is combined with stability rather then

instability? It would appear that personal control is largely unimportant when people do not expect the same cause of the performance to be present in the future (unstable attributions). On the other hand, when people do expect the same cause to be present in the future (stable attributions), then a sense of personal control has a large effect, allowing people to maintain higher efficacy expectations.

Of the other attribution dimensions, there were no significant main effects for locus of causality or external control upon efficacy expectations, but there was a significant interaction of locus of causality and stability upon efficacy expectations. It would appear that, when attributions to less successful performances are external there is no difference in efficacy expectations when attributions are stable or unstable; when attributions are internal, efficacy expectations are higher when attributions are stable. As proposed by Crocker *et al*. (2002) the correlations between locus of causality and personal control were high (*r*s .65, .77). The great majority of attributes that athletes classify as internal in locus may also be perceived to be under personal control. Personal control and locus of causality may not therefore provide unique information about causal attributions and the locus of causality dimension may be of less psychological significance for sport psychology than controllability (Rees *et al*., 2005).

A strength of this study is that a clear pattern of results was generated for more and less successful conditions in a naturalistic setting. The effect sizes for the interactions (12% and 8%) were particularly notable. McClelland and Judd (1993) highlighted a number of statistical factors that contribute to the difficulty in finding significant interactions in field studies, compared with experimental studies, and Evans (1985) noted that significant moderator effects are so difficult to detect, that effects as

low as 1% should be viewed as important. Finally, even if a Bonferroni corrected alpha of 0.008 had been applied to the six models, both interactions would have remained significant. Of the five main effects, two would have been non-significant (the effect of stability after inclusion of personal control in the more successful condition, and stability in the less successful condition).

Some potential limitations should, however, be noted. Similar to previous research using the CDSII (e.g., Ingledew *et al*., 1996; McAuley *et al*., 1992), the internal consistency for the stability dimension was low (.66) in the more successful condition. One should therefore be cautious in drawing conclusions with regard to the stability dimension in this condition. It should be noted that the categorisation into more and less successful conditions does not reflect objective winning and losing (or success and failure). Similar procedures have been used before in sport psychology research (e.g., Graham *et al*., 2002; McAuley, 1985). McAuley (1985) found that perceived success was a better predictor of attributions than actual performance scores and Biddle (1993) urged research that focussed upon attributions for perceived success, rather than just objective outcomes. Nevertheless, based upon participants' subjective appraisal of their previous performances, this categorisation procedure might have simply reflected the different participants. One might wish all participants to be referring to the same event and to have contributed to both more and less successful data. This would be a daunting task in field research, however, and attribution experiments are criticised because they "cannot reveal the kinds of attributions that people usually, normally, routinely, generally, or typically make" (Gilbert and Malone, 1995, p. 28). There may therefore be no perfect solution to this problem.

As already noted, the categorisation into more and less successful conditions did create a clear pattern of results in regression analyses, and compared with less successful performances, more successful performances were seen as more internal, stable and personally controllable. If the focus were upon the locus of causality dimension, this could be seen as evidence in support of the self-serving bias (see, e.g., Bradley, 1978), wherein sportspeople attribute success internally, but attribute failures externally. The means for locus of causality and personal control were, however, above the mid-point in both more and less successful conditions, reflecting attributions that in general were internal and personally controllable. The mean for stability (4.61) was close to the mid-point in the more successful condition. In the less successful condition, the mean for stability was below the mid-point (3.72), reflecting unstable attributions. To some degree, then, these results reflect personal changeability (Schoenemann and Curry, 1990). Participants took responsibility for both more and less successful performances by making internal and personally controllable attributions, but less successful performances were viewed as changeable (unstable).

It is also important to note that no causal link can be inferred from this study. The focus has been on the effects of attributions upon efficacy expectations. However, because all data were collected simultaneously, it is possible that level of efficacy expectations influenced attributions (cf. McAuley, 1991). Another concern is potential confounders. For example, a study such as this one, where all the measures were self-report, may well have been prone to negative affectivity bias (Watson and Pennebaker, 1989). Reflecting a general dimension of subjective distress, this pervasive mood disposition can act as a general nuisance factor, leading to inflated relationships between

self-report measures. It could be that efficacy expectations that were predicted by the attributions were also influenced by negative affectivity.

Despite the generally accepted relevance of attributions in applied settings, there has been a decline in frequency of published studies in sport psychology featuring attributions as the primary topic of interest. The proposals outlined in this study are an attempt to introduce novel perspectives on the attribution process and need further testing and replication. Because researchers in sport (e.g., Biddle *et al*., 2001; Crocker *et al*., 2002) have called into question the factor structure and psychometric properties of the CDSII, there is scope for future instrument development and consideration of additional attribution dimensions, such as globality and universality. It would also be important to develop the ideas in the present study to incorporate aspects of intuitive and reflective appraisal (Vallerand, 1987) in relation to efficacy expectations, and to use prospective studies to assess how attributions might change over time (Biddle *et al*., 2001).

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Table 1

Means, s, and Intercorrelations of Attribution Dimensions and Efficacy Expectations

	α	mean±s	1	2	3	4
More Successful						
1. Locus of Causality	.77	6.64±1.54				
2. Stability	.66	4.61±1.57	.37**			
3. Personal Control	.80	6.77±1.52	.65**	.31**		
4. External Control	.82	4.36±1.78	-.54**	-.14	-.40**	
5. Efficacy Expectations	.80	3.81±0.52	.06	.35**	.32**	-.02
Less Successful						
1. Locus of Causality	.78	5.70±1.93				
2. Stability	.72	3.72±1.70	.27**			
3. Personal Control	.87	5.91±2.17	.77**	.24*		
4. External Control	.87	4.35±2.12	-.25*	.28**	-.08	
5. Efficacy Expectations	.85	3.60±0.62	.01	.21	.03	.17

Note. * denotes correlation significant at .05 level (2-tailed)

** denotes correlation significant at .01 level (2-tailed)

Table 2

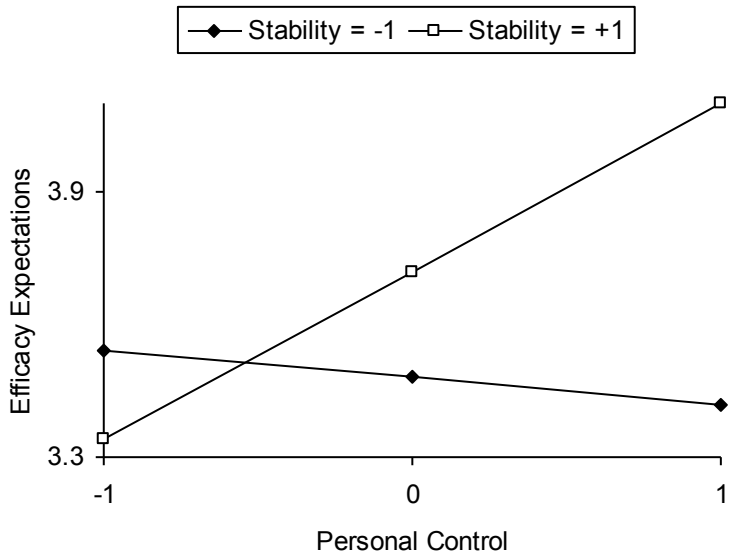
Hierarchical Regression Analyses: Main and Interactive Effects.

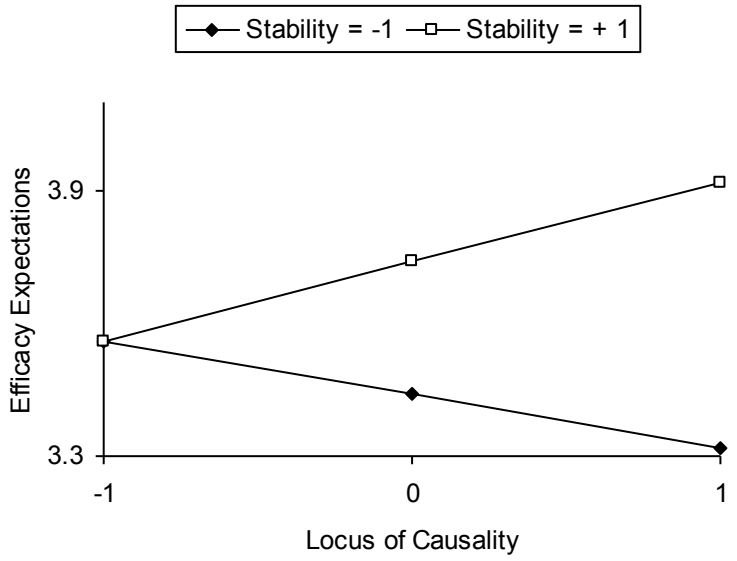
Dependent Variable	Step	Independent Variable	ΣR^{2a}	ΔR^{2b}	$P(F)^c$	b^d	$P(t)^e$
More Successful							
Efficacy Expectations	1	Personal Control	.10	.10	.01	.16	.04
	2	Stability	.17	.07	.02	.14	.04
	3	Product	.17	.00	.44	.06	.44
Efficacy Expectations	1	Locus of Causality	.00	.00	.64	-.05	.51
	2	Stability	.12	.12	.00	.15	.04
	3	Product	.15	.03	.10	.12	.10
Efficacy Expectations	1	External Control	.00	.00	.89	.04	.56
	2	Stability	.12	.12	.00	.21	.00
	3	Product	.16	.04	.09	-.12	.09
Less Successful							
Efficacy Expectations	1	Personal Control	.00	.00	.78	.16	.03
	2	Stability	.04	.04	.05	.12	.05
	3	Product	.16	.12	.00	.22	.00
Efficacy Expectations	1	Locus of Causality	.00	.00	.93	.03	.67
	2	Stability	.05	.05	.04	.15	.02
	3	Product	.13	.08	.01	.15	.01
Efficacy Expectations	1	External Control	.03	.03	.11	.10	.15
	2	Stability	.06	.03	.11	.10	.13
	3	Product	.07	.01	.33	.06	.33

n=162. All variables standardised except for product. Product formed from the two preceding (standardised) variables. [a]Cumulative R^2. [b]Stepwise change in R^2. [c]Probability of F for ΔR^2. [d]Unstandardised regression coefficient in final equation. [e]Probability of t for b.

Figure Caption

Figure 1. The interactive effect of personal control and stability upon efficacy expectations in the failure condition. The interactive effect of locus of causality and stability upon efficacy expectations in the failure condition.


Stability = -1
Stability = +1
Efficacy Expectations
3.9
3.3
-1
0
1
Personal Control


Stability = -1
Stability = + 1
Efficacy Expectations
3.9
3.3
-1
0
1
Locus of Causality