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A CAUSAL MODEL OF THE EFFECTS OF FEEDBACK ON SELF-EVALUATIONS, SELF-EFFICACY, GOALS AND EFFORT.

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Abstract

A causal model was developed to overcome weaknesses in Campion and Lords Control Systems model (1982) which proposed that people who experience a discrepancy between their previous goals and performance can achieve congruence in the future either by increasing their effort or by reducing their goals, but failed to specify when each of these responses would occur. A new model which integrates Bandura and Cervone's (1983) concept of self-evaluative satisfaction or dissatisfaction arising from performance feedback and two dimensions of their concept of self-efficacy (confidence in task-specific skills and goal expectancies) was developed to resolve weaknesses in Campion and Lord's discrepancy reduction explanation by predicting when people who experience discrepancy increase effort rather than reduce goals, and when those who achieve congruence increase effort rather than maintain goals and effort.

The plausibility of the new model was tested in a longitudinal field study in which 503 students who enroled in a first year psychology course answered six questionnaires and completed five multi-choice tests as part of their normal course assessment. Path analyses offered some support for the new model but revealed a weak link between effort and performance and raised questions about the effect of self-evaluations on skills self-efficacy, goals and expectancies. Further analyses also cast doubt on the tenability of the discrepancy explanation for feedback functioning by showing that performance had more effect on subsequent responses than the discrepancy between previous goals and performance. In addition, other results showed that some responses depend on perceptions of the accuracy of the feedback.

Two revisions of the new model were devised, both of which included previous performance instead of discrepancy as the only exogenous variable and focused on predicting effort rather than subsequent performance. The plausibility of the revised models were compared, and the results of people who rated their feedback as accurate were compared with those who questioned the accuracy of their feedback to explore the effects of the perceived accuracy of performance feedback on responses. Results favoured the revision which predicted that people who are dissatisfied with their performance feedback are more likely to increase goals and effort if they experience their feedback as motivating, and more likely to have low skills self-efficacy if they

experience their feedback as debilitating. Together, the results suggested that perceptions of the motivating effects of feedback were more useful than Bandura and Cervone's concept of self-efficacy in resolving weaknesses in Campion and Lord's model.

Results for people who rated their feedback as inaccurate also favoured the revision which emphasised the motivating and debilitating effects of feedback. However, the weaker support for both models among people who rated their feedback accuracy as low confirmed that perceptions of feedback accuracy influence responses. The results indicated that performance feedback generally had less effect on skills self-efficacy, goals and expectancies of goal attainment among people who doubted the accuracy of their feedback. However, poor performers were more likely to increase effort if they rated their feedback as inaccurate and those who were dissatisfied continued to experience their feedback as motivating. In contrast, dissatisfying feedback became progressively less motivating and more debilitating among people who rated their feedback as accurate. This pattern of results suggests that rejecting the accuracy of feedback may help ameliorate the potentially debilitating effects of negative feedback and serve a positive function for poor performers by helping them maintain motivation and effort, and discouraging them from withdrawing from the situation.

However, the flaws and limitations to the key concepts from the original models, apparent changes in both accuracy groups' responses to feedback over time, inconsistent results and weaknesses in the present research design and measures suggest that considerably more research is needed to identify all factors which influence responses to feedback. Issues which need to be clarified in order to develop a comprehensive framework to explain and predict the effects of feedback on motivation and performance are discussed.

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Chapter 1
Introduction

The proliferation in the literature dealing with either goal–setting or task performance feedback seen in recent decades reflects increasing interest in factors which influence motivation and performance in a variety of settings. Until the 1980's most attempts focused on explaining the effects of either goals or feedback on subsequent responses. However, increasing recognition that neither goals nor feedback are particularly effective in the absence of the other (Erez, 1977) has resulted in a number of attempts to integrate the goal–setting and feedback explanations. The control systems (Campion & Lord, 1982) and social cognitive (Bandura & Cervone, 1983) approaches represent two of the earliest attempts to integrate the literatures, but each has a number of limitations which restrict their explanatory and predictive power. Integrating the key concepts from these approaches could result in a more comprehensive framework to explain the effects of performance feedback and task goals on subsequent effort and performance. Consequently, the purpose of this research was to develop a causal model which attempts to overcome the weaknesses of the earlier approaches.

Feedback and Goal–Setting Literatures

Feedback

The term 'feedback' originated from the work of the cybernetic theorist Weiner (1948) although Annett (1969) points out that the same concept had been investigated previously as knowledge of results (KR). The cybernetic definition uses a machine analogy to describe feedback as "... information about the actual performance or actions of a system used to control future actions of a system" (Nalder, 1979, p310). This approach points out that feedback serves two functions: (a) as an outcome of earlier performance, feedback provides error–detection information obtained by measuring and comparing actual performance against some predetermined standard and (b) as a stimulus for later performance, feedback serves an error–correction function.

Although the cybernetic model is useful for describing the actions of purpose–built machines, humans are not automatically self–correcting, and some differences

would be expected in the definitions of feedback applied to human situations. However, applications to human behaviour derived from the cognitive and behavioural frameworks reflect a similar perspective. For example, Prue and Fairbank (1981, p1), who adopt a behavioural approach, describe feedback as "... information ... about the quality or quantity of performance" while Ilgen, Fisher and Taylor (1979, p351), representing a cognitive perspective, define feedback as "Information about the appropriateness of past performance". Both definitions focus on the error-detection function of feedback and imply that error-correction is an outcome or function of providing information about past performance. The major difference between human and cybernetic definitions is that human feedback can include positive information (for example, comments about good points) while machine feedback allows for error information only.

The explanations the cognitive and behavioural frameworks offer for the way feedback influences performance are also similar to each other, although they vary in their terminology and underlying assumptions. The cognitive approach proposes that information about past performance leads to improvement by directing (giving information about which behaviours should be accomplished) and motivating (increasing the importance of good behaviour by showing how it is related to rewards) (Ilgen et al, 1979) while behaviourists assume that error-detection information functions as a discriminative stimulus (giving cues to identify correct behaviours and information about consequences) and, or, as a conditioned reinforcer (Balcazar, Suarez & Hopkins, 1985/6; Duncan & Bruwelheide, 1985/6). Since the 'directing and motivating' function is very similar to a discriminative stimulus, the debate over feedback functioning centres on whether it serves as a source of information or as a reinforcer. However, this debate is likely to be fruitless because information and reinforcers occur simultaneously and are confounded (Schwartz & Lacey, 1982). Most researchers now prefer the informational explanation while accepting that feedback can become a conditioned reinforcer (Annett, 1969; Balcazar et al, 1985/6; Duncan & Bruweilheide, 1985/6; Ilgen et al 1979; Locke, 1980).

Beliefs about the utility of feedback have given rise to considerable research. Reviews of the research investigating the impact of feedback on academic learning (Barringer & Gholson, 1979; Crooks, 1988; Getsie, Langer & Glass, 1985; Kulik &

Kulik, 1988; Sassenrath, 1975), performance of perceptual and motor skill tasks (Annett, 1969; Salmoni, Schmidt, & Walter, 1984), group task behaviour in laboratory settings (Nalder, 1979), group processes in therapeutic sessions (Kivlighan, 1985) and on the incidence of desired behaviours (Balcazar et al, 1985/6) suggest that it can improve learning and motivation. Research in organisational settings also offers general support for the belief that feedback provides a relatively simple, cost–effective means of improving organisational effectiveness. Koppleman's (1982) review of 27 empirical studies concluded that objective feedback offered an effective, long–term method of enhancing worker productivity, McAfee and Winn (1989) found that feedback and incentives increased worker safety behaviours and reduced accidents in all 24 studies they reviewed, and Guzzo, Jette and Katzell (1985) concluded from their meta–analysis that appraisal and feedback programs were reasonably effective in improving worker output when compared with other types of organisational interventions.

However, questions about the universal effectiveness of feedback interventions have been raised by those who point out that feedback sometimes has no impact, or may even have debilitating effects which have negative outcomes for subsequent performance (e.g. Arvey & Ivancevich, 1980; Baron, 1988; Ilgen et al, 1979; Kluger & Denisi, 1993; Latham & Locke, 1991; Luckett & Eggleton, 1991). Such inconsistencies are not surprising in view of the complex, multi–dimensional nature of human feedback (Duncan & Bruwelheide, 1885/6; Ford, 1980; Ilgen et al, 1979; Prue and Fairbank, 1981) and the lack of a unifying theoretical framework (Ilgen et al, 1979; Kluger & DeNisi, 1993).

Recognition of the contradictory findings is reflected in the research into the feedback–giving process which has investigated how source, recipient and message characteristics interact to affect the tendency for feedback to be given (Ilgen & Knowlton, 1980; Larson, 1984, 1986), perceived accurately, accepted and acted upon (Furnham & Schofield, 1987; Ilgen et al, 1979; Johnson, Cain, Falke, Hayman & Perillo, 1985; Snyder, Schenkel & Lowery, 1977). Overall, the findings suggest that timely, positive, specific feedback which is obtained from a credible, expert, trustworthy source who has control over outcomes which are important to the recipient is more likely to be accepted and acted upon than feedback which is negative or

vague, or offered by a source who lacks credibility or power (Ilgen et al, 1979). The personal characteristics of the recipient and situational factors also interact with each other and the feedback message and source to reduce or enhance the link between feedback and performance.

Another factor which contributes to the inconsistencies in the feedback literature arises from the tendency for a variety of different messages and techniques to be administered as 'feedback' (Duncan & Bruweilheide, 1985/6), often in conjunction with each other (Balcazar et al, 1985/6). The possible confounding of feedback with other effects was investigated by Balcazar and colleagues (1985/6) who reanalysed data from 126 studies. These researchers found that feedback information which was administered on its own was less effective than when it was accompanied by behavioural consequences such as monetary incentives or praise, or when the feedback was administered in conjunction with goal setting. The superiority of combining goals with feedback is consistent with the goal–setting approach.

Goal–Setting

Recent developments in the goal–setting approach to explaining motivation and performance draw on the early work of Locke (1968). Goal–setting theory is inherently cognitive in orientation because it assumes that conscious behaviour is purposeful and goal–directed, and that goals motivate actions (Latham & Locke, 1991). Goals, which represent what an individual is trying to do, are similar to task intentions, purpose (Locke, 1968) and performance standards.

Goals are proposed to have two major characteristics (Locke et al, 1981). *Goal content* refers to the outcomes sought and includes specificity, or the clarity with which the goal level is defined, and difficulty, or the standard of proficiency required by the task. The second characteristic, *goal intensity*, refers to the processes by which individuals set goals and decide how to achieve them. The most common aspect of goal intensity is goal commitment, which reflects a determination to try for a goal (Locke et al, 1981), a reluctance to change the goal and willingness to expend effort in pursuing it (Latham & Locke, 1991).

The four mechanisms proposed by Locke and colleagues (1981) to explain how goals motivate performance are similar to the 'direct and motivate' explanations of

feedback functioning (Klein, 1989). Goals are assumed to direct attention and action, regulate effort, enhance persistence and encourage the development of new task strategies. Specific goals are assumed to be more effective in directing attention and action than vague, or no goals because the information they provide allows goal attainment to be assessed more precisely. Difficult goals which indicate that high levels of effort are required are more likely to increase effort expenditure than easy goals, which can be attained with less effort. Difficult, specific goals are expected to enhance persistence by encouraging people to work longer, harder or faster to attain their goals, and encourage the development and use of new task strategies if more familiar methods fail to result in goal attainment.

Research into goal–setting has focused heavily on the effect of specific, difficult goals on performance with attention also being paid to identifying boundary conditions. Locke and colleagues' (1981) narrative review found that 90% of the research published between 1969 and 1980 supported or partially supported the effectiveness of specific, hard goals in improving performance. Meta–analyses by Tubbs (1986) and Mento, Steel and Karren (1987) also supported assumptions that goal difficulty and specificity have beneficial effects on performance, and Guzzo and colleagues' (1985) meta–analysis demonstrated that goal–setting programs were the second most effective (after training) of the eleven organisational interventions they compared.

The beneficial effects of goals have been demonstrated across educational levels (Mento et al, 1987), in experimental and survey research designs and for both assigned and participatively set goals (Mento et al, 1987; Tubbs, 1986). However, participative goals are more effective than assigned goals, laboratory settings produce stronger effects than field settings (Mento et al, 1987 Tubbs, 1986), and goals have been shown to have more effect on simple, than on complex tasks (Wood, Mento & Locke, 1987). The superiority of participative goals is likely to reflect greater goal acceptance, commitment and opportunity for strategy development (Latham & Locke, 1991) while ineffective task strategies may account for the weaker effects which goals have on complex tasks (Wood et al, 1987). The tendency for laboratory settings to produce stronger effects than field settings suggests that the practical relevance of goal setting needs to be demonstrated using tasks and situations which have real–life

relevance and important outcomes for participants.

After initially arguing that any effects of feedback (Locke, 1967) or incentives (Locke, 1968) on performance could be attributed to their influence on goal level, Locke and colleagues (1981) subsequently acknowledged that both goals and feedback were necessary to improve task performance. Some evidence for the importance of giving feedback with goals was found by Tubbs (1986) and by Mento and colleagues (1987) whose results suggested that a 17.5% increase in productivity could be gained by giving feedback on specific hard goals. However, support for the proposition that the effectiveness of goal setting depends on the provision of feedback was inconclusive because of the small number of well-designed studies which were identified and included in the meta-analyses (Mento et al, 1987; Tubbs, 1986).

In spite of the tendency for some factors to enhance the impact of goals on performance, the utility of setting difficult, specific goals is now well accepted (Wood et al, 1987; Tubbs, 1989; Latham & Locke, 1991). Attention now focuses on integrating other relevant factors to explain why and how goals influence performance. Particular interest has been shown in the role of task performance feedback in enhancing the effectiveness of goal-setting.

Integrations of the Goal-Setting and Feedback Literatures

Similarities in the explanations for the way in which feedback and goals affect motivation and performance (Klein, 1989), together with the assumption that neither is particularly effective in the absence of the other, led to the development of a number of theoretical frameworks which integrated these concepts during the 1980s. Two of the earliest, proposed by Campion and Lord (1982) and Bandura and Cervone (1983), sought to extend the motivational explanation of the link between goals and feedback by predicting the circumstances necessary for increased effort to occur. Although there are a number of differences between these two models, both view feedback as a mechanism which regulates future performance by providing information about goal achievement and propose that the desire to achieve congruence between goal and performance levels is the key to task motivation.

Campion and Lord's Control System Model

The control system approach proposed by Campion and Lord (1982) and subsequently elaborated on by Taylor, Fisher and Ilgen (1984), Lord and Hanges (1987) and Klein (1989) draws on cybernetic theory and uses a machine analogy to describe the way in which goals and feedback together regulate performance outcomes. A machine system includes four components: a sensor, referent, a comparator and an effector (Klein, 1989). Input into a system is conveyed by a *sensor* signal which continuously monitors the environment. A *comparator* mechanism assesses the degree of fit between the information conveyed by the sensor and a *referent*, or standard, which represents the desired state. If the comparator establishes a reasonable match between the sensor and referent, no corrective action is required, and the sensor continues to monitor the environment. However, if the comparator detects a difference between the actual and desired states, an *effector* mechanism is activated to remedy the situation and continues to operate until the comparator identifies a match between the sensor and referent information (Klein, 1989).

In human control systems the sensor signal is provided by task performance feedback, the referent standard is represented by goal level and the effector mechanism by the actions the individual takes to remedy any perceived discrepancy (Campion & Lord, 1982). However, human control systems differ from machine models in at least two important respects. First, in machine systems (e.g. a thermostat) it is desirable for standards to be matched as closely as possible, while in human tasks exceeding a specific performance level is generally seen as desirable. Consequently, *discrepancy* usually refers to negative deviations and *congruence* usually includes performances which match or exceed standards (Taylor et al, 1984). Secondly, human goals are generally not predetermined, inflexible standards, as are the referent mechanisms in machines (Klein, 1989). This distinction is recognised in Campion and Lord's model by the inclusion of a 'decision mechanism' as an additional component which interprets comparator mechanism information.

Together, the five components of Campion and Lord's model predict that the information derived from comparing task performance feedback with previous goals influences subsequent goal, effort and performance levels. If recipients identify a good match between goals and performance this congruence feedback indicates that

performance is 'on target' and recipients maintain their current behaviours. Under these circumstances, no changes in effort or performance would be expected (Taylor et al, 1984; Lord & Hanges, 1987) unless goals increase (Campion & Lord, 1982). However, if the comparison process indicates that performance has fallen below goal level, the perceived discrepancy activates the decision mechanism which, in turn, stimulates some sort of action aimed at correcting the discrepancy. Campion and Lord viewed behavioural change in the form of increased effort and cognitive change in terms of reduced goals as the most likely responses of the decision mechanism, but Lord and Hanges (1987) have identified changes in task strategies and distortion of feedback as alternative responses to discrepancy feedback. Increasing effort and changing task strategies are aimed at achieving future congruence by bringing performance into line with goals while reducing goals achieves the same aim by bringing goals into line with performance. The possibility of feedback distortion is different in that it establishes the perception of congruence for present performance rather than attempts to achieve actual congruence for future performance.

Campion and Lord (1982) obtained some support for their model in a field study investigating the effect of multi-choice test grades on the subsequent goal level and effort made by university students enroled in an introductory course. They found that 'successful' students (those who matched or exceeded their test goals) were more likely to raise than lower their goals while unsuccessful students were more likely to lower than raise their subsequent test goals. Although some successful students reduced their short-term goals and many unsuccessful students increased their goals, people who experienced frequent, consecutive failures tended to reduce both long- and short-term goals, and the extent and frequency of failure was associated with some increase in effort.

Although the control-system framework has failed to generate a great deal of empirical research (Klein, 1991), some laboratory studies lend support to aspects of Campion and Lord's model. In a series of early studies, Locke, Cartledge and Knerr (1970) found that perceived discrepancy between goals and performance was related to intentions to improve performance (described as goals) and with actual increases in subsequent performance. Matsui, Okado and Inoshita (1983) supported the discrepancy-effort link in two laboratory studies which showed that subjects who were

making poor progress toward their end goals increased their effort while those who believed they were making good progress maintained their previous effort levels. Matsui, Kakuyama and Onglatco (1987) extended this finding to group tasks and performance outcomes in a laboratory study which found that groups which were performing below target level improved their performance more than those who were on target. Podsakoff and Farh's (1989) findings also supported the assumption that discrepancy feedback enhances performance by showing that people who believed that their performance was below average showed greater improvement in performance than those who believed their performance was above average. Finally, support for the goal–reduction alternative was obtained by Kernan and Lord (1988) who showed that higher levels of discrepancy were associated with greater decreases in goals and by Vance and Colella (1990) who found that increasingly negative performance–goal discrepancies resulted in subjects rejecting assigned goals and setting low personal goals.

While these studies offer some support for Campion and Lord's model, there are a number of weaknesses in the model itself. The assumption that goal achievement will occasion inaction has been challenged by Wood and Bandura (1989a) who point out that this type of reaction does not characterise human motivation. These authors suggest that once a goal has been achieved, people may create the potential for future discrepancies by increasing their goals and then mobilising the effort needed to achieve them. A 'discrepancy production' effect of this nature is recognised by Campion and Lord's (1982) prediction that people who achieve their previous goals will not increase effort unless they raise their goals. Given that people who exceed their goals can restore congruence in future by raising their goals to match their performance level, this possibility is consistent with the tenets of control system theory, as long as a distinction is maintained between matching and exceeding goals. Notably, Campion and Lord's field study offered more support for the hypothesis that people raise goals after experiencing congruence than Matsui and colleagues' (1983; 1987) laboratory studies.

An additional limitation to Campion and Lord's model lies in its failure to predict the circumstances under which people who experience a performance–goal discrepancy choose to increase effort rather than reduce goals. Similarly, if increasing

goals offers a way for people who exceeded their previous goals to restore performance–goal congruence, the factors which differentiate people who maintain their goals from those who raise them need to be identified. A variety of factors which could contribute to such choices have been proposed (see for example, Taylor, Fisher et al, 1984; Klein 1989), many of which draw on the social cognitive approach to goal–setting.

Bandura and Cervone's Social Cognitive Approach

The social cognitive approach to goal–setting draws on Bandura's earlier social learning theory (1977) which emphasises the role of modelling, attention, retention, rehearsal and reinforcement to promote learning, and the motivating role of anticipated, rather than actual, response outcomes. The social cognitive goal–setting approach is similar to Campion and Lord's in that it makes the same assumptions about the motivating potential of perceived goal–performance discrepancy, but introduces the concepts of self–evaluation and self–efficacy as two self–regulatory processes which influence effort.

Self–evaluation refers to the degree of self–satisfaction or self–dissatisfaction arising from success or failure in attaining valued goals (Bandura, 1991; Bandura & Cervone, 1983). People are assumed to create incentives for themselves to perform well by making self–satisfaction contingent on goal attainment in such a way that both the anticipation of self–satisfaction arising from achieving future goals and self–dissatisfaction with a previous performance–goal discrepancy encourage motivation (Bandura & Cervone, 1983). Such self–administered 'rewards' and 'punishers' are assumed to influence the amount of effort people make.

Self–efficacy is viewed as a key mechanism in human action which affects cognitions, behaviours and emotional arousal, thereby influencing choice of tasks and activities, the amount of effort expended and persistence after failure (Bandura, 1982). This concept has been defined as "belief in one's capabilities to execute the competencies needed to exercise control over events that affect ones' welfare" (Bandura, 1986, p1) or, more recently, as a "resilient self belief in one's capabilities to exercise control over events to accomplish desired goals" (Wood & Bandura, 1989a, p364). Both definitions emphasise a sense of control and, together, suggest that self–

efficacy is a relatively stable belief that one possesses and can organise a broad range of skills, knowledge and personal attributes, and mobilise the effort required to achieve desired goals and outcomes in particular situations.

Self–efficacy perceptions are influenced by an individual's prior history of success and failure on the task, the opportunity to observe similar others' success, verbal persuasion and physiological states, such as anxiety (Bandura, 1982; Wood & Bandura, 1989a). Although success tends to increase self–efficacy and failure creates self doubts, a strong resilient sense of self–efficacy is most likely to develop when people learn to overcome obstacles through persistence. However, repeated successes are needed to learn to cope with the adverse aspects of failure (Wood & Bandura, 1989a) because early failures which are not due to a lack of effort undermine self–efficacy (Bandura, 1982).

Bandura (1986) summarised earlier research into self–efficacy by stating that people with low self–efficacy

> "... shy away from difficult tasks, ... [have] low aspirations and weak commitment to the goals they pursue, ... dwell on their personal deficiencies ... [and] diagnose insufficient performance as deficient aptitude" (p8). In contrast, people with high self–efficacy "... approach difficult tasks as challenges to be mastered rather than threats to be avoided, ... set themselves challenging goals and maintain commitment to them, ... heighten their efforts in face of set back and failure ... and attribute failure to insufficient effort" (Bandura, 1986, p8).

This description emphasises the importance of the attributions people make about the causes of their performance success or failure (Weiner, Frieze, Kukla, Reed, Rest & Rosenbaum, 1972) and suggests that self–efficacy is similar to Rotter's (1966) concept of an internal locus of control.

In an early formulation of the model, Bandura and Cervone (1983) focused on explaining levels of effort among people who experienced moderate levels of discrepancy which allowed goals to be perceived as difficult, but attainable. Under such circumstances, self–dissatisfaction and self–efficacy were expected to jointly regulate the amount of effort made in such a way that the highest effort would be made by people with high self–efficacy who were dissatisfied with their performance and the lowest levels would be made by people who had low self–efficacy and were satisfied. People who had high self–efficacy and were satisfied, and those with low

self–efficacy who were dissatisfied were assumed to make similar moderate levels of effort. However, dissatisfaction and self–efficacy were viewed as unlikely to affect effort among people who experienced extreme discrepancy, or among those who matched or exceeded their goals. Extreme discrepancy was expected to result in discouragement and giving up, while the self–satisfaction arising from attaining goals was likely to serve as an incentive for further effort. This discussion suggests that dissatisfaction is positively related to effort change under conditions of moderate discrepancy but negatively related to effort change under conditions of extreme discrepancy and congruence.

The possibility that discrepancy and dissatisfaction have an interactive effect on effort change was a focus of a later formulation of the model which viewed goal level as a third self–regulatory process which people use to regulate motivation (Bandura & Cervone, 1986). In addition, this version focused on dissatisfaction if previous performance levels were to be repeated (future dissatisfaction) rather than dissatisfaction with past performance (past dissatisfaction). Here, Bandura and Cervone (1986) proposed that self–efficacy contributes to increases in effort directly, but that the effect of dissatisfaction and goals depends on the level of discrepancy experienced previously. People who would be satisfied by repeating their previous performance levels were expected to maintain their effort, while those who would be dissatisfied were expected to increase effort, but only if they had experienced moderate or marked discrepancy.

Bandura and Cervone (1986) also proposed that goal change (measured as the difference between self–set goals and previously assigned goals) contributes to effort change for everyone except those who had previously experienced marked discrepancy as the latter would maintain their personal goals at the assigned goal level. Although they did not specify the nature of the links between all variables, Bandura and Cervone (1986) indicated that self–efficacy is positively related to goals, that discrepancy is linked to dissatisfaction, and that successive, extreme failures undermine self–efficacy and goals.

Bandura and Cervone's empirical tests. Bandura and Cervone tested their models in two laboratory studies in which samples of university students participated in a task requiring strenuous physical activity. Support for the earlier version (Bandura

& Cervone, 1983) was obtained from results showing that changes in effortful performance were positively linked to levels of self–efficacy (confidence in achieving the assigned goal of a 40% increase in effort), dissatisfaction with previous performance, dissatisfaction if the previous performance levels were to be repeated and a composite 'self–efficacy plus future dissatisfaction' variable. Further analyses showed that the high efficacy–dissatisfied group increased effort the most, the low efficacy–satisfied showed the least increase in effort, and the other groups (which were combined for analysis on the basis of their similarity) showed intermediate levels of effort increase.

The later formulation of the model was tested in the second study (Bandura & Cervone,1986) in which the results for the marked discrepancy, moderate discrepancy, minimal discrepancy and congruence groups were analyzed separately. Results showing that dissatisfaction, self–efficacy and goal–change jointly predicted effort–change among the moderate discrepancy group supported the general predictions. The moderating effects of discrepancy were also supported by the non–significant contribution of goal change to effort change among the marked discrepancy group, and of dissatisfaction among the minimal discrepancy and congruence groups. However, the preliminary analyses showed that mean dissatisfaction scores decreased and those for goal change and self–efficacy increased as levels of discrepancy decreased. These results suggest that the discrepancy interaction may reflect attenuated variability arising from subdividing the sample into discrepancy groups.

Research on self–efficacy or goals and effort. While no other research examining the combined effects of goals, self–efficacy and dissatisfaction on effort was located, a number of studies have investigated links between effort and either self–efficacy or goals, or the combined effects of self–efficacy and goals on performance. Experimental research indicates that high self–efficacy is associated with greater persistence on problem–solving tasks, even after subjects' self–efficacy levels have been manipulated by changing their perceptions of task difficulty and expectations of success (Brown & Inouye, 1978; Cervone, 1989; Cervone & Peake, 1986). The generality of the impact of self–efficacy on effort and performance is also supported by field research in educational (see, for example, Schunk, 1982; Dweck & Leggett, 1988; Forsyth, 1988) and other settings (see Bandura, 1982; 1986).

The empirical literature also offers some support for the positive effect of goals on effort. Difficult goals have been associated with greater persistence on a prose reading task (LaPorte & Nath, 1978), work-pace on a clerical task (Bassett, 1979) time spent studying learning materials (Terborg, 1976), and self-ratings of effort and persistence in a business simulation experiment and in a field study of service organisation workers (Earley, Wojnaroski & Prest, 1987). An experiment by Terborg and Miller (1978) using a complex construction task showed that quality goals were linked with the tendency to check the quality of work and correct errors, although neither quality nor quantity goals were associated with self-ratings or supervisor ratings of effort.

Research on self-efficacy, goals and performance. Most of the recent research investigating the outcomes of self-efficacy and goals has examined their combined effects on performance rather than effort. These studies suggest that goals and self-efficacy together (Taylor, Locke, Lee & Gist, 1984), or in conjunction with past performance (Garland, 1985) and task strategies (Locke et al, 1984; Wood & Bandura, 1989a, 1989b; Bandura & Wood, 1989) contribute to the prediction of performance. However, Podsakoff and Farh's (1989) results supported the effects of self-efficacy and past performance, but not goals, and Earley, Connelly and Ekegren (1989) found that difficult, specific goals resulted in trial and error learning which had a detrimental effect on performance. The inconsistencies in these findings are partly explained by the results of the three two-trial studies reported by Wood and Bandura (1989a, 1989b; Bandura & Wood, 1989) which suggest that the use of appropriate task strategies often partially or completely accounts for the effects of goals and self-efficacy on performance of complex tasks. This possibility is consistent with the results of Wood and colleagues' (1987) meta-analysis which suggested that difficult or specific goals have most effect on performance of simple tasks on which the amount of energy expended is likely to influence outcomes, and least effect on complex tasks on which ability and the appropriateness of the strategies used to perform the task are more important. Such moderating effects help explain why Terborg (1976), who used a relatively straightforward task, found that effort completely accounted for the link between goals and performance, while Earley and colleagues (1987) found that effort, task-planning and goals all contributed to

performance on the complex tasks used in their studies.

Research on dissatisfaction. In contrast with the attention which has been paid to the effects of self-efficacy and goals on effort or performance, relatively little research has focused on dissatisfaction, and that which has has produced mixed results. Podsakoff and Farh (1989) found that dissatisfaction was positively correlated with subsequent performance, although this link was not significant when self-efficacy, ability and feedback sign were controlled. However, Brief and Hollenbeck's (1985) field study found that self-criticism was associated with poor end-of-year performance among sales people. Although the correlational nature of the latter study prevents any causal inferences, this finding casts some doubt on Bandura and Cervone's (1983; 1986) prediction that high levels of dissatisfaction lead to an increase in effort. Two studies published after the present research commenced (Stock & Cervone, 1990; Bandura & Jourden, 1991) support Brief and Hollenbeck's results.

Research on inter-relationships between variables. Although Bandura and Cervone (1983; 1986) focused on identifying factors which predict effort and did not specify the exact nature of the links between all variables, several studies help shed light on possible linkages. Studies focusing on goals have produced mixed results. Single-trial studies have found that self-efficacy (Taylor, Locke et al, 1984; Wood & Locke, 1987) and past performance (Locke et al, 1984; Podsakoff & Farh, 1989) have a positive effect on goal level, but dissatisfaction makes no contribution when ability, past performance and self-efficacy are controlled (Podsakoff & Farh, 1989). The results of the Wood and Bandura multi-trial studies (1989a; 1989b; Bandura & Wood, 1989) offer mixed support for the effects of past performance and self-efficacy on goals by suggesting that effects of past performance weaken and those of self-efficacy strengthen over trials. However, Garland (1985) found that the subjective probability of goal attainment (similar to Bandura's measure of self-efficacy) was negatively correlated with assigned goals. These results suggest that further clarification of the link between self-efficacy and goals is needed.

There is somewhat more consensus over the variables which influence self-efficacy and dissatisfaction. Various measures of perceived self-efficacy have been positively linked with previous performance (Locke et al, 1984; Podsakoff & Farh, 1989; Wood & Bandura, 1989a; 1989b; Bandura & Wood, 1989) and the strategies

used to perform the task (Locke et al, 1984; Wood & Bandura, 1989), but not with feedback sign (Podsakoff & Farh, 1989). Similarly, strong links between negative feedback and dissatisfaction were found in the five studies reported by Locke and colleagues (1970) and in that by Podsakoff and Farh (1989). The latter findings are consistent with the steady decrease in mean dissatisfaction scores which Bandura and Cervone (1986) found across their four discrepancy level groups. The apparent links between discrepancy and dissatisfaction suggest that the support Bandura and Cervone (1986) found for the interactive effect of these variables on effort may arise from their between-groups research design.

Summary of support. Overall, Bandura and Cervone's (1983; 1986) results offer some support for their model by suggesting that effort change is influenced by goals, self-efficacy and self-evaluations, although the possibility that the effect of dissatisfaction and goals on effort depends on discrepancy level needs further consideration. Other studies investigating aspects of the social cognitive approach support the predicted links between effort and both goals and self-efficacy, but suggest that the complexity of the task and appropriateness of the strategies used help determine whether effort is reflected in performance. The studies reviewed here also indicate that people tend to be dissatisfied with high levels of discrepancy, and that previous performance influences goals (particularly on unfamiliar tasks) self-efficacy and subsequent performance. However, possible effects of dissatisfaction on effort, the nature of the link between goals and self-efficacy, and the causal direction of links between variables need further clarification. In addition, the impact of discrepancy, rather than previous performance level, on other variables needs to be examined because only one of the studies (Locke et al, 1970) examined here included performance-goal discrepancy level as a predictor. These issues suggest that further research, guided by a clear specification of how the relevant variables influence each other, is needed to establish the usefulness of various aspects of the social cognitive integration of the feedback and goal-setting literatures.

Theoretical Development of the Goal-Setting and Feedback Approach

The control systems approach proposed by Campion and Lord (1982) and the social cognitive model proposed by Bandura and Cervone (1983) identify some of the

key concepts and mechanisms to help explain how feedback and goals interact to influence performance and motivation. The control systems model which points out that people who experience a performance–goal discrepancy can either increase effort or reduce goals to achieve future congruence offers a basic framework, but is limited by its failure to predict when discrepancy results in changes in effort rather than goals, and when goal attainment results in an increase in goals. Integrating the concepts of self–evaluations and self–efficacy from the social cognitive approach may overcome these limitations.

Although Bandura and Cervone's 1986 model partially integrated the key aspects from their earlier version and the control systems approach, it focused on identifying variables which predict effort and failed to specify, explain and test all the necessary linkages between the predictor variables. Further theoretical development aimed at identifying the constructs which need to be included and explaining how and why each variable is expected to be related to every other is needed to develop a more comprehensive framework to guide research. Issues of particular concern include (a) the possibility that 'mediator' effects offer a better explanation for the links between performance–goal discrepancies, self–evaluations, goals and effort than the 'moderator' explanation proposed by Bandura and Cervone (1986); (b) the omission of effort as a predictor of performance in recent models (Locke et al, 1984; Podsakoff & Farh, 1989; Taylor, Locke et al, 1984; Wood & Bandura, 1989a; 1989b; Bandura & Wood, 1989b); (c) the lack of clarity in the nature of the link between self–evaluations and goals; and (d) problems surrounding the concept and measurement of self–efficacy which raise questions about its causal links with other variables. Such issues need to be clarified to allow a more complete integration of the control systems and social cognitive approaches.

Moderator versus Mediator Effects

A weakness in Bandura and Cervone's (1986) study arises from the possibility that a mediator effect offers a better explanation for the nature of the links between performance–goal discrepancies, self–evaluations, goals and effort than their moderator explanation. A *moderator* effect indicates that discrepancy level identifies the conditions which are necessary for, and specifies when, dissatisfaction and goal

change influence effort change (Baron & Kenny, 1986; James & Brett, 1984). Bandura and Cervone (1986) supported their hypothesis by demonstrating that effort change was not linked with goal change in the marked discrepancy group, or with dissatisfaction in the groups with low levels of discrepancy. However, the mean scores showed that the marked discrepancy group was the least likely to increase their goals, and the two lowest discrepancy groups had the lowest levels of dissatisfaction. These results suggest that the apparent moderator effect may simply reflect attenuated variability in the dissatisfaction and goal change scores arising from their links with discrepancy, a problem which was compounded by the small number of subjects (22) in each group.

An alternative explanation suggests that dissatisfaction and goal change *mediate* the discrepancy–effort change link, by explaining why or how discrepancy influences effort change (Baron & Kenny, 1986; James & Brett, 1984). This explanation suggests that people who experience discrepancy increase their effort because they are dissatisfied with their performance, while those who experience congruence increase effort because they raise their goals. Thus, the causal effect of discrepancy on dissatisfaction and goal change, and of dissatisfaction and goal change on effort accounts for any effect of discrepancy on effort. Bandura and Cervone's results are consistent with these predictions but the moderator versus mediator effects could not be compared because the data from the four discrepancy groups were analyzed separately. Overall, the pattern of Bandura and Cervone's (1986) mean scores and other research showing significant links between discrepancy and dissatisfaction (Locke et al, 1970) or goals (Kernan & Lord, 1988; Vance & Colella, 1990) suggest that mediator effects offer a more plausible explanation for the links between discrepancy, dissatisfaction, goals and effort than Bandura and Cervone's (1986) moderator explanation.

Effort as a Predictor of Performance

Campion and Lord (1982) and Bandura and Cervone (1983; 1986) focused on effort as the key outcome variable because their models sought to identify factors which influence willingness to perform, independently of ability. Given that their research used relatively straightforward tasks on which effort tends to enhance

performance, this emphasis is consistent with Wood and colleagues' (1987) recommendations. In contrast, most of the more recent work has simply omitted effort from consideration (Taylor et al, 1984; Garland, 1985; Podsakoff & Farh, 1989), or has included task strategies instead (Wood & Bandura, 1989a; 1989b; Bandura & Wood, 1989). While the omission of effort is consistent with the complex tasks used in these studies, the exclusion of any potential mediator variables implies that goals and self-efficacy influence performance by serving as a 'self-fulfilling prophesy', creating a situation which becomes real, simply because it is believed. The Wood and Bandura studies (1989a; 1989b; Bandura & Wood, 1989) cast doubt on this explanation by showing that task strategies often partially or completely mediate the effects of goals and self-efficacy on performance. The direct effects which were found on some trials could arise from the exclusion of effort as a second mediator of the effects of goals and self-efficacy on performance as there is no logical reason why people should perform better than others who have the same ability and use the same strategies, simply because they have high goals and self-efficacy.

Support for including effort as a predictor of performance on complex tasks can be inferred from several studies. Although Earley and colleagues (1989) suggest that difficult goals can cause 'over-motivation' and result in trial-and-error strategy choices which have a detrimental effect on performance of complex tasks, other research shows that high goals can result in better planning (Earley et al, 1987) and the use of appropriate task strategies (Wood & Bandura, 1989a; 1989b; Bandura & Wood, 1989). These studies and others linking self-efficacy to effort (Bandura & Cervone, 1983; 1986), and effort to performance on complex tasks (Earley et al, 1987; Terborg & Miller, 1978) support the supposition that both effort and task strategies mediate the effects of goals and self-efficacy on performance. The inclusion of effort as an additional mediator is also logically sound because people who put more effort into pursuing appropriate task strategies should perform better than those who put less effort into the same strategies.

The preceding discussion suggests that a comprehensive goal-setting and feedback framework should either include both effort and task strategies as predictors of performance or focus on the amount of effort people put into using appropriate task strategies. Given that difficult goals can result in the use of ineffective strategies

(Earley et al, 1989) the latter option may be more useful in developing a generalisable framework which can be applied to both complex and simple tasks.

Self–Evaluations

The direction and sign of the link between self–evaluations and goals also need further clarification. Although Bandura and Cervone (1983; 1986) failed to specify the nature of this link, inferences drawn from their discussion of the effect of dissatisfaction on effort change are contradictory. In their earlier paper they claimed that satisfaction could serve as an inducement for further effort while in the later paper they predicted that people who were satisfied would maintain effort. To the extent that goals influence effort, the earlier study implies that people who are satisfied increase their goals while the later study implies that they do not. The assumptions of the later study were supported by a nonsignificant correlation between dissatisfaction and goal change in the congruence group, but these variables were positively correlated in the two discrepancy groups.

The apparent contradiction in the sign of the dissatisfaction–goal link between the two studies may reflect a tendency to focus on dissatisfaction with past performance (past dissatisfaction) in the earlier model and on dissatisfaction if previous performance were to be repeated in future (future dissatisfaction) in the second study. This would indicate that goals are negatively linked with past dissatisfaction and positively linked with future dissatisfaction, but raises questions about the causal direction between dissatisfaction and goals.

Bandura and Cervone (1986) favoured the future dissatisfaction variable because it taps the performance level people view as necessary for them to be satisfied in the future, and is consistent with the incentive function self–evaluations are supposed to serve. They also pointed out that people can be satisfied with their prior performance but still be dissatisfied if they were to repeat the same level, although Podsakoff and Farh's (1989) correlation of r.84 between past and future dissatisfaction suggests that this situation is relatively uncommon. Although Bandura and Cervone (1986) did not identify any variables which mediate the link between past and future dissatisfaction, goal change is a possibility because people who were satisfied with their previous performance level would be unlikely to be so in future if they raised

their goals. Thus, the positive link between dissatisfaction and goals proposed in the later study is plausible if future dissatisfaction is an outcome of goal change.

The negative link from past dissatisfaction to goals implied in the earlier study (Bandura & Cervone, 1983) is also plausible because people who fail to achieve their previous goals have little reason to increase them. To the extent that satisfaction represents a self–administered reward for goal attainment and increases perceptions of self–efficacy and achievement–oriented behaviours, greater levels of satisfaction should be related to the tendency to increase rather than simply maintain goals. Such possibilities are consistent with control systems theory, and with Wood and Bandura's (1989) claim that motivation is guided by discrepancy production, achieved by raising goals after success, as well as by discrepancy reduction.

The preceding analysis suggests that goal change mediates the relationship between past and future dissatisfaction so that past dissatisfaction is a cause, and future dissatisfaction is an outcome, of goal level. If so, any contribution future dissatisfaction makes to the prediction of other variables such as effort can be attributed to the combined effects of past dissatisfaction and goals. In contrast, the extent of satisfaction with past performance may help differentiate between people who increase rather than maintain goals and effort after achieving congruence, so helping overcome the limitation Wood and Bandura (1989a) identified with the control systems approach. Thus, self–evaluations resulting from past performance should be included in a framework aimed at explaining and predicting motivation and performance while those tapping future performance can be excluded on the grounds of parsimony.

Self–Efficacy

Some problems surrounding the measurement of self–efficacy and the nature of its causal links with other variables also need to be resolved to allow the integration of the control systems and social cognitive approaches. Bandura's (1982; 1986; Wood & Bandura, 1989a) conceptualisation indicates that self–efficacy subsumes a variety of perceived task–specific skills and attributes which influence an individual's estimate of his or her ability to cope with specific situations. This suggests that self–efficacy includes one dimension relating to perceptions of skills and attributes and another

tapping expectations of success. However, the most popular measures in current use ignore the skills aspect and focus an individual's expectations of achieving certain outcomes. Such narrowly defined measures are likely to represent a deficient operationalisation of the construct, particularly if the skills and expectancy dimensions have different influences on the goals people set and the effort they make to achieve those goals. The existing measures also have limitations which may restrict the generalisability of the existing research.

Typically, the outcomes expectancy dimension of self–efficacy is measured according to self–efficacy magnitude, self–efficacy strength, or a combination of both (Gist & Mitchell, 1992). Self–efficacy *magnitude* refers to the number of the possible range of performance levels subjects believe they can attain while self–efficacy *strength* refers to their certainty that they can perform at one or each magnitude level.

Bandura and Cervone (1983; 1986) operationalised self–efficacy as the strength dimension by selecting subjects' certainty that they could perform at the assigned goal level. This goal expectancy approach appears to be identical to that adopted by Garland who described his measure as 'the subjective probability of goal attainment'. Such measures are more likely to offer a valid measure of self–efficacy when goals have been assigned than when people can choose their own level. Given that the probability of achieving a goal diminishes as difficulty increases, goal expectancy should differentiate between different self–efficacy levels when goal level is held constant by assigning goals. However, when people set their own goals, a goal expectancy measure of self–efficacy may produce misleading results, as when someone who aims for average performance and gives him or herself a 90% chance of achieving it scores as having higher self–efficacy than one who aims for outstanding performance but rates the chance of achieving it at 75%. This point was noted by Garland (1984), who found a significant negative correlation between the difficulty of assigned goals and expectancy of goal attainment. The negative but non–significant correlation Garland (1984) found between self–set goal level and expectancy suggests that other factors, such as skills self–efficacy, influences both self–set goal level and goal expectancies. Consequently, the goal expectancy dimension, on its own, represents an inadequate measure of self–efficacy in situations where goals are self–set.

Locke and colleagues (1984) and Podsakoff and Farh (1989) tried to avoid such problems by using the sum of a range of certainty ratings to measure self–efficacy strength and combining the magnitude and strength dimensions into a composite measure. This approach emphasises expectancies of performing well rather than expectancies of achieving a particular goal and is now the one which is recommended (eg. Latham & Locke, 1991; Locke, 1991; Gist & Mitchell, 1992). However, including the magnitude dimension to obtain a composite score causes problems in assessing predictions that high self–efficacy results in people setting high goals (Bandura, 1986; Locke et al, 1984) and making more effort (Bandura & Cervone, 1983; 1986). A strong correlation between self–efficacy magnitude and goal level can be expected because people are unlikely to set goals below the level they expect to achieve. However, the legitimacy of any causal inference is dubious because of the similarity in the two constructs. Similarly, research supporting a positive link between goals and effort (eg. Bassett, 1979; Earley et al, 1987) suggests that including the magnitude dimension in the self–efficacy measure will artificially inflate any effects which self–efficacy may have on effort.

The sign and causal direction of the link between self–efficacy, as measured by the strength of performance expectancies, and effort is also questionable. The predicted positive link between self–efficacy and effort (Bandura & Cervone, 1983; 1986) is more plausible if self–efficacy is considered an outcome rather than a cause of effort. Logically, people who have made high levels of effort should expect to perform better and be more confident that they can do so than those who have made less effort. However, if self–efficacy is assumed to cause effort then a negative link would be plausible because people who are highly confident in performing well may see effort as less necessary than those who are less confident in any performance level. Thus, the positive link predicted by theory (Bandura & Cervone, 1986) would suggest that **performance** expectancies are more likely to be an outcome than a cause of effort. In contrast, the measure of **goal** expectancy strength which Bandura and Cervone (1983; 1986) used to support their hypotheses is a plausible predictor of effort because people are more likely to work for goals they believe to be attainable than those which are not.

A somewhat different approach to measuring self–efficacy was adopted by

Wood and Locke (1987) who developed and validated an academic self–efficacy scale. This measure focused on specific task areas which contribute to academic performance and assessed magnitude and strength of skills confidence. This task–specific, skill–based measure of self–efficacy captures the skills and attributes dimension but not the outcomes expectancy so it, as well as the previous measures, represents an incomplete operationalisation of the construct described by Bandura (1982). In contrast with the outcomes expectancies measures, skills self–efficacy is likely to be a legitimate predictor of goal level because people who rate their skills highly can be expected to set high goals, but setting high goals is unlikely to influence peoples' perceptions of their skills. However, a direct link between skills and effort is unlikely because people who believe they have good skills may tend to rely on ability rather than effort unless they set high goals which they feel they have a reasonable chance of achieving. Thus, goal level and the goal expectancies dimension of self–efficacy should mediate any link between skills efficacy and effort.

The preceding analysis of the concept of self–efficacy suggests that two different dimensions are needed to capture the essence of this construct and that the different dimensions predict different criteria. Skills self–efficacy (Wood & Locke, 1987) should predict goals, but not effort level, while the expectancy of attaining self–set goals is a plausible predictor of effort, but not goals. The performance expectancies measure of self–efficacy is less likely to represent a legitimate predictor of either goals or effort. Although the reliability and validity of the skills and goal expectancy measures need to be established, the preceding analysis suggests that both dimensions need to be integrated in a comprehensive framework which predicts motivation and performance.

An Integrated Model

The integration proposed here incorporates Bandura and Cervone's (1983; 1986) concepts of self–evaluation and self–efficacy with Campion and Lord's (1982) distinction between cognitive and behavioural change to predict the circumstances under which congruence results in increased goals, and discrepancy leads to increased effort rather than reduced goals. The present model is similar to Bandura and Cervone's (1986) earlier integration in the variables included in the framework.

However, it differs by focusing on satisfaction with past, rather than future, performance, by distinguishing between two dimensions of self–efficacy, by proposing that dissatisfaction and goals mediate the link between discrepancy and effort, and by including both effort and performance as criterion variables. The proposed model also contrasts with earlier approaches in the extent to which the sign and direction of causal links between variables are specified.

The integration proposes that feedback about a discrepancy between previous goals and performance affects self–evaluations in such a way that people who match or exceed their goals are highly satisfied with themselves and their performance while those who experience discrepancy are dissatisfied (Locke et al, 1970). As a general rule, people who are dissatisfied with their past performance increase their effort more (Bandura & Cervone, 1983; 1986) and make more effort than those who are satisfied. However, the impact of dissatisfaction on effort is counteracted by a tendency for self–evaluations to influence skills self–efficacy, goals and expectancies of goal attainment. Even though self–efficacy can be highly resilient, feedback provides a source of information which, when evaluated in relation to the self, influences perceptions of the appropriateness of self–assessed skills, goals and expectancies. This is particularly likely to occur when the task is unfamiliar and initial skills assessments are tentative (Bandura, 1982). Thus, people who are dissatisfied with feedback about their past performance tend to reduce their goals and expectancies of achieving them, particularly when their dissatisfaction undermines their skills self–efficacy. Conversely, satisfaction arising from congruence feedback is expected to confirm and heighten skills self–efficacy, encouraging an increase in goals (Wood & Locke, 1987) and expectancies. Under such circumstances, people are expected to make more effort than those who have lower goals (Earley et al, 1987; La Porte & Nath, 1978; Terborg, 1976) and expectancies (Bandura & Cervone, 1983; 1986). Effort is expected to enhance performance, as long as people have the necessary ability and use appropriate strategies to perform the task.

This integration of the control systems (Campion & Lord, 1982) and social cognitive (Bandura & Cervone, 1983; 1986) models distinguishes between behavioural and cognitive choices by predicting that people who are dissatisfied as a result of feedback about a performance–goal discrepancy increase effort if they maintain

confidence in their task skills, but reduce goals if their skills self–efficacy is low, or undermined by their dissatisfaction with failing to attain their goals. People who are satisfied after achieving congruence are expected to maintain their goals and effort if they have a low skills self–efficacy, but increase goals and effort if skills self–efficacy is high, or if satisfaction rewards and increases self–efficacy and achievement behaviours. Thus, Bandura and Cervone's concept of self–evaluations and the skills dimension of their concept of self–efficacy help overcome weaknesses in Campion and Lord's model (1982) by predicting when people choose behavioural versus cognitive change to achieve congruence between their goals and performance in future.

Methodological Concerns in the Goal–Setting and Feedback Research

In addition to the factors which hinder the conceptual integration of the control systems and social cognitive approaches discussed above, a number of methodological issues need to be clarified. Of particular concern is the possibility that the usefulness of much of the existing research is limited by poor reliability and validity of discrepancy measures and the data analysis methods used in many studies. Such problems need to be clarified and avoided to allow the proposed integration to be tested effectively.

Discrepancy Measures

One potential problem which could hinder efforts to develop and test a valid framework explaining how goals and feedback regulate motivation and performance lies in the concept and measurement of discrepancy. Discrepancy between previous goals and performance is the mechanism which underlies all explanations of the manner in which goals and feedback jointly influence other variables as all incorporate the assumption that success or failure in attaining previous goals influences a person's cognitions, evaluations and behaviours. However, because discrepancy is measured as the difference between previous goals and performance, it is a valid measure of the underlying construct only if the two component scores make equal but opposite contributions to the criteria they are supposed to predict (Edwards, 1994).

Like other difference variables such as change scores, performance–goal discrepancy measures are prone to suffer from poor reliability, systematic correlations

with their component scores and spurious correlations with other variables (Cohen & Cohen, 1983; Johns, 1981). The reliability of a difference score tends to be poor because it cannot exceed the average reliability of its components, and will reach that level only if the correlation between the components is zero (Johns, 1981). Notably, the research supporting predictions that high goals can have a positive effect on subsequent performance (e.g., Bandura & Wood, 1989; Earley et al, 1987; Locke, Taylor, Lee & Gist, 1984; Wood, Bandura & Bailey, 1990) indicates performance–goal discrepancy scores have relatively poor reliability.

Another problem with difference scores arises from their tendency to be systematically correlated with their component variables. This problem is demonstrated by the "change" literature which shows that initial scores are generally negatively correlated with gain scores (Johns, 1981). Such findings indicate that people who achieve high scores subsequently demonstrate less improvement than those who score low, and suggest that the negative correlations reflect artifacts such as ceiling effects and regression to the mean. Similarly, goal–performance discrepancy scores will be correlated with their components because low goals are easier to achieve than high goals, and people who perform well are more likely to achieve a goal than those who perform poorly. Consequently, positive correlations between goals and discrepancy and negative correlations between performance and discrepancy are artifacts which reflect the objective probability of achieving goals of different levels.

When difference scores are strongly correlated with their components they demonstrate spurious correlations with outcomes with which the components are correlated. Because the contributions of the components to the discrepancy score will be equal only if the components have equal variances, the component which has the greater variability will be over–represented in the difference score, (Edwards, 1994) and the correlation between discrepancy and the criterion will reflect that between the criterion and the component with greater variability (Johns, 1981). In performance–goal discrepancy scores, performance rather than goals will tend to have greater variability and be over–represented because people are more likely to perform poorly than they are to aim to perform poorly. Thus, links between performance–goal discrepancy and variables such as subsequent performance, effort and goals could be due to previous performance rather than failure to attain goals.

The problem of potential confounding between performance and discrepancy is apparent in the literature cited previously. Both studies by Matsui and colleagues (1983; 1987) assigned goals for subjects to achieve over two trials and divided their samples into high versus low progress (1983) or on–target versus below–target (1987) groups at the mid–point of the trial. As the groups were established according to their progress toward achieving the assigned goal, the low progress or below target groups contained all poor performers while the high progress or on–target groups contained all the better performers. Consequently, whenever goals are assigned and genuine performance feedback is given, discrepancy will be synonymous with performance.

In Podsakoff and Farh's (1989) study in which subjects were given genuine feedback but told that they had performed above or below average, discrepancy was likely to have been confounded with perceived rather than actual performance. This possibility is supported by the manipulation checks which showed that the group which was told that their performance level was above average rated their performance as better than those who were told that they had performed below average. Even Campion and Lord's (1982) natural setting study in which participants set their own goals and received genuine performance feedback on a task which had real–life consequences suffered some contamination because, as discussed previously, good performers would have been over–represented among those who achieve congruence.

Overall, most of the research to date has failed to establish that discrepancy between goals and performance, rather than performance, is the relevant factor which influences goals, effort and subsequent performance. Of the research which has examined the effect of discrepancy on other variables, only that of Bandura and Cervone (1986), in which all subjects were told that they had shown at least some improvement, differentiated actual or perceived performance from discrepancy. The other source of evidence to support a discrepancy rather than a performance effect arises from the studies which indicate that performance feedback in the absence of goals has less effect on later behaviours than when it is combined with goals (see for example Erez, 1977, and reviews by Balcazar et al, 1985/6; Locke et al, 1981).

Although performance is almost certainly confounded with discrepancy in natural settings, Edwards (1994) provides guidelines which allow the tenability of the model implied by the use of difference scores such as performance–goal discrepancy

to be tested. He recommends regressing relevant criteria on the two discrepancy component variables to determine whether (a) both components explain a significant increment in the variance when they are entered simultaneously, (b) each component displays a significant independent effect, and (c) the coefficients for the two components are opposite in sign to each other, and not significantly different in magnitude. If all these constraints are met, use of a discrepancy variable is justified and a performance–goal discrepancy explanation for the observed effects is plausible. However, a significant difference between the size of the component coefficients indicates that the larger component is over–represented and casts doubt on the validity of the discrepancy score as a measure of the construct. If only one of the component coefficients is significant then that variable, and not discrepancy, is responsible for the effect. If the coefficients have the same sign, effects will be additive and it would be more appropriate to add than subtract the component scores. The two later possibilities suggest that the concept rather than the measure of discrepancy is untenable.

Data Analysis Methods

Another problem which limits the usefulness of research into goal–setting and feedback concerns the methods used to analyse data. Many of the studies cited previously used difference scores to measure changes in effort (Bandura & Cervone, 1983; 1986; Campion & Lord, 1982; Matsui et al, 1983), goals (Campion & Lord, 1982; Kernan & Lord, 1988) or performance (Matsui et al, 1987) in spite of the problems with such variables (Johns, 1981) and the availability of alternative methods (Cohen & Cohen, 1983). In addition, much of the evidence is based on simple correlations (Bandura & Cervone, 1983; Campion & Lord, 1982; Locke et al, 1970), chi squares (Campion & Lord, 1982) or analysis of variance (Matsui et al, 1983; 1986). Simple correlations can produce spurious results because they fail to take inter–relationships between variables into account, while chi squares and ANOVA can reduce the likelihood of real effects being identified because dividing the sample into comparison groups attenuates variability in the category variable and others with which the category is linked (Cohen & Cohen, 1983). As noted previously, between–group designs also preclude the comparison of moderator versus mediator explanations for the nature of the relationships between variables.

In contrast, techniques based on multiple regression offer a highly flexible means of analysing data because they allow the independent contributions of predictors, including categorical variables, to be examined. Categorical variables can be coded and entered to help avoid problems with attenuated variability. 'Residualised' scores in which the effects of pre–scores are controlled statistically can be used to measure change in criterion variables while avoiding the problems associated with difference variables noted previously (Pedhazur, 1982; Cohen & Cohen, 1983). Mediator versus moderator explanations can also be compared using multiple regression. Potential mediators are supported if (a) the predictor influences the proposed mediators, (b) the mediators influence the outcome variable, and (c) the link between predictor and the outcome decreases substantially when the effects of the mediators are controlled (Baron & Kenny, 1986). Moderator effects can be confirmed by testing the significance of the interaction term (the product of standardised scores for the main effects) when it is entered in a final block after potential mediators and main effects. This type of analysis allows the plausibility of moderator versus mediator explanations for the relationships among variables to be compared, and avoids many problems inherent in the bivariate analyses used in much of the existing research.

Path Analysis

When a series of inter–related propositions derived from a theoretical model are to be tested, path analysis can be used. Path analysis is an hypothesis testing technique which assesses the plausibility of a particular causal sequence by examining the direct and indirect effects of one variable or set of variables on another which is proposed to be causally dependent on the former. As path analysis is inherently a theory–testing not a theory–generating technique, predicted sequences of variables must be made explicit in a path diagram using arrows to depict hypothesized causal connections between exogenous and endogenous variables. Exogenous (predictor) variables are assumed to be caused by factors outside the theoretical system, and to have a causal influence on one or more endogenous (criterion) variables. Causal relationships between all except exogenous variables must be unidirectional and can be either direct, or indirect if mediated by another endogenous variable (Pedhazur, 1982).

In addition to the usual multivariate assumptions, path analysis presupposes that all relationships between variables are linear and additive, that there is a unidirectional causal sequence, and that the residuals are uncorrelated with each other, or with other endogenous variables (Pfaffenberger, 1981). Failure to recognise violations of the homogeneity of regression assumption which requires all contributions to endogenous variables to be independent of each other results in a model which is incomplete or incorrect (Billings & Wroten, 1987). Although this problem can be overcome by depicting significant interactions (moderators) in path diagrams (Cohen & Cohen, 1983), the resulting violation of the additivity assumption prevents significant paths from being interpreted as additive. Unidirectional causal sequences which characterise the recursive models tested by path analysis prevent the inclusion of reciprocal influences and feedback loops within the model while the uncorrelated residuals requirement implies that no variable which has been excluded from the model exerts a systematic influence on more than one endogenous variable. The latter implies that alternative explanations can be ruled out because all relevant causal variables are included in the model (Pedhazur, 1982).

A causal model which is to be assessed using path analysis should be 'over-identified', as when a number of restrictions or constraints are imposed on the model. The most common restriction involves omitting some of the logically-possible links between variables. An over-identified or restricted model of this nature contrasts with a 'just-identified' or full model in which all logically-possible pathways are included (Pedhazur, 1982).

Path analysis is performed using a series of multiple regressions to compare the restricted (over-identified) model representing the theoretical predictions against a full (just-identified) model. Values for the restricted model are obtained using ordinary least squares regression to calculate path coefficients for all direct pathways predicted by the theory, while those for the full model are obtained by entering all other logically-possible pathways into the regression in a subsequent block (Cohen & Cohen, 1983). Path coefficients and residual error terms for the restricted model can be entered in the path diagram. Path coefficients which are derived from regression beta weights quantify the independent contributions of predictors to criterion variables while the residuals, which are derived from the squared multiple correlation, express

the variance in a particular endogenous variable which is not explained by the predictors (Pedhazur, 1982).

The plausibility of a model can be assessed according to four major criteria: (a) the statistical significance of the predicted paths, (b) the omitted parameters test, (c) decomposition of the correlations and (d) goodness of fit indices. Path coefficients can be tested statistically to determine whether the hypothesised paths make useful contributions to the prediction of a particular endogenous variable. A 'theory trimming' approach can then be adopted by deleting all non–significant paths. Deletion of non–significant paths imposes restrictions and results in the over–identification of a just–identified model but suffers from being post hoc in nature (Pedhazur, 1982) and can produce a model which is over–fitted to the sample data.

The *omitted parameters test* assesses the over–identified model's implicit hypothesis, that the contribution of paths which were omitted from the model do not differ significantly from zero. The omitted parameters test cannot be used to assess a just–identified model which includes all logically–possible paths.

Decomposition of the correlations compares the relative strength of direct versus indirect paths and, by determining the extent to which correlations can be reproduced from the paths in the restricted model, indicates whether some of the proposed paths are misspecified. A correlation is considered to be reproduced adequately if the sum of the product of all relevant direct and indirect pathways in the restricted model is within .05 of the correlation coefficient (Pedhazur, 1982). The contributions of omitted paths (even if some are nonsignificant), correlated residuals and incorrect ordering of variables are the most common reasons for correlations to fail to decompose (Billings & Wroten, 1978). If all logically possible paths are included, the sum of the direct and indirect paths will always equal the correlation coefficient, making the decomposition criterion inappropriate for assessing just–identified models (Pedhazur, 1982).

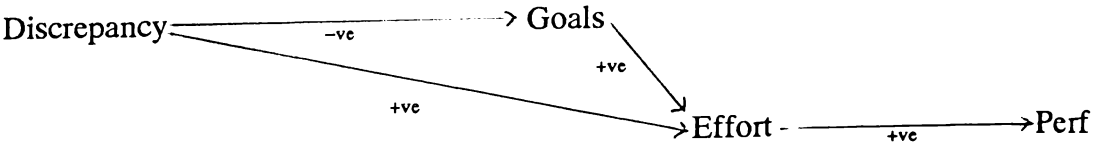
In contrast with the three preceding criteria which assess the usefulness of specific pathways, the final major criterion evaluates the usefulness of the restricted model overall by comparing it with the full model. The *goodness of fit* of the restricted model, as expressed by the Q index, describes the variance accounted for by the restricted model as a proportion of that accounted for by the full model. Q is

derived from the ratio of two scores which represent generalised squared multiple correlations because they summarise the variance explained by the restricted model (X score) and the full model (Y score) as a proportion of the total variance in the scores. The Q index can be tested statistically, with a non–significant chi square indicating a good fit to the data. However, because the large samples required for path analysis inflate the chi square, Q is normally assessed according to its size, rather than statistical significance. A Q of .90 or higher indicates that the restricted model accounts for at least 90% of the variance accounted for by the full model, and is viewed as demonstrating an acceptable fit between the theoretical model and the data (Pedhazur, 1982).

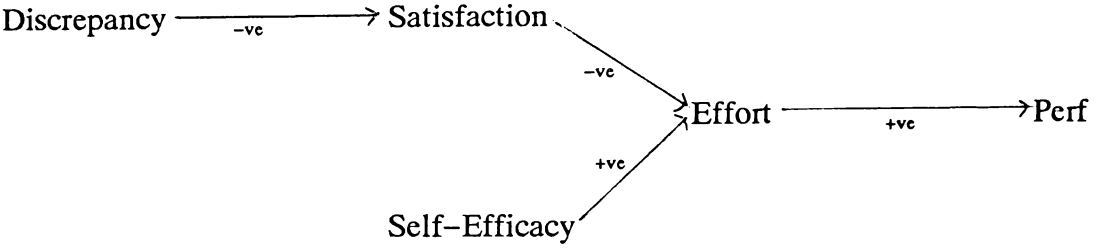
A major limitation to the usefulness of goodness of fit indices arises from the increase which occurs as the number of constraints which are imposed decreases so that just–identified models must always fit the data perfectly. Consequently, restricted models should also be assessed for parsimony. In this context, parsimony refers to the number of constraints which are imposed in relation to the number of independent elements in the model, rather than to the total number of variables or predicted paths. Q can be adjusted to assess the parsimony of the model by multiplying it by the ratio of the number of omitted paths to the number of logically–possible pathways. This criterion is particularly useful when different models are to be compared, as it takes into account the parsimony of the model as well as the goodness of fit (Mulaik, James, Van Alstine, Bennet, Lind & Stilwell, 1989).

Purpose

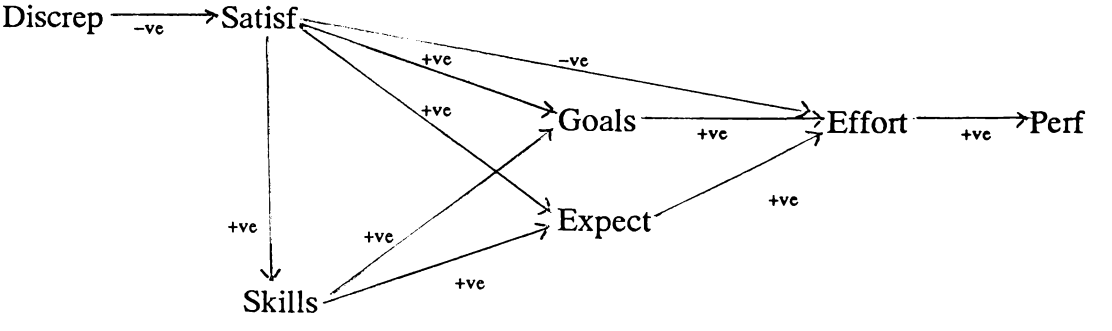
The overall purpose of this study was to develop and test a causal model which integrates key concepts from Campion and Lord's (1982) control systems and Bandura and Cervone's (1983) social cognitive approaches into a comprehensive framework to explain the effects of goals and feedback on effort and performance. In view of the areas of theoretical confusion and methodological concern discussed in the preceding sections, the aims of this study were to reproduce Campion and Lord's (1982) and Bandura and Cervone's (1983) results and to assess the plausibility of the proposed integrated model using path analysis. A third aim was to examine the tenability of the concept and measure of discrepancy by examining the effect of the two component



1.1: Campion and Lord's Control System Theory (1982)



1.2: Bandura and Cervone's Social Cognitive Theory (1983)



1.3: Integrated Model

Notes. +ve = Positive Path -ve = Negative Path

Discrep = Discrepancy
Skills = Skills Self-Efficacy
Perf = Performance

Satisf = Satisfaction
Expect = Expectancies

Figure 1: Path Diagrams for Three Theoretical Models.

variables on relevant criteria predicted by the three models.

Given that path analysis requires a large sample (Pedhazur, 1982) and one of the aims was to replicate findings from earlier research which used student subjects, this study followed Campion and Lord (1982) in using an academic setting to examine the effect of the various predictors on effort and performance across a sequence of multi-choice tests. Using multi-choice tests in an academic setting has other advantages in that the series of tests offers the opportunity to replicate results and the real life consequences of task outcomes enhance the external validity of the results.

Predictions for the three models are summarised by the path diagrams in Figure 1 and described in relation to academic settings below. In view of the emphasis which recent developments place on predicting performance (eg Bandura & Wood, 1989; Wood & Bandura 1989a; 1989b), all models include performance as the ultimate criterion, even though this variable was not included in Campion and Lord's (1982) and Bandura and Cervone's (1983) models. Performance is assumed to be predicted by ability and the amount of effort expended on appropriate task strategies. However, ability is excluded from the predictions for the present models because there was no independent measure of academic ability available for the sample used in this research.

Control Systems Model Predictions

Campion and Lord (1982) proposed that performance feedback regulates future effort by providing information about goal achievement and that people who perceive a discrepancy between their previous goals and performance can either reduce their goals or increase their effort to achieve congruence in future. As expressed in Figure 1.1, these propositions indicate that goal level partially mediates the effect of discrepancy on effort. The direct positive path from discrepancy to effort predicts that people who experience discrepancy make more effort than those who achieve congruence, while the indirect negative path via goals represents the goal reduction alternative which results in low effort levels. Conversely, the same paths predict that people who achieve congruence make low levels of effort, unless they set high goals. The final path predicts that people who expend effort perform better than those who make less effort.

Social Cognitive Model Predictions

Bandura and Cervone's model focuses on self–evaluative reactions to goal achievement information rather than performance–goal discrepancy feedback, and introduces the concept of self–efficacy (operationalized as expectancy of goal achievement). According to this model, satisfaction with performance feedback and self–efficacy jointly influence effort so that people who have high self–efficacy and are dissatisfied make the most effort while those with low self–efficacy who are satisfied make the least.

As shown in Figure 1.2, this model predicts that satisfaction mediates the direct link between discrepancy and effort proposed by Campion and Lord. The indirect positive effect of performance–goal discrepancies on effort is shown by the negative path from discrepancy to satisfaction which predicts that people who achieve congruence are more satisfied than those who experience discrepancy and negative path from satisfaction to effort. Together, the two paths from satisfaction and self–efficacy to effort predict that the most effort is made by dissatisfied people with high self–efficacy and the least effort by satisfied people with low self–efficacy. The final path predicts that effort influences performance.

Integrated Model Predictions

The integrated model combines key variables from Campion and Lord's (1982) and Bandura and Cervone's (1983) frameworks, and distinguishes between two aspects of self–efficacy to predict the circumstances under which people who experience discrepancy choose to increase effort rather than reduce goals. This model proposes that discrepancy between previous goals and performance influences satisfaction which, in turn, influences skills self–efficacy directly, and goals, expectancy of goal attainment and effort both directly and indirectly. In contrast with Bandura and Cervone's model which implies that self–efficacy is a relatively stable characteristic, the integrated model proposes that people who are satisfied as a result of congruence feedback increase their skills self–efficacy, while those who are dissatisfied as a result of discrepancy feedback decrease their skills self–efficacy.

In accordance with these propositions, the path diagram for the integrated model (see Figure 1.3) includes a direct negative path from discrepancy to satisfaction

and a direct positive path from satisfaction to skills self–efficacy which predict that people who experience discrepancy are less satisfied than those who achieve congruence, and that those who are satisfied increase their skills self–efficacy more than people who are dissatisfied. The direct paths from satisfaction to goals and expectancy and indirect paths via skills self–efficacy predict that people who are satisfied as a result of congruence tend to set higher goals and have higher expectancies than those who are dissatisfied, particularly if their satisfaction encourages high skills self–efficacy. No path from goals to expectancy is predicted because any link is expected to be spurious and result from their common antecedents with skills self–efficacy and satisfaction.

Effort is expected to be jointly determined by satisfaction, goals and expectancy of goal attainment. The direct negative path from satisfaction to effort predicts that people who are dissatisfied generally make more effort than those who are satisfied, while the four indirect paths specify factors which encourage people who are satisfied to make high levels of effort. The indirect paths from satisfaction to effort via goals and expectancies predict that people who are satisfied set higher goals and have higher expectancies than the dissatisfied and, as a result, make more effort than those who set lower goals or have lower expectancies. The tendency for the satisfied to rate their skills highly serves as further encouragement for them to have higher goals and expectancies than the dissatisfied. The final sections of the model predict that people who make a great deal of effort perform better than their counterparts who make less effort.

Chapter 2
Method

Overview

The plausibility of the three causal models in explaining levels and changes in cognitive and behavioural responses, and of the discrepancy explanation for feedback functioning were tested in an academic setting using a repeated measures design. First year university students completed a questionnaire containing a number of self-attitude scales and questions about their course goals and expectancies at the beginning of the academic year. At each of the later five measurement periods they completed multi-choice tests which contributed 70% toward their final course grade and questionnaires which measured their reactions to their performance feedback, skills and goal-expectancy self-efficacy, test goals and effort.

The effects of the variables predicted by the models on both levels and changes in criterion variables were tested to determine whether particular factors result in people maintaining rather than increasing or decreasing their self-efficacy, goals, effort and performance. The repeated measures design allowed the replicability of the models to be assessed while the academic setting and use of test grades to measure performance helped ensure that the research situation had real-life relevance to participants.

Sample

All students enroled in a first year social psychology course in 1990 participated in this research in exchange for course credits. However, late enrolments, withdrawals and illness resulted in sample sizes of 593, 587, 555, 532, 514 and 502 at the six measurement periods respectively. Participants had an average age of 20.84 years (sd = 4.93) and were predominantly female (62.7%). People who identified themselves as Maori, both Maori and Pakeha, or other Polynesian comprised 14.5% of the sample, but the majority were Pakeha (75.3%). Most of the sample were first-year (71.2%), full-time students (84%) enroled in the School of Social Science (53.4%), Management (24.6%), Education (8.4%), Humanities (7.7%) or Science (3.2%). A total of 85.6% had an upper secondary school qualification (University Entrance, Sixth Form Certificate, Bursary or Scholarship), a further 7.6% had at least

Table 2.0 Summary List of Key Variables

Variable	Short Name	Definition & Number of Items	Test Times					
			1	2	3	4	5	6
Skills self-efficacy	Skills	Confidence in task-related skills (20 items)	y	y	y	y	y	y
Expectancy self-efficacy	Expect	Expectancy of attaining self-set course or test goals (1 item)	y	y	y	y	y	y
Goals	Goals	Course or test goal aimed for (1 item)	y	y	y	y	y	y
Effort	Effort	Self-reported lecture attendance, hours spent studying, frequency of making study notes and self-rating of overall effort (4 items)	n	y	y	y	y	y
Discrepancy	Discrep	Discrepancy between goals and performance (i item)	n	n	y	y	y	y
Performance Feedback	Perf	Information about test performance (1 item)	n	n	y	y	y	y
Self-Evaluations	Self-eval	Extent to which feedback made them feel pleased and disappointed with themselves and their performance (4 items)	n	n	y	y	y	y
Dissat-isfaction	Dissat	Negative dimension of self-evaluations (2 items)	n	n	y	y	y	y
Feedback Accuracy Ratings	Acc	Ratings of the accuracy with which test marks reflected performance (1 item)	n	n	y	y	y	y
Feedback Motivation Ratings	Motiv	Extent to which feedback believed to encourage effort and make good performance more important (2 items)	n	n	y	y	y	y
Giving Up	Give up	Extent to which test mark made them feel like giving up (1 item)	n	n	y	y	y	y

one School Certificate subject, but 1.9% had no formal school qualifications and 4.7% had a tertiary qualification.

Measures

Six questionnaires (see Appendix 1) and five tests were administered during the course of the survey to collect information about performance, goals, self–efficacy dimensions, effort and self–evaluations. The questionnaires also included a number of variables which were used to validate the self–efficacy and effort measures. Except where specified otherwise, students responded to questions using a six–point Likert response format and total scores for multiple item measures were derived by computing the mean of the contributing items rather than summing scores. The resulting measures reduce the effect of missing data.

Performance. Performance was measured using the multi–choice question section of the five tests students sat as part of their normal course assessment. The first three tests were worth 10% each while the final two were each worth 20% of the final course grade. Except for the 40–item Test 4, all tests contained 20 questions, each of which had four or five response options. Scores for Test 4 were halved so the results would be comparable with other tests. Two text book chapters were examined in each of the first three tests, four chapters for Test 4 and five for the final test while the number of teaching weeks covered by each test varied from three for Tests 1 and 3, four for Test 2 and five for the last two tests.

In general, test items were selected from a test bank which accompanied the text book, and were marked and verified by a computer program to help ensure the reliability and validity of the multi–choice tests. However, the multi–choice nature of the tests introduces a chance factor which selectively advantages poorer students. Even though the four–option response format offers each student a 25% chance of getting each of the 20 questions right, a person with a 'true' score of zero has the opportunity to get five questions correct by chance alone, while a person with a 'true' score of 20 cannot benefit from chance.

Ability. The three short–answer tests which students undertook as part of Tests 2, 4 and 5 were used to assess ability independently of multi–choice test performance because no measure of ability prior to entry to the course was available. Together,

these tests contributed 27% toward the final course grade.

Goals. All six questionnaires measured students' goals, although the initial one focused on course goals, later ones assessed test goals and the final questionnaire sought information about both test and final course goals. Goals were measured by asking students to identify the course or test grade they were aiming for by circling one of 11 categories which represented grades ranging from E to A++. Grades were also explained as percentages (e.g. 40% for E, to 90–100% for A++) for the course goals and as test scores for the test goals. Grades of D and E represent failure while A++ represents high distinction. The importance participants attached to achieving or exceeding their goals was also measured in each questionnaire using a single question with a response scale ranging from '1' (not at all important) to '10' (more important than anything).

Discrepancy. Measures of discrepancy were obtained by subtracting the test goal from the subsequent performance score, so that positive or high scores indicated discrepancy while negative or low scores represented congruence.

Self–efficacy. All questionnaires included measures of the goal expectancy and skills dimensions of self–efficacy, and a global self–rated academic skills question which provided a comparison standard to assess the convergent validity and test–retest reliability of the skills and expectancy dimensions. Goal expectancy efficacy was measured by asking students to circle one of ten categories representing probabilities of attaining self–set goals ranging from '0–9%' to '90–100%'.

A skills self–efficacy measure covering similar content to Wood and Locke's (1987) academic self–efficacy scale was developed with the assistance of the University Study Skill's Advisor to ensure that important multi–choice test skills were covered adequately. The 19 items in this measure were intended to tap three broad areas. General skills (items 1 to 5) focused on the ability to organise time effectively and work independently; basic multi–choice test skills (items 6–14) included factors such as note–taking, efficient reading and recognition; and more advanced skills (items 15–19) focused on issues such as applying learning, critical facility and generation of new ideas. These areas reflect the concentration, memorization, explaining, discriminating and note–taking questions in Wood and Locke's (1987) measure. However, a Likert response format was used in the present study because the 190

ratings which would be required by Wood and Locke's (1987) magnitude and strength format were impractical under the time constraints. (The way in which items were combined for later analysis is discussed in Chapter 3).

Effort. The amount of effort students reported putting into each test was measured in all except the initial questionnaire by collecting information about study behaviours and a subjective self-rating of effort. Consistent with the earlier discussion, study behaviours incorporated both effort and the appropriateness of the strategies used by examining the amount of effort put into three important study strategies. Effort put into study behaviours was measured by asking students (a) to tick each of the one-hour lecture, practical and tutorial classes they had attended (Attendance); (b) the number of hours they had spent studying each test chapter and hours spent studying lecture notes from each class (Study); and (c) whether they developed their own study notes for each chapter (Notes). Students were also asked if they had attempted some crossword puzzles which were designed to help study and revise, but this information was not used as the set of puzzles was incomplete. Subjective self-rated effort was measured by asking students to give a global rating of their effort for the test overall. (See Chapter 3 for a discussion of the reliability and validity of the effort measure).

Self-evaluations. Bandura's (1986) concept of self-evaluative reactions to feedback was assessed in Questionnaires 3 to 6 using four questions from a 15-item feedback assessment measure which was designed to collect information about students' perceptions of their feedback. At the beginning of the questionnaires, students were asked to think back to when they received the results for the previous test and recall what they thought and felt about their mark. Self-evaluations were measured by asking participants to rate the extent to which their mark made them feel (1) pleased (satisfaction) or (2) disappointed (dissatisfaction) with (a) themselves and (b) their performance. Response options for the four-point Likert format ranged from 'not at all' to 'a great deal'. The negatively-worded items were recoded and the mean for the four items was calculated so that a high score indicates satisfaction.

Validation variables. A number of variables were included to help assess the convergent validity (degree of association between measures of the same construct), criterion-related validity (extent to which measures are correlated with others

identified by theory) and discriminant validity (lack of association between measures which should be independent of each other) of key measures. Global questions asking students to rate their understanding of each topic (both lecture and text material) were included in each questionnaire to examine the criterion validity of the self–efficacy and effort variables. The extent to which the skills and goal expectancy measures produced results which were consistent with Bandura's conceptualisation of self–efficacy was assessed further using students' ratings of the importance of their course goals and a number of self–attitude scales which were administered in the first questionnaire for teaching purposes. These scales included Rosenberg's Self–Esteem Scale (1979), the achievement and affiliation subscales of the Multidimensional – Multiattributional Causality Scale (Lefcourt, Von Baeyer, Ware & Cox, 1979) and the Need for Achievement and Need for Affiliation subscales from Jackson's PRF–E Form (1974).

The validity of the self–evaluation measure was examined using questions from the feedback assessment measure which focused on the motivating potential, informational value and accuracy of the test performance feedback. The motivation questions asked students to rate the extent to which their test mark increased the importance of good performance, encouraged them to work harder or make more effort, and made them feel like giving up. The information items focused on the extent to which the test mark showed students what they had done right and wrong, clarified what was expected and showed them how to improve, while the accuracy question simply asked students to rate the accuracy of their test mark feedback.

Procedure

The research design was approved by a departmental ethical review before the study commenced early in 1990. During the first lecture, the nature and purpose of the research was explained in general terms, students were asked to keep a note of the time they spent on various study activities and told they would be given a .5% course credit for completing each of the six questionnaires. The participation credit was intended to offer some incentive to take part without being unduly coercive to students who did not want to participate. Although anonymity was not possible, students were assured that all information would be coded under Student Identity Number rather than

name, and that the data would not be examined until course grades had been finalised.

Participants completed Questionnaire 1 during the first lecture and transferred their responses to an answer sheet which was handed in. Subsequent questionnaires were administered and collected immediately before each of the five in-class tests to prevent the test questions influencing students perceptions of the appropriateness of their test goals, expectations and academic skills rating. The source of the test questions and marking procedure were explained to assure students of the accuracy of their test mark. Performance feedback was made available to the whole class by posting test scores on a departmental noticeboard one to two weeks after each test. While it would have been preferable to collect information about satisfaction with performance and goals for the next test when students received their test scores, the introduction of another four data collection periods was impractical.

Data Analysis

The plausibility of the causal models was examined using the SPSS multiple regression program to conduct path analyses. A structural equation modelling approach would have been preferred because it differentiates between measurement problems and theoretical weaknesses (Fassinger, 1987), but no appropriate computer programs (eg LISREL) were available. Consequently, particular attention was paid to establishing the reliability and validity of key variables in the models to increase the likelihood that non-significant findings reflected theoretical problems rather than measurement error.

The plausibility of the causal models was assessed by conducting two sets of path analyses for each model. The 'levels analyses' used levels scores as the criterion variables to assess the effect of levels of one attribute on levels of another, while the 'change analyses' used change scores as criteria to assess the effect of levels of one attribute on changes in another. The results of the two sets of analyses were then compared. Comparing the significance and sign of betas for the same paths produced by the levels and change analyses offers unique information which is not provided by either analysis on its own. For example, a significant positive change beta with a significant negative levels beta reflects a tendency for people to show greater increases in scores but still score lower than their counterparts, while a significant levels beta

with a non-significant change beta indicates that people simply maintain their previous high scores. Such information can contribute to a more comprehensive understanding of factors which influence effort and performance than most previous research which has focused on either levels or changes in criterion variables.

Change in criterion variables was measured using 'residualised' or 'adjusted' scores because of problems arising from raw difference scores (Cohen & Cohen, 1983). Change scores were calculated using the procedure recommended by Cohen & Cohen (1983, p413) in which the prescore is multiplied by the regression coefficient of the prescore on the postscore before the difference score is computed. (That is, Change = A − (((${r_{AB}}$ * sd_A)/sd_B) * B), where A refers to the postscore and B to the prescore). By partialling out the pre-score variance from the post-score, this procedure ensures that the residualised change score is independent of the pre-score, and that any effects of the residualised change scores on criterion variables are not due to spurious links between the pre-score and the criterion.

The *X* and *Y* values for the goodness of fit results were calculated by obtaining the residuals ($1-R^2$) for each criterion variable in the restricted and full models, and subtracting the product of the residuals from one. *Q* indices were obtained by dividing the *X* by the *Y* value (Pedhazur, 1982). *Y* values were also examined because, as generalised squared multiple correlations, they describe the variance accounted for by all logically possible paths as a proportion of the total variance in scores (Pedhazur, 1982), and indicate the extent of problems arising from unmeasured causes. Following the rationale of Mulaik and colleagues (1989), the parsimony ratio was calculated as the number of omitted paths (degrees of freedom) divided by the total number of logically possible paths. This ratio was then multiplied by *Q* to derive the parsimonious goodness of fit index (PGFI).

Correlations between predictor and criterion variables were decomposed to assess the goodness of fit of specific pathways in the model. Total effects for the levels analysis decompositions (i.e. the correlations between levels score predictors and levels score criteria) were obtained by summing path coefficients for any direct paths and the product of path coefficients for each section of the indirect paths. Decomposition is considered adequate if the difference between the total effects and correlation is less than .05 which can be attributed to sampling error (Pedhazur, 1982).

Total effects for the change analysis decompositions (correlations between levels scores predictors and residualised change scores) were calculated using the change analysis path coefficients for direct paths and the final section of indirect paths but the levels analysis path coefficients were used for all earlier sections of the indirect paths. This approach was followed because correlations between the levels score predictors and residualised change score criteria contain variance arising from the prescores for variables in the indirect links which has been removed from the total effects by regressing the residualised change scores on levels variables. Consequently, the inclusion of variance in the correlation but not in the total effects inflates the difference and prevents the correlations from being decomposed adequately if path coefficients for the early sections of the indirect paths are used. (This problem is illustrated in Appendix 2).

Following Cohen and Cohen (1983), all betas, correlations, residuals and other values were calculated to four decimal places to reduce effects of accumulated rounding errors and improve the precision of the goodness of fit and decomposition results.

Residuals analyses. Results for the residuals analyses which were conducted to detemine the extent to which the multivariate assumptions required for path analysis were met are included in an appendum at the end of the appendices.

Chapter 3
Reliability and Validity Analyses

Normative, reliability and validity data for the key variables were examined to help ensure that nonsignificant findings in the causal models could be attributed to theoretical weaknesses rather than to measurement problems. Particular attention was paid to the self–efficacy and effort measures which were designed for this study, and to the 4–item composite self–evaluation measure which contrasted with Bandura and Cervone's single bipolar question. Links between ratings of feedback accuracy and performance and discrepancy scores were also examined to assess the possibility that some participants distorted and rejected their feedback (Lord & Hanges, 1987). Reliability data for the self–attitude scales which were used to assess the validity of the self–efficacy measures are reported in Appendix 3A.

Performance

Table 3.1 shows that the mean scores for the five multi–choice tests which were used to measure performance ranged from a low of 10.43 (52.15%) for the second test (Time 3) to a high of 13.98 (69.9%) for the fourth test (Time 5). An alpha coefficient of .78 for the five multi–choice tests and correlations of r.35 (Time 3), r .48 (Time 5) and r .66 (Time 6) between the multi–choice and short–answer tests which were administered at the same period suggest that the multi–choice test performance measure had adequate internal consistency and convergent validity. However, significant correlations between multi–choice test scores and feedback accuracy ratings (r.26, r .22, r .26, and r.29, p<.001) show that poor performers rated their performance feedback as less accurate than good performers. These results suggest that some people may have distorted or rejected their feedback.

Goals and Discrepancy

The average goal of 76.16% (sd 9.1) which students set for the course overall at the beginning of the year decreased to 58.21% (sd 9.71) by the end of the course. The change in the course goal is reflected in the test goals which decreased slightly at all intervals except that between Times 3 and 4 (see Table 3.1). Test goals tended to be set higher than previous performance levels except at Time 6 when the mean

Table 3.1: Descriptive Data for Multi-choice Test Performance, Short Answer Test Performance, Goals, Discrepancy and Self-Evaluations.

		Times				
		2	3	4	5	6
Multi Choice Test Performance	m	12.49	10.43	12.03	13.98	10.85
	sd	(3.08)	(2.82)	(3.01)	(2.77)	(3.48)
Short Answer Test Performance	m		3.69		4.60	5.32
	sd		(1.34)		(1.59)	(2.09)
Goals	m	14.14	13.33	13.59	13.16	12.98
	sd	(2.07)	(2.25)	(2.25)	(2.28)	(2.29)
Discrepancy	m	1.65	2.91	1.51	-1.71	2.12
	sd	(3.34)	(3.14)	(3.21)	(6.39)	(3.47)
Self-Evaluations	m		2.61	2.14	2.56	2.92
	sd		(.90)	(.86)	(.83)	(.78)

goal was one mark lower than the mean performance level for the previous test. This difference is surprising as the negative mean performance–goal discrepancy score of −1.7 shows that Time 5 was the only period at which performance levels exceeded goals. Other mean discrepancy scores ranged from 2.91 at Time 3 to 1.51 at Time 4. Performance–goal discrepancy was negatively correlated with students feedback accuracy ratings (r −.19, r −.20, r −.25, r −.21, p <.001), but these links were somewhat smaller than those between accuracy and previous performance. Although the difference between the two sets of correlations is small, these results suggest that students were somewhat less likely to reject feedback about a performance–goal discrepancy than they were to reject feedback about poor performance.

Self–Evaluations

Means, standard deviations and principal components analyses for the four items measuring the extent to which their test score feedback made students feel pleased and disappointed with themselves and their performance are reported in Appendix 3B with those for the other eleven items from the feedback assessment measure. Principal components analyses supported the construct validity of the self–evaluation measure by showing that all four items had salient loadings on the same factor at each measurement period. When the two disappointment items were recoded, mean scores for the composite measure ranged from 2.14 out of four at Time 4 to 2.92 at Time 5 (see Table 3.1). Alpha coefficients which varied from .88 at Time 5 to .91 at Time 3 demonstrate that the four–item self–evaluation measure had good internal consistency.

The validity of the self–evaluation measure was investigated using questions from the feedback assessment measure. Consistent with Bandura's (1986) discussion of the motivating and debilitating effects of self–evaluations, criterion validity was examined by correlating self–evaluations with the extent to which the feedback increased the importance of good performance and encouraged effort (the feedback assessment motivational dimension), or made students feel like giving up. Discriminant validity focused on possible response sets (Campbell & Fiske, 1959) by examining links between self–evaluations and students' ratings of the accuracy, and the informational value of their feedback to assess the possibility of generalised

Table 3.2: Criterion and Discriminant Validity of Self-Evaluation Measures

Self-Evaluation Dimensions	Criterion Validity		Discriminant Validity	
	Motivation Ratings	Give Up	Accuracy Ratings	Information Ratings
Time 3				
Dissatisfaction	.41***	.40***	-.24***	.01
Satisfisfaction	-.27***	-.33***	.28***	.10*
Composite Variable	-.37***	-.39***	.28***	-.04
Time 4				
Dissatisfaction	.35***	.38***	-.22***	-.00
Satisfisfaction	-.18***	-.29***	.27***	.06
Composite Variable	-.30***	-.37***	.26***	.03
Time 5				
Dissatisfaction	.35***	.39***	-.19***	.04
Satisfisfaction	-.08	-.29***	.36***	.10*
Composite Variable	-.24***	-.38***	.30***	.03
Time 6				
Dissatisfaction	.21***	.50***	-.25***	.03
Satisfisfaction	.03	-.36***	.40***	.16***
Composite Variable	-.10	-.47***	.35***	.07

response biases or common method variance. Since Bandura (1986; Bandura & Cervone, 1983) suggests that high levels of both satisfaction and dissatisfaction can serve as incentives for future performance, the positive and negative dimensions, as well as the four–item composite measure were assessed.

The results in Table 3.2 show that the dissatisfaction dimension was significantly positively correlated with giving up and with the motivational ratings of the feedback at all measurement times. The satisfaction dimension was significantly negatively correlated with giving up at all times, but its links with motivational ratings became nonsignificant after the second measurement period. The correlation between the composite measure and motivational ratings was also nonsignificant at the final period. Dissatisfaction was significantly negatively correlated with the feedback accuracy ratings at all periods, but not with students' ratings of the informational value of their feedback. The satisfaction dimension was somewhat more strongly correlated with feedback accuracy ratings than was dissatisfaction, and was significantly linked with informational ratings at all periods except Time 4.

Overall, these results show that the dissatisfaction dimension had acceptable criterion validity as it was linked with motivational ratings and giving up. The nonsignificant links between dissatisfaction and students' ratings of the informational value of their feedback suggest that this measure also had acceptable discriminant validity, particularly if it can be assumed that feedback which is perceived as inaccurate increases students' dissatisfaction with themselves and their performance. In contrast, support for the satisfaction dimension was mixed. While the significant negative links with giving up suggest that the measure was adequate, the non–significant or negative correlations with motivational ratings cast doubt on the possibility that high levels of satisfaction are likely to create inducements for future performance (Bandura, 1986). The strong links between the satisfaction dimension and feedback accuracy ratings, and significant links with informational ratings at three of the four measure periods cast doubt on the discriminant validity of this dimension and indicate the existence of a generalised positive response bias. These results suggest that the dissatisfaction dimension offers a more useful measure of students' affective responses to their feedback than the composite measure which includes both satisfaction and dissatisfaction.

Table 3.3: Means, Standard Deviations and Alphas for Self-Efficacy Measures

		Measurement Times					
		1	2	3	4	5	6
Skills (19 items)	m	4.21	4.14	3.97	4.02	3.94	4.01
	sd	.52	.53	.62	.61	.67	.66
	alpha	.88	.90	.90	.91	.92	.92
Global Ability	m	4.12	3.97	3.80	3.94	3.84	3.80
	sd	.59	.71	.84	.84	.90	1.01
Expectancy %	m	38.44	42.75	47.36	46.11	49.3	48.84
	sd	15.54	15.94	15.90	15.96	16.95	17.57
Skills (20 items)	m	4.20	4.13	3.97	4.02	3.94	4.00
	sd	.51	.52	.61	.60	.66	.66
	alpha	.89	.90	.91	.91	.93	.93

Note. Ability and expectancy were single-item measures

Self-Efficacy Measures

Mean scores for the 19-item self-rated skills measure (skills-19) and the goal expectancy question which, respectively, followed Wood and Locke's (1987) and Bandura and Cervone's (1983; 1986) approaches to measuring self-efficacy are presented in Table 3.3. Normative data for the global self-rated ability item which was used as a comparison standard to assess the reliability and convergent validity of the other measures, and a 20-item measure in which global ability was included with the self-rated skills items are also shown along with the alpha coefficients. (Means for the individual skills items and principal components analyses of the 19 skills items are reported in Appendix 3C).

All mean scores for skills-19 and global ability fell slightly above the scale midpoint of 3.5, suggesting that, on average, the sample rated their skills and ability as only slightly more than moderate. Although the mean ratings for ability were all slightly lower than those for skills-19, ratings on both measures tended to decrease across time and, except at Time 6, the pattern of change for the two measures was very similar. Mean ratings for expectancy of goal achievement increased from a low of 38.44% for the initial course goal to 49.3% at Time 5.

Alpha coefficients for the 19-item self-rated skills measure increased steadily from .88 at Time 1 to .92 at Time 6, with all items contributing to the internal consistency at each measurement period. The inclusion of global self-rated ability in the 19 skills items increased the alpha coefficients marginally at two periods.

Short-term and long-term test-retest reliability were examined using Pearson correlations to assess the stability of the measures and to try to differentiate between variability due to changes in the underlying constructs versus unreliability of the measures. Short-term reliability assessed the strength of links between scores at adjacent time periods while long-term reliability linked scores obtained at the first period with those at each later time. As shown in Figure 3.1, skills-19 had the highest short-term reliability at each period, while the single-item goal expectancy measure had the lowest. The short-term correlations for skills-19 and ability increased at all except one measurement period, but there was little overall change for expectancy. Combining ability with the skills items increased the skills correlations by .01 at two intervals to give short-term reliability coefficients of .72, .69, .75, .77 and .80.

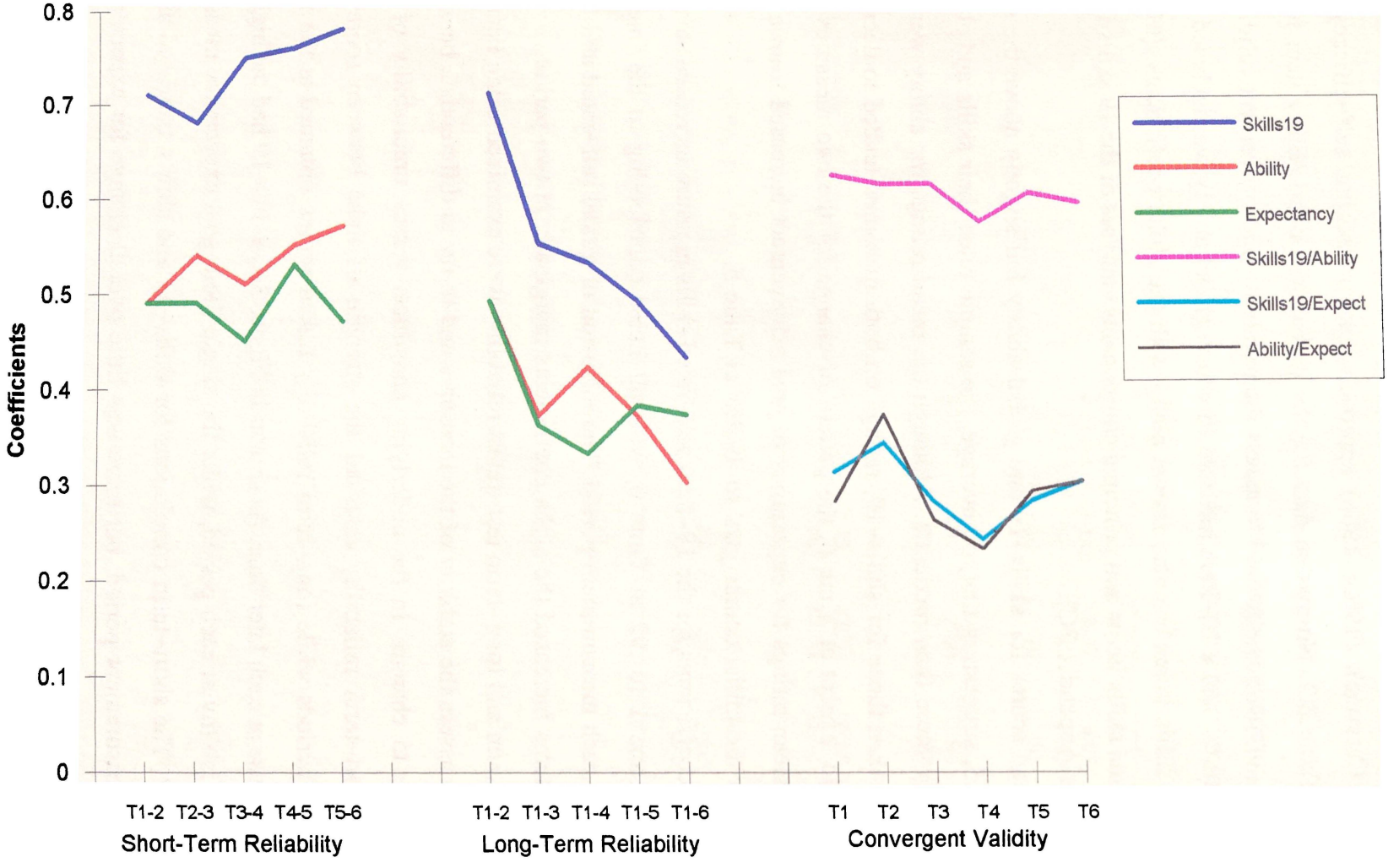


Figure 3.1: Reliability and Convergent Validity Coefficients for Three Self-Efficacy Measures

The 19–item self–rated skills measure also had better long–term reliability than either ability or expectancy. The overall trend was for test–retest reliability to decrease as time progressed, but the sharpest decrease for all measures was at the Time 1–3 interval which included the first test. Only skills–19 decreased at each subsequent measurement period. Including ability with the 19 skills items increased the skills coefficients by .01 at two intervals, giving long–term test–retest coefficients of .71, .56, .54, .50 and .43.

The convergent validity (extent of relationship between measures of the same underlying construct) of the self–efficacy measures was investigated by examining the intercorrelations between self–rated skills (skills–19), global ability and expectancy. As shown in Figure 3.1, skills–19 and ability were consistently related to each other with correlations ranging from .62 at Time 1 to .56 at Time 4. Only two of the correlations between skills–19 and ability fell below the .60 level which indicates that two variables tap the same construct (Morrow, 1983). The pattern of correlations between expectancy and skills–19, and expectancy and ability were similar to each other, but considerably lower and less stable than those between skills–19 and ability. These results suggest that 19 self–rated skills items and global ability tap a similar underlying construct, while expectancy reflects a somewhat different concept.

Comparison of the short–term reliability and convergent validity results shows that the short–term reliability coefficients for skills–19 and expectancy were all stronger than any of their respective validity coefficients, demonstrating that measures of the same construct obtained at adjacent time periods were more highly correlated than measures of similar constructs obtained at the same time. This finding indicates that a greater proportion of the variance in the 19–item skills and expectancy measures can be attributed to the underlying construct than to the time at which the measures were obtained. However, the convergent validity correlations between the 19–item skills and global ability measures were higher than the short–term reliability coefficients for ability, suggesting that responses to the global ability item were influenced by the preceding questions about academic skills.

Initially, the criterion validity of the self–efficacy measures was assessed by examining their capacity to predict students' self–rated understanding of the material they covered for each test. Global ability was included in these analyses to determine

Table 3.4: Contribution of Three Self-Efficacy Measure To Self-Rated Understanding

		Measurement Times				
Variables		2	3	4	5	6
Skills-19	β	.37***	.36***	.22***	.17***	.11**
Ability	β	.27***	.19***	.31***	.41***	.43***
Expectancy	β	.13***	.17***	.23***	.15***	.27***
	R^2	.64	.58	.58	.59	.65

whether it contributed additional variance to that explained by the skills–19 and expectancy measures because the alpha coefficients and convergent validity results suggested that it may be appropriate to include global ability in the skills self–efficacy measure. The typical approach which focuses on performance to validate self–efficacy measures (Gist & Mitchell, 1992; Wood & Locke, 1987) was not followed because a person's perception of his or her capability usually differs from actual ability (Bandura, 1982). Thus, a variety of situational factors which reduce self–efficacy's links with performance (Gist & Mitchell, 1992) will have less effect on its links with self–rated understanding of test material.

Beta weights and multiple correlations for the stepwise multiple regressions are shown in Table 3.4. These results demonstrate that skills–19, global ability and expectancy all made significant contributions to the prediction of understanding at each time. Skills–19 made the greatest contribution at the first two periods while global ability made the strongest contribution at the three later times. Multiple correlations ranged from *R* .58 at Times 3 and 4 to *R* .65 at Time 6. These results support the criterion validity of the skills–19 and expectancy measures of self–efficacy and suggest that including global ability in the 19–item skills measure would enhance the capacity of the latter to predict relevant outcomes.

The self–attitude scales and question about the importance of achieving course goals were used to assess the criterion and discriminant validity of the expectancy and 20–item self–rated skills measure which incorporated global ability to determine whether they produced results which were consistent with Bandura's (1982, 1986) conceptualisation of self–efficacy. Bandura's definition of self–efficacy as "belief in one's capabilities to execute the competencies needed to exercise control over events that affect one's welfare" (1986, p1) together with his discussion of the benefits of this attribute suggest that people with high self–efficacy have an internal locus of control and emphasise the importance of effort in achieving valued outcomes. Thus, people with high self–efficacy should attribute achievement success to ability or effort, but not to chance or the situation, and attribute failure to lack of effort but not to lack of ability or external factors. In addition, the description of high self–efficacy people as "approaching difficult tasks as challenges to be mastered rather than threats to be avoided" (Bandura, 1986, p8) and of those with low self–efficacy as having low

Table 3.5: Criterion and Discriminant Validity of Skills and Expectancy Measures of Self-Efficacy

	Criterion Validity		Discriminant Validity	
	Skills	Expectancy	Skills	Expectancy
Self Esteem	.43***	.21***		
Goal Importance	.15***	.14**		
Need	.40***	.18***	.13***	.04
Attributions				
Ability – Success	.16***	.05	–.04	.03
Ability – Failure	–.11**	–.06	–.09	–.02
Effort – Success	.26***	.17***	.07	.09*
Effort – Failure	.05	.12**	–.09	.06
Situation – Success	–.16***	–.02	–.06	–.01
Situation – Failure	–.11	–.06	–.10*	–.08
Luck – Success	–.20***	–.09	–.08	–.09
Luck – Failure	–.12**	–.10	–.11	–.10

Note. The Need and Attribution measures refer to achievement for the criterion validity assessments and to affiliation for the discriminant validity

aspirations, weak commitment to goals and "falling easy victim to stress and depression" (p8) suggest that self–efficacy should be positively related to need for achievement, the importance attached to course goals and self esteem. Conversely, because self–efficacy is assumed to be specific to the task or situation (Gist & Mitchell, 1992), it should be relatively independent of need for affiliation and attributions for affiliation success and failure.

As shown in Table 3.5, both skills ratings and expectancy were significantly related to need for achievement, self esteem and goal importance (p <.01) although skills ratings accounted for at least four times as much of the variance in need for achievement and self esteem as did expectancy. The skills measure was also significantly related to all of the achievement attribution dimensions except for effort and situational attributions for failure, while the only achievement attribution dimensions to which expectancy was significantly related were the two effort subscales.

Neither self–rated skills nor expectancy was significantly related to any of the affiliation attribution dimensions (p >.01), although skills ratings were correlated with need for affiliation. However, partial correlations showed that the link between skills and need for affiliation became nonsignificant when need for achievement was controlled (.08, p >.01), while that between skills ratings and need for achievement was relatively unaffected when need for affiliation was controlled (.39 p <.001).

Overall, these results indicate that the 20–item self–rated skills and single item expectancy measures both had acceptable reliability and validity and produced results which were consistent with Bandura's conceptualisation of self–efficacy. Support for incorporating the global ability item with the skills measure was obtained from the convergent validity results which suggested that both measures tapped similar underlying constructs, and the initial criterion validity findings showing both measures contributed additional variance to the prediction of understanding. Alpha coefficients for the 20–item skills ratings measure all exceeded the .80 required for applied research and approximated the .90 level necessary for applied use (Nunnally, 1979). The temporal stability of this measure was also acceptable as the general tendency for the short–term coefficients to increase while the long–term coefficients decreased indicates that variability was due to changes in the underlying construct rather than

Table 3.6: Descriptive Data for Effort Measures.

		Measurement Times				
		2	3	4	5	6
Attendance	m	.89	.71	.57	.50	.43
	sd	(.20)	(.24)	(.25)	(.25)	(.25)
Study Hours per week	m	1.47	1.57	1.52	1.21	.93
	sd	(1.07)	(1.55)	(1.35)	(.94)	(1.04)
Study Notes	m	.72	.69	.68	.32	.20
	sd	(.41)	(.43)	(.44)	(.21)	(.18)
Global Effort	m	3.82	3.50	3.55	3.48	3.47
	sd	(1.21)	(1.29)	(1.27)	(1.31)	(1.32)
Composite Effort	Alpha	.52	.58	.60	.63	.65

measurement error. Finally, significant correlations with need for achievement, self–esteem, goal importance and six of the eight achievement attributions subscales, and non–significant links with the affiliation measures suggested that the results produced by the 20–item self–rated skills measure are consistent with Bandura's descriptions of people with high and low self–efficacy.

Support for the reliability and validity of the expectancy measure was somewhat weaker than that for skills ratings, but still acceptable. The short–term and long–term reliability coefficients showed that this measure had only moderate temporal stability while the convergent validity results suggested than expectancy measured a somewhat different underlying construct from that tapped by the self–rated skills and ability items. However, the additional variance which expectancy contributed to the prediction of understanding and the significant correlations with need for achievement, self–esteem, goal importance and the two effort achievement attribution subscales supported the criterion validity of this measure. This support suggest that expectancy's mediocre temporal stability could be due to legitimate fluctuations in students' expectations of achieving their goals rather than measurement error. Together, these results suggest that the skills ratings and expectancy measures tap somewhat different aspects of self–efficacy and that both should be included in a comprehensive framework linking goals and feedback to motivation and performance.

Effort

Mean scores for the three effort behaviours (class attendance, hours spent studying and frequency of making study notes) and global self–rated effort are presented in Table 3.6 with alpha coefficients for a composite effort variable comprising the sum of the standardised scores for the four effort measures. The mean scores reveal a general tendency for effort to decrease over the course. Attendance was highest for the first period (Time 2) when students attended an average of 89% of the classes, but decreased to 43% for the final period. The average number of hours students spent studying text–book chapters and lecture notes remained relatively stable at approximately 1.5 hours per week over the first three periods, but decreased to .93 hours at the final time. The percentage of lecture topics for which students developed

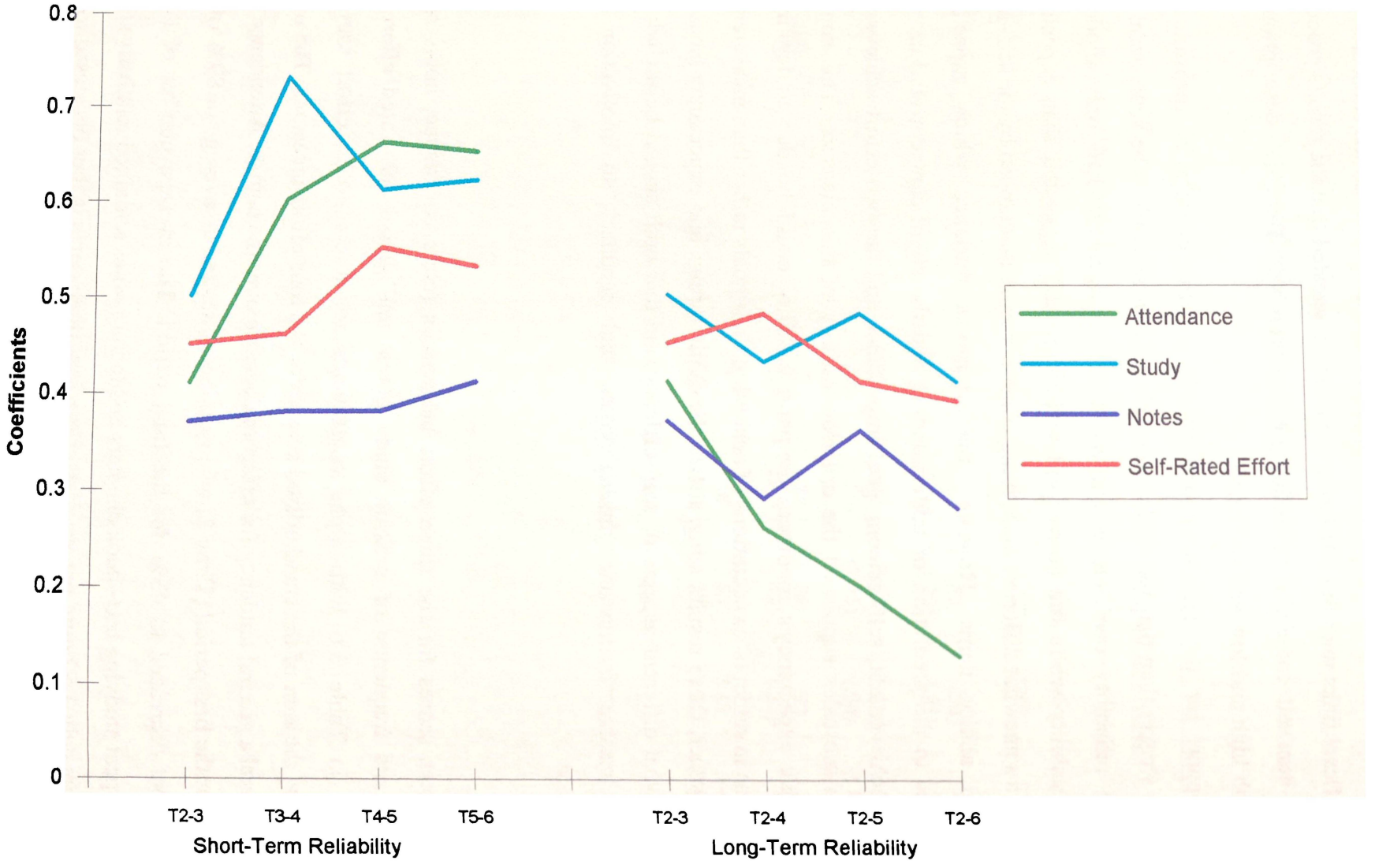


Figure 3.2: Short-term and Long-Term Reliability Coefficients for Four Effort Measures

their own study notes decreased only slightly from 72% to 69% across the first three times but dropped sharply to 32% and 20% at the later periods. Mean scores for global self-rated effort also declined over the periods, although the decrease of 9.2% from the highest to the lowest self-ratings considerably under-estimated declines of 51.6% in lecture attendance, 40.7% in the hours spent studying and 72% for the frequency with which they made study notes. Mean scores which approximated the scale midpoint of 3.5 at all except Time 2 suggest that students generally rated the effort they put into the tests as only moderate.

Alpha coefficients indicated that the internal consistency of the composite effort variable increased slightly but consistently from .52 to .65 across the measurement periods. Corrected inter-item total correlations showed that global effort made the greatest contribution to the internal consistency of the scale while attendance, which reduced the alphas slightly at Times 2 and 5, made the least. These findings are consistent with the assumption that class attendance, hours spent studying and the frequency with which students made their own study notes represent three relatively independent study behaviours which contribute to students' overall perception of the amount of effort they put into the tests.

As shown in Figure 3.2 the test-retest reliability of the individual effort variables was low at the first interval for which data were collected (Times 2 to 3), although the short-term reliability coefficients for attendance and study increased at later intervals to reach or exceed .60. The short-term coefficients for global self-rated effort increased slightly at all except the final interval while those for study notes remained consistently low. Composite effort demonstrated a generally higher and more stable pattern of short-term reliability with coefficients of .54, .64, .65 and .68 across the intervals.

The long-term reliability of attendance decreased rapidly across the five tests while the coefficients for study, notes and global effort showed more varied patterns of increases and decreases. The sharp decrease in test-retest reliability for attendance is likely to be due to late enrollees who had the opportunity to attend classes for later tests but not the first. Composite effort which had coefficients of .54, .50, .50 and .41 showed a rate of decline that was less dramatic than attendance and more stable than study and notes.

Table 3.7: Contribution of Effort Behaviours to Global Effort.

Effort Behaviours		Measurement Times				
		2	3	4	5	6
Attendance	β	.07	.15***	.15***	.16***	.21***
	r	.13	.24	.26	.28	.34
Study Hours per week	β	.32**	.30***	.37***	.37***	.27***
	r	.37	.39	.46	.49	.41
Study Notes	β	.31***	.32***	.27***	.23***	.30***
	r	.37	.39	.37	.35	.42
	R	.49***	.53***	.56***	.55***	.56***

Note. Effort was not measured at Time 1 because there was no test.

The convergent validity of the three effort behaviours which were assumed to reflect the amount of overall effort put into appropriate study strategies was examined using multiple regression to determine their contributions to global self–rated effort. As shown in Table 3.7, betas for all three self–reported behaviours were significant at all measurement periods, except for attendance at Time 2. The very low contribution which attendance made to global self–rated effort at this time period may be due to insensitivity in the attendance measure resulting from the high attendance levels, and a tendency for late enrollees to put extra effort into other study strategies. The multiple correlations which ranged from .49 to .56 were all significant (p <.001) but show that the three effort behaviours accounted for a maximum of only 31.4% of the variance in self–rated effort.

The relatively low multiple correlations could arise from criterion deficiency in the effort behaviour measures or from criterion contamination in self–rated effort. Criterion deficiency suggests that some other important aspect affecting students's perception of their effort was not measured in this study while criterion contamination indicates that the global self–rated effort measure was contaminated by some other irrelevant factor such as common method variance. The most likely sources of such contamination appear to be students' global ratings of their academic ability and their self–ratings of the understanding of the test material because these variables were measured in the same section of the questionnaire as self–rated effort and used the same response format.

The criterion validity of the four effort measures and the possibility of criterion contamination of global effort by common method variance were examined in two regression analyses using students' self–rated understanding of the test material as the criterion. In the first analysis, the three effort behaviours were entered step–wise in the first block to determine whether all made significant contributions at each period, and global effort was entered in the second block to see if it contributed additional variance. For the second analysis, self–rated effort scores were residualised for the effect of global ability using the procedure recommended by Cohen and Cohen (1983) to help ensure that any contribution which self–rated effort makes to understanding does not result from common method variance. The residualised self–rated effort variable and three effort behaviours were entered into the equation in a first block,

Table 3.8: Contribution of Effort Measures and Ability to Self-Rated Understanding

		Time 2			Time 3			Time 4			Time 5			Time 6		
Variables		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Attend	β	-.01	-.04	-.04	.05	-.02	-.02	.17***	.09*	.11**	.16***	.08*	.12**	.23***	.10**	.16***
	r			.01			.11			.21			.24			.32
Study	β	.04	-.09	-.04	.19***	.03	.07	.13**	-.05	-.01	.24***	.04	.12*	.11**	-.05	.01
	r			.08			.23			.20			.33			.26
Notes	β	.24***	.11**	.16***	.17***	.00	.04	.16***	.03	.06	.13**	.01	.05	.32***	.13***	.22***
	r			.24			.21			.21			.21			.39
Global Effort	β		.43***	.27***		.52***	.41***		.48***	.36***		.54***	.33***		.60***	.37***
	r			.30			.53			.50			.58			.67
Ability	β			.48***			.40***			.42***			.42***			.41***
	r			.56			.46			.49			.56			.58
	R	.25	.44	.34	.30	.53	.45	.31	.51	.43	.38	.59	.47	.48	.69	.57
	R^2	.06	.19	.12	.09	.29	.20	.10	.26	.19	.14	.35	.22	.23	.47	.32
adjusted	R^2	.06	.18	.11	.08	.28	.30	.09	.25	.18	.14	.34	.22	.22	.47	.32

followed by global ability which is likely to still share common method variance with understanding.

The results assessing the effect of effort behaviours on understanding (see Table 3.8, column 1 at each period) show that the frequency with which students made study notes made significant contributions to understanding at each period, although betas for the hours studied at Time 2 and for attendance at Times 2 and 3 were not significant. The multiple correlations for the effort behaviours increased steadily from .25 to .48 across the measurement periods. The results in column 2 show that the entry of the significant self–rated effort betas reduced those for the effort behaviours, but the study notes betas remained significant at Times 2 and 6, and the attendance betas remained significant at the three later times. Multiple correlations ranging from .44 (Time 2) to .69 (Time 6) show that the entry of unresidualised self–rated effort more than doubled the variance accounted for by the three effort behaviours at each time.

The results of the second analysis (see column 3) show that the multiple correlations (obtained before the entry of global ability) and betas for self–rated effort all decreased when the global ability variance was removed from self–rated effort. However, both global ability and the residualised self–rated effort variable made relatively strong contributions to understanding at each time. Attendance also made additional contributions at Times 4 to 6, as did notes at Times 2 and 6 and Study at Time 5. While these results suggest that common method variance inflates the contribution which self–rated effort makes to understanding, self–rated effort still explained a significant portion of variance in understanding which was not accounted for by effort behaviours, or the combination of self–rated ability and common method variance incorporated in the global ability measure.

Overall, these results suggest that incorporating the standardised scores for the three effort behaviours and global self–rated effort into a composite variable would provide a more reliable and valid measure of effort than any of the individual variables. The relatively low alpha coefficients, corrected item–total correlations and convergent validity analyses all support the assumption that class attendance, hours spent studying materials and developing study notes represent different, relatively independent study strategies which contribute to, but do not fully account for, students' perceptions of their overall effort. The low test–retest coefficients for the individual

and composite effort variables are consistent with Weiner and colleagues' (1972) definition of effort as a temporary, rather than stable characteristic, and with the assumption that students are likely to experiment with different study strategies.

The three effort behaviours all demonstrated acceptable criterion–related concurrent validity as all contributed significantly to the prediction of understanding at three or more periods. Self–rated effort contributed additional variance to understanding, independently of actual behaviours, or self–rated ability and common method variance represented by the global ability measure. To the extent that common method variance is the most likely source of criterion contamination, these results suggest that the relatively low multiple correlations between the effort behaviours and self–rated effort are more likely to reflect criterion deficiency in the former than criterion contamination in the latter. Although the source of any deficiency cannot be identified with certainty, the three effort behaviours offer a reasonably objective, quantitative measure which fails to reflect any assessment of the quality of effort made. The relatively strong link between global effort and understanding suggests that the subjective, global effort rating may reflect an assessment of the effectiveness of the effort made, and, in doing so, help compensate for deficiencies in the effort behaviour variables. Consequently, the composite effort variable which incorporates information about effort put into appropriate study strategies with a subjective self–rating appears to offer the most useful measure of effort for use in later analyses.

Conclusion

The analyses in this section indicate that the key variables generally demonstrated sufficient reliability and validity to allow some confidence that nonsignificant paths in the models could be attributed to theoretical weaknesses rather than measurement error. The results suggested that including the global ability question with the 19 skills items, and the global self–rated effort with the three study strategies would provide more comprehensive measures of skills self–efficacy and the amount of effort made. The pattern of results for the skills and expectancies analyses also supported the earlier argument that these constructs represent somewhat different dimensions of Bandura's (1982; 1986) concept of self–efficacy.

The four–item composite self–evaluation measure which was used instead of

Bandura and Cervone's single bipolar question showed good internal consistency at each time, and acceptable criterion validity at the earlier periods. However, the negatively-worded dissatisfaction dimension demonstrated superior criterion and discriminant validity to that of the composite measure, particularly at the later times. These results indicate that the composite measure could be used to replicate Bandura and Cervone's findings, but that it would be preferable to use the dissatisfaction dimension in any revisions, especially those testing data collected at the later times.

The multi-choice test performance measure showed adequate reliability and concurrent validity with the short-answer tests which were available as independent measures of ability at three of the measurement periods. However, the chance factor which is built in to multi-choice tests will reduce the capacity of this measure to be predicted by effort. In addition, the link between students' feedback accuracy ratings and both previous performance and performance-goal discrepancy indicates that good performers, and those who achieved congruence between the goals and performance rated their feedback as providing a more accurate source of information about their performance than poor performers and those who experienced discrepancy. These results are consistent with other research linking feedback sign to perceptions of feedback accuracy, credibility or trustworthiness (Ilgen et al, 1979; Jacob et al, 1973; Taylor et al, 1984), and suggest that some people may have distorted their perceptions of their feedback (Lord & Hanges, 1987; Taylor et al, 1984). To the extent that feedback is unlikely to influence subsequent responses if it is rejected (Ilgen et al, 1979), the possibility that students' responses to feedback depend on whether they perceived it as accurate will need to be investigated if weaknesses are found in the results for Campion and Lord's (1982), Bandura and Cervone's (1983) or the integrated models.

Chapter 4.

Assessment of Three Models and the Discrepancy Explanation of Feedback

The analyses reported in this section were aimed at (a) reproducing the major findings from Campion and Lord's (1982) and Bandura and Cervone's (1983) models, (b) assessing the plausibility of the proposed integration and (c) investigating the tenability of the concept and measure of discrepancy between previous goals and performance. The extent to which the models explain a tendency to maintain high scores rather than increase them was also examined by conducting two sets of analyses in which levels score criterion variables (levels analyses) and residualised change score criterion variables (change analyses) were regressed on relevant predictor variables (see pages 42–43 for a rationale). Bandura and Cervone's (1986) prediction that performance–goal discrepancy level moderates the effect of self–evaluations and goal change on effort was examined in a final step of the omitted parameters test of the integrated model because their 1983 model did not include goals.

The three models were tested using the data collected at Time 3, immediately before the second test, which was the first measurement period for which all relevant variables were available. Data from the later periods were reserved to test any revisions which might be needed, and to replicate findings from the earlier times. The four–item composite self–evaluation variable which taps satisfaction with performance feedback was used to test the models because it represented the bipolar variable employed by Bandura and Cervone (1983; 1986) and had adequate criterion validity at the earlier periods. The omission of an ability measure reduces the capacity of all models to predict performance level but should have little effect on the performance change results.

Assessment of Existing Models

Campion & Lord's Control Systems Model

Betas for the predicted and omitted paths for the levels and change analyses of Campion and Lord's model are displayed in Table 4.1, together with the multiple correlations, zero–order correlations between the predictor and criterion variables, across–time correlations for the criterion variables and goodness of fit results.

Table 4.1: Control Systems Model Path Analyses

	Levels Analyses			Change Analyses		
Criteria *Predictors*	Predicted Path βs	Omitted Path βs	*r*	Predicted Path βs	Omitted Path βs	*r*
Performance						
Effort	.2034***	.1674***	.20	.2085***	.2001***	.21
Goals		.1912***	.24		.0041	.08
Discrepancy		−.3366***	−.31		.0683	.09
R	.2034	.4289		.2085	.2194	.45@
adj R^2	.0396	.1794		.0417	.0428	
Residuals	.9586	.8160		.9565	.9519	
Effort						
Goals	.3618***	.3618***	.37	.3253***	.3253***	.33
Discrepancy	.0838*	.0838*	.10	.0942*	.0942*	.11
R	.3752	.3752		.3429	.3429	.54@
adj R^2	.1376	.1376		.1143	.1143	
Residuals	.8592	.8592		.8824	.8824	
Goals						
Discrepancy	.0465	.0465	.05	−.2382***	−.2382***	−.24
R	.0465	.0465		.2382	.2382	.56@
adj R^2	.0003	.0003		.0550	.0550	
Residuals	.9978	.9978		.9433	.9433	
Goodness of Fit						
X & Y	.1782	.3004		.2038	.2077	
Q	.5932			.9812		
PGFI	.1977			.3270		

Note. @ *Across-time correlations*

The predicted path from discrepancy to goal level was not significant but the other three paths in the levels analyses and all four paths in the change analyses were significant. The only omitted paths in this model were from discrepancy and goals to performance. These paths were significant in the levels, but not in the change, analyses.

The goodness of fit results indicate that the change analysis Q reached an acceptable level (.98) but the levels analysis Q index of .59 was lower than the required level of .90. The Y values show that all logically possible paths accounted for relatively small proportions of the total variance in the levels (.30) and change (.21) scores, and the parsimonious goodness of fit indices (PGFIs) were also low (levels =.20; change =.33).

Together, these results show that people who experienced discrepancy feedback reduced their goals to a similar level to those set by people who achieved congruence; that people who set high goals or who experienced discrepancy increased effort more and made more effort than their counterparts; and that people who made high levels of effort improved their performance more and performed better than those who made less effort. The omitted paths results showing that people who set high goals or achieved congruence maintained, but did not improve, their performance suggest that goals and discrepancy are confounded with previous performance which, in turn, is likely to be confounded with ability.

Overall, these findings are consistent with Campion and Lord's (1982) prediction that people who experience discrepancy between their previous goals and performance can reduce goals or increase effort to try to achieve congruence in future. However, comparing the strength of the path coefficients suggests that people who experience discrepancy are less likely to increase their effort than to reduce their previously high goals to a similar level as those set by their counterparts who achieve congruence. The path coefficients and zero-order correlations also show that goal level had more effect on levels and changes in effort than did discrepancy. Together, these findings suggest that feedback about a performance-goal discrepancy has a limited capacity to encourage people to increase or maintain high levels of effort.

Table 4.2: Social Cognitive Model Path Analyses

	Levels Analyses			Change Analyses		
Criteria *Predictors*	Predicted Path βs	Omitted Path βs	*r*	Predicted Path βs	Omitted Path βs	*r*
Performance						
Effort	.2034***	.2257***	.20	.2085***	.1996***	.21
Self-Efficacy		.0404	.15		.0030	.04
Self-Eval		.0845	.25		-.1122*	-.12
Discrepancy		-.2755***	-.31		-.0029	.09
R	.2034	.3982		.2085	.2356	.45@
adj R^2	.3396	.1523		.0417	.0533	
Residuals	.9587	.8414		.9565	.9445	
Effort						
Self-Efficacy	.3086***	.3092***	.29	.2442***	.2446***	.22
Self-Eval	-.1197**	-.0601	-.07	-.1566***	-.1200*	-.12
Discrepancy		.0934	.10		.0573	.11
R	.3141	.3222		.2699	.2735	.54@
adj R^2	.0953	.0988		.0694	.0696	
Residuals	.9013	.8962		.9271	.9252	
Self-Evaluation						
Discrepancy	-.6395***	-.6395***	-.6395			
R	.6395	.6395				
adj R^2	.4079	.4079				
Residuals	.5910	.5910				

Goodness of Fit

X & Y	.4893		.5543			
Q		.8827		.4759		.4835
PGFI		.4414			.9843	
					.4922	

Note. @ *Across-time correlations*

Bandura and Cervone's (1983) Social Cognitive Model

The results in Table 4.2 show that all four predicted paths in Bandura and Cervone's 1983 model were significant in both the levels and change analyses, although the entry of the non-significant omitted path from discrepancy reduced the contribution of self-evaluations to effort level. The omitted parameters tests also show that discrepancy made a significant contribution to performance level while self-evaluations contributed to performance change. Although the levels analysis Q of .88 was lower than the required level, that for the change analysis (.98) was acceptable, and the Y values show that all paths accounted for 55.43% of the total variance in the levels scores and 48.35% of that in the change scores. The PGFIs were .44 and .49 for the levels and change analyses respectively.

Together, these analyses indicate that higher levels of discrepancy resulted in greater dissatisfaction, and that people who were dissatisfied with their performance, or had high levels of self-efficacy (expectancies of goal achievement) increased effort, and made more effort than those who were satisfied or had lower self-efficacy. The performance regressions suggest that high levels of effort helped students improve their performance and perform better than those who made less effort, while people who achieved congruence maintained their previous high performance levels and those who were dissatisfied improved and performed at a similar level to people who were satisfied. These results are consistent with Bandura and Cervone's (1983) social cognitive model which proposes that people with high self-efficacy who are dissatisfied with their performance show the greatest increases in effort while those with low self-efficacy who are satisfied show the least.

Assessment of the Integrated Model

Table 4.3 shows that all 10 of the predicted paths in the integrated model were significant in both the levels and change analyses, although the paths from self-evaluations to goal level and expectancy level and change were weaker (significant at $p < .05$) than the other paths. However, the omitted parameters tests show that goals accounted for the effect of self-evaluations on expectancy level and discrepancy accounted for the effect of self-evaluations on goal change. Discrepancy also made additional contributions to levels of skills self-efficacy and goals, both goals and

Table 4.3: Integrated Model Path Analyses

	Levels Analyses			Change Analyses		
Criteria *Predictors*	Predicted Path βs	Omitted Path βs	*r*	Predicted Path βs	Omitted Path βs	*r*
Performance						
Effort	.2034***	.1623***	.20	.2085***	.1897***	.21
Expectancy		.0220	.15		.0060	.04
Goals		.1779***	.24		.0390	.08
Skills		.0168	.13		−.0260	.01
Self–Eval		.0228	.25		−.1184*	−.12
Discrepancy		−.3184***	−.31		−.0078	.09
R	.2034	.4304		.2085	.2385	.45@
adj R^2	.0396	.1760		.0417	.0462	
Residuals	.9586	.8148		.9565	.9431	
Effort						
Goals	.3428***	.3298***	.37	.3250***	.3271***	.33
Expectancy	.2450***	.2753***	.29	.1839***	.1809***	.22
Self–Eval	−.1668***	−.1703**	−.07	−.2012***	−.2211***	−.12
Skills		.0435	.20		.0086	.14
Discrepancy		.0010	.10		−.0288	.11
R	.4572	.4589		.4148	.4154	.54@
adj R^2	.2046	.2032		.1674	.1663	
Residuals	.7910	.7894		.8279	.8274	
Expectancy						
Skills	.2806***	.2495***	.30	.1704***	.1722***	.19
Self–Eval	.0976*	.0327	.15	.0855*	.0199	.12
Goals		.1150*	.21		.0223	.08
Discrepancy		−.0804	−.10		−.0964	−.11
R	.3131	.3331		.2038	.2165	.52@
adj R^2	.0946	.1043		.0380	.0397	
Residuals	.9020	.8890		.9584	.9531	

Table 4.3 continued

	Levels Analyses			Change Analyses		
Criteria *Predictors*	Predicted Path βs	Omitted Path βs	*r*	Predicted Path βs	Omitted Path βs	*r*
Goals						
Skills	.3380***	.3180***	.36	.1847***	.2094***	.21
S-Eval	.1045*	.2400***	.16	.1350***	-.0322	.17
Discrep		.2063***	.05		-.2546***	-.24
R	.3711	.4031		.2474	.3146	.56@
adj R^2	.1345	.1578		.0573	.0939	
Residuals	.8623	.8375		.9388	.9011	
Skills						
S-Eval	.1780***	.2796***	.18	.1439***	.0744	.14
Discrep		.1589***	-.02		-.1086	-.16
R	.1780	.2159		.1439	.1664	.70@
adj R^2	.0299	.0430		.0189	.0240	
Residuals	.9683	.9534		.9793	.9723	
Self-Eval						
Discrep	-.6395***	-.6395***	-.64			
R	.6395	.6395				
adj R^2	.4079	.4079				
Residuals	.5910	.5910				
Goodness of Fit						
X & Y	.6625	.7302		.5876	.6149	
Q	.9073			.9556		

Note. @ *Across-time correlations*

discrepancy contributed additional variance to performance level, and self–evaluations had an additional effect on performance change.

The goodness of fit results show that the Q indices for both the levels and change analyses exceeded .90. The Y values for the two sets of analyses of .73 and .61 and PGFIs of .48 and .50 were also higher than those for either the control systems or the social cognitive models.

Bandura and Cervone's (1986) predictions that discrepancy moderates the effect of self–evaluations and goals on effort change were tested by conducting a further analysis in which the interaction terms were entered in a final step to the effort regressions. The results showed that the discrepancy x self–evaluation interaction made a significant contribution to effort level (β = −.1045, p <.01), but not to effort change (β = −.0688 p >.05). However, the discrepancy x goal change interactions failed to contribute to either levels (β = −.04, p >.05) or changes (β = .01, p >.05) in effort.

Overall, the predicted path results offer reasonable support for the proposed integration of Campion and Lord's (1982) and Bandura and Cervone's (1983) model. People who achieved congruence were more satisfied with their performance than those who experienced discrepancy, and those who were satisfied tended to raise their skills ratings and rate their skills more highly than people who were dissatisfied by their previous performance feedback. Those who were satisfied or had high skills self–efficacy increased their goals and expectancies of achieving them so that their goals and expectancies were higher than those of their counterparts. People who set high goals, who had high expectations of achieving their goals, or who were dissatisfied with their previous performance tended to increase their effort and make more effort than their counterparts, and those who made a great deal of effort improved their performance more, and performed better than people who made less effort.

The predicted path results also supported the integrated model predictions that goal level partially mediates the effect of discrepancy on effort level and change while the non–significant discrepancy x goal change interactions failed to confirm the moderating effect of discrepancy on the link between goal change and effort which Bandura and Cervone found in their 1986 study. However, the present results offered mixed support for Bandura and Cervone's (1986) discrepancy x self–evaluation

moderator by showing that self–evaluation contributed to effort change, independently of discrepancy, but the direction of the link between self–evaluations and effort level depended on the level of discrepancy. Crossbreaks were used to examine the mean previous and current effort scores for four groups which were obtained by splitting the sample at the median scores for discrepancy and self–evaluation. These data showed that people who experienced discrepancy between their previous goals and performance maintained high levels of effort if they were dissatisfied but further reduced their low effort levels if satisfied, while those who achieved congruence maintained low effort levels if dissatisfied, but reduced their high effort levels to average if satisfied. These results offer some support for the logic underlying Bandura and Cervone's predicted interaction, but emphasise a link between satisfaction and low effort levels rather than that between dissatisfaction and increased effort which Bandura and Cervone described (1986).

Although the predicted path results offered general support for the integrated model, the omitted parameters tests failed to support predictions that self–evaluations fully mediate the effects of discrepancy on skills self–efficacy, goals and expectancies. Suppressor effects (see Appendix 4) resulted in both self–evaluations and discrepancy contributing to levels of skills self–efficacy and goals, while goal level rather than either discrepancy or self evaluations contributed to expectancy level. Discrepancy, instead of self–evaluations influenced goal change, while multi–collinearity resulting from the strong correlation between discrepancy and self–evaluations resulted in neither variable contributing to changes in skills self–efficacy or goals when both were entered into the regression. Overall, these results cast doubt on the extent to which Bandura and Cervone's concept of self–evaluations mediates the effect of discrepancy on any variables other than effort, and suggest that this variable may have a relatively limited role in the integrated goal–setting and feedback model.

Assessment of Discrepancy

Endogenous variables collected at Time 3, the first period for which all variables were available, were regressed on the two components of discrepancy (previous goals and performance) to assess the tenability of the discrepancy explanation of feedback functioning. Data from the final period (Time 6) were also

examined in case discrepancy effects become stronger as experience with the task increases. Effort, goals and self-evaluations were examined because the control systems or social cognitive models predict that discrepancy has a direct effect on these variables, and expectancy and skills self-efficacy were included because the omitted parameters tests for the integrated model indicated that these variables were influenced by discrepancy rather than self-evaluations. However, the contribution of the discrepancy components to goals must be interpreted with caution because the calculation of discrepancy as 'previous goals minus performance' and of goal change as 'current goals minus previous goals' results in previous goal level serving as a component score of both discrepancy and goal change. Under such circumstances, the entry of the previous goal component of discrepancy into the goal level analysis converts the criterion variable into a change score, and the residualisation procedure used to compute change scores ensures that previous goal level is independent of goal change (Cohen & Cohen, 1983). Consequently, the effects of the discrepancy component variables on goal level and change were examined further by splitting the sample at the median scores for previous goals and performance and conducting a graphic analysis of the data collected at each measurement period.

The results of the components analyses were evaluated according to Edwards' (1994) criteria which require that (a) the two components, together, to account for a significant increment in the explained variance, (b) the betas for both components be significant and (c) the component betas be opposite in direction to each other and similar in size. The direction of the component variable contributions can be determined from their links with discrepancy. Given that discrepancy was computed by subtracting performance from goal level, performance makes a negative contribution to discrepancy while that for goal is positive. Thus, in the effort regressions, the previous goal betas should be positive and those for performance negative, and in the goal, expectancy, skill self-efficacy and self-evaluation regressions, the previous goal betas should be negative and those for performance should be positive.

Table 4.4: Discrepancy Components Analyses, Time 3 and Time 6.

	Time 3.		Time 6.	
Criteria *Predictors*	Levels *β*s	Change *β*s	Levels *β*s	Change *β*s
Effort				
Prev. *Perf*	−.0096	−.0897*	−.0311	−.0923
Prev. Goals	.2111***	.0882*	.2652***	−.0114
Component *R*	.2093***	.1119*	.2609***	.0953
Discrep *r*	.1006*	.1094*	.1669***	.0598
Expect				
Prev. Perf	.1908***	.1310**	.1728***	.1098*
Prev. Goals	.1110**	−.0194	.1579***	.1708***
Component *R*	.2400***	.1284**	.2560***	.2203***
Discrep *r*	.1010	.1115**	−.0374	.0145
Goals				
Prev. *Perf*	.2258***	.2715***	.1282***	.1689***
Prev. Goals	.5079***	−.0565	.6258***	−.0332
Component *R*	.5974***	.2655***	.6631***	.1656***
Discrep *r*	.0465	−.2382***	.2496***	−.1389**
Skills				
Prev. Perf	.1882***	.1909***	.1684***	.1243**
Prev. Goals	.2904***	−.0141	.2741***	.0618
Component *R*	.3777***	.1885***	.3488***	.1493**
Discrep *r*	.0199	−.1562***	.0290	−.0552
Self-Eval				
Prev. Perf	.7512***		.5457***	
Prev. Goals	−.1119***		−.0146	
Component *R*	.7360***		.5430***	
Discrep *r*	−.6395***		−.3980***	

Note. Prev. Perf = previous performance
Prev. Goals = previous goals

Components Regressions

The significant Time 3 multiple correlations in Table 4.4 meet Edward's first criterion by showing that, together, the two components explained significant proportions of the variance in all of the endogenous variables. However, the non-significant contributions of performance to effort level, and of previous goals to expectancy, goals and change in skills self-efficacy fail to satisfy the second criterion. Although the non-significant contribution of previous goals to current goals can be attributed to the residualisation, performance was slightly more strongly correlated with goal change (r .26) than was discrepancy (r -.24). Both components made significant contributions to the remaining endogenous variables but the expectancy, goal and skill self-efficacy level regressions failed to meet the third criterion because both betas were positive. The self-evaluation regression also failed to meet the third criterion because the positive performance beta accounted for considerably more variance (52.97%) than the negative contribution of previous goals (1.2%).

In contrast with the preceding results, the Time 3 results for effort change met all three criteria: the component betas were opposite in direction to each other, virtually identical in size and, although small, both betas and the multiple correlation were significant (p <.05). However, this effect disappeared at Time 6 when both components made negative contributions to effort level and neither the betas nor the multiple correlation were significant. The multiple correlations for the other criterion variables were all significant at Time 6 but previous goals failed to contribute to self-evaluations, or changes in skills self-efficacy and goals. Both components made positive contributions to levels of skills self-efficacy and goals, and to expectancy level and change. As with the Time 3 data, performance was slightly more strongly correlated with goal change (r .16) than was discrepancy (r -.14). Overall, the Time 6 results (see Table 4.4) offer no evidence to suggest that discrepancy effects become stronger over time.

Since the Time 3 effort change regressions offered some support for a discrepancy effect, Campion and Lord's (1982) predictions were assessed further by entering the predicted path from current goals into the equation on a final step. As shown in Table 4.5, the effort level regressions still failed to meet the second criterion because the beta for previous goals became non-significant after the entry of current

Table 4.5: Contribution of Discrepancy Components and Current Goals to Effort

	Time 3.		Time 6.	
Criteria *Predictors*	Levels βs	Change βs	Levels βs	Change βs
Effort				
Prev. Perf	−.0980*	−.1988***	−.0900*	−.1525***
Prev. Goals	.0123	−.1571***	−.0172	−.3048***
Curr. Goals	.3914***	.4829***	.4514***	.4688***
Component *R*	.3773	.4031	.4269	.3636
Discrep *R*	.3752	.3429	.4227	.2320

Note. *Prev. Perf* = previous performance
Prev. Goals = previous goals
Curr. Goals = current goals

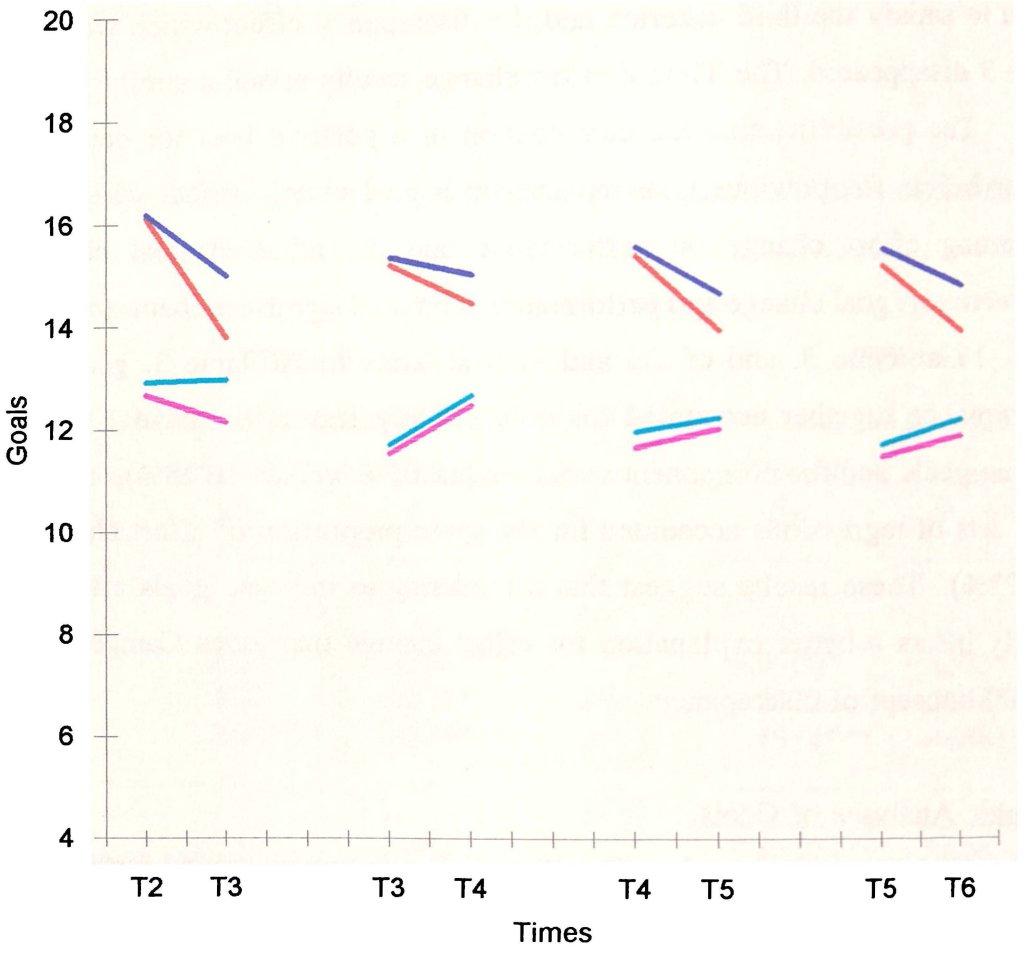
goals at both times. When the predicted path from current goals was entered into the effort change regression for Time 3, the significant negative betas for both components failed to satisfy the third criterion and the discrepancy effect which was apparent at Time 3 disappeared. The Time 6 effort change results reveal a similar pattern.

The possibility that the combination of a positive beta for current goal and negative beta for previous goal represented a goal change effect was examined by regressing effort change on performance and the adjusted goal change scores. Respectively, goal change and performance produced significant betas (p <.001) of .40 and −.17 at Time 3, and of .36 and −.15 at Time 6. At Time 3, goal change and performance together accounted for only slightly less effort change variance than current goals and the component variables (15.07% versus 16.25%), but at Time 6, both sets of regressions accounted for the same proportion of effort change variance (13.22%). These results suggest that a tendency to increase goals after performing poorly offers a better explanation for effort change than does Campion and Lord's (1982) concept of discrepancy.

Graphic Analyses of Goals.

The discrepancy explanation of goal change was examined further by splitting the sample at the median scores for the two discrepancy component variables (previous goals and performance) and conducting a graphic analysis. The results were examined to assess whether the pattern of results produced by (a) different groups at the same time and (b) the same groups at different times were consistent with their mean discrepancy scores. Mean previous and current goal scores for the four groups are plotted in Figure 4.1. Mean post scores at one period differ from the mean pre-scores at the following time because individuals who scored above the median at some times and below at others were included in different groups at different times.

The mean discrepancy scores which are also listed in Figure 4.1 show that people who set high goals but performed poorly experienced the highest levels of discrepancy at each period, while the negative mean scores for those who set low goals and performed well all fell in the congruence range. The group which set low goals and performed poorly had higher mean levels of discrepancy than the one which set high goals and performed well, but both achieved congruence at the final period.



	T2	T3	T4	T5
Hi Goal Lo Perf Mean Discrep	5.83	6.72	5.03	2.79
Lo Goal Lo Perf Mean Discrep	2.72	3.45	1.95	-0.4
Hi Goal Hi Perf Mean Discrep	1.07	2.35	0.66	-1.2
Lo Goal Hi Perf Mean Discrep	-1.8	-0.86	-2.52	-4.5

Figure 4 .1: Contribution of Discrepancy Components to Goals

These results confirm the earlier argument that the probability of discrepancy occurring increases as goals increase and performance decreases. The relative ordering of the groups also confirms that discrepancy tended to be more strongly linked with poor performance than high goals.

The ordering of the mean current goal level scores for the four groups was consistent across the measurement times. The group with low mean discrepancy levels (high goals – good performance) set the highest subsequent goals, followed by the high discrepancy group (high goals – poor performance). The moderate discrepancy group (low goals – poor performance) set the lowest goals at Time 3, but at the later periods their goals were very similar to those of the congruence group (low goals – good performance).

Comparing the pattern of goal change demonstrated by the four groups at the same times offers limited support for a discrepancy effect. Differences between the mean scores for Time 2 and Time 3 goals indicate that the high discrepancy group demonstrated the greatest decrease in goals, and the congruence group tended to maintain goals. However, the low discrepancy group reduced their goals more than the group which had moderate discrepancy levels. In addition, at the later periods, both groups which set high goals previously (high and low discrepancy groups) reduced them, while both groups whose previous goals were low (moderate discrepancy and congruence) increased their goals. Within the high goal groups, poor performers reduced their goals somewhat more than good performers, but both low goal groups increased their goals regardless of performance or discrepancy level.

Comparing the extent to which each group changed its goals at each of the four intervals between the measurement periods suggests that previous goal level has more effect on goal change than does discrepancy. If discrepancy were responsible for goal change, the greatest decreases should occur between Times 3–4 when discrepancy levels were highest, and the highest increases between Times 5–6 when discrepancy levels were lowest and the mean scores for three of the groups fell in the congruence range. However, the group which set high goals and performed poorly showed slightly less goal reduction when its discrepancy levels were lowest, and the group which performed well after setting high goals displayed about the same decrease regardless of whether it achieved its highest level of congruence or its greatest level of

discrepancy. Similarly, the group which performed poorly after setting low goals demonstrated slightly less increase in goals when it achieved congruence than when its discrepancy level was highest, and the group which performed well after setting low goals showed slightly less increase when its congruence levels were highest than when they were lowest. In contrast, at the Time 2–3 interval when all groups set their highest initial goals, both high goal groups reduced their goals more than at any other time and the two low goal groups maintained or decreased their goals instead of increasing them as at other periods when their initial goals were lower.

Since the preceding results indicate that performance had more influence on goal level and change if previous goals were high than if they were low, further regressions were conducted to determine whether the components interacted to influence the criteria. The previous goal x previous performance interaction made significant contributions to goal level and change which accounted for the effect of previous performance at all periods except Time 4 when the beta for performance was not significant before the entry of the interaction. (The interaction term also made a significant contribution to effort level at Time 6, but this became non–significant when current goal level was entered. The interaction failed to contribute to any other criteria).

Discrepancy assessment summary. Overall, the results of the components analyses cast considerable doubt over the tenability of the concept of discrepancy in explaining responses to feedback. When effort level was regressed on the two discrepancy component variables the results indicated that people who set high goals previously made high levels of effort and previous performance had little effect. However, when current goals was entered in the regression, the results suggested that the highest levels of effort were made by people who set high goals after performing poorly. This pattern of results suggests that the significant discrepancy – effort level correlation reflects the previous goal component of discrepancy, and the significant discrepancy beta obtained in the results for the control systems model was due to the performance component.

The initial analysis supported a discrepancy explanation for effort change and the use of an algebraic difference score at Time 3, but this effect disappeared by the final measurement period. Further regressions which included current goals as a

predictor suggest that the greatest increases in effort were shown by people who increased their goals (i.e. set low goals on the earlier test and high goals on the later one) after performing poorly. The goal change explanation for the negative previous goal beta was supported by the significant contributions which goal change and performance made to effort change and the similarity in the multiple correlations produced by the 'goal change plus performance' and 'current goal plus components' analyses. These results suggest that the positive beta for previous goals in the analyses which excluded current goals reflected the strong link between previous and current goals, and the negative beta in the analyses which included current goals arose from the role of previous goals as a component of goal change rather than discrepancy.

In the goal level components analyses, the positive betas for both components at both times indicate that the highest goals were set by students who set high goals previously and performed well. These results contrast with the negative previous goal beta required to demonstrate a discrepancy effect which predicts that the highest goals will be set by people who perform well after setting low goals. The graphic analyses confirmed the components analysis results, but revealed an interaction which indicated that good performers set higher goals than poor performers if their previous goals were high, but those who set low goals previously continued to do so regardless of performance levels.

The components analysis zero-order correlations showed that previous performance tended to account for somewhat more of the variance in the residualised goal change scores than did discrepancy. However, these results could be expected as discrepancy was more strongly linked with previous goals (r .44) than was performance (r .21) and the variance the predictors share with previous goals becomes error variance when the residualisation procedure removes the effect of previous goals from the goal change scores. These results indicate that Edwards' (1994) criteria are inappropriate for assessing the discrepancy explanation of goal change because previous goals is a component of both discrepancy and goal change.

The graphic analyses showed that the pattern of goal change demonstrated by the groups with the highest mean discrepancy and highest mean congruence scores were consistent with a discrepancy effect, but those for the moderate and low discrepancy groups were not. Overall, there was little evidence that the extent of goal

change reflected the mean discrepancy scores for either the different groups at the same time, or for the same groups at different times. Comparing the degree of goal change for each group across the four measurement periods showed that both high goal groups reduced their goals while both low goal groups tended to maintain or increase their goals. These results suggest that regression to the mean offers a better explanation for goal change than does discrepancy.

The significant interaction between the components indicates that good performers were less likely to reduce their goals than poor performers if previous goals were high, while people who set low goals previously tended to increase them slightly, regardless of performance level. The significant interactions contrast with a discrepancy effect which assumes that the difference, rather than the interaction, between the components influences goal level and goal change.

The Time 3 self–evaluation results indicated the rudiments of a discrepancy effect by showing that the people who were most satisfied were those who performed well after setting low goals. Such people are the most likely to have achieved congruence between their goals and performance. However, the difference in the size of the component betas indicate that an algebraic difference score represents an inappropriate measure of the concept, and the discrepancy effect disappeared by the final period when the contribution of previous goals to self–evaluations was not significant. In addition, Hotelling's test for differences between correlations drawn from the same sample (Guildford & Fruchter, 1978, p164) showed that satisfaction was more strongly correlated with previous performance than with discrepancy at both Time 3 (t_{dr} = 4.59 > 3.29, p<.001) and Time 6 (t_{dr} = 4.86 > 3.29, p<.001).

The pattern of results for expectancy and skills self–efficacy level are similar to those for goal level in suggesting that people who set high goals previously tended to have higher expectancies and skills self–efficacy than those who set low goals, particularly if they performed well. The non–significant contribution of previous goals to change in skills self–efficacy at both times, and expectancy change at Time 6 suggest that the positive levels betas for previous goals reflected its links with previous skills self–efficacy and expectancies. In general, these results suggest that levels and changes in skill self–efficacy and expectancies were influenced by performance rather than discrepancy.

Conclusion

The path analyses offered some support for the initial control systems (Campion & Lord, 1982) and social cognitive (Bandura & Cervone 1983) models, and that which incorporated the major concepts from both earlier models. The results of the control systems change analyses are similar to those found by Campion and Lord who used correlations to demonstrate that higher levels of discrepancy were linked with greater increases in effort, and chi squares to show that people who experienced discrepancy tended to reduce goals while those who achieved congruence tended to raise goals. Both the levels and change analyses used to assess the social cognitive approach produced results which were consistent with the correlations Bandura and Cervone (1983) found between effort change and expectancy self–efficacy, and effort change and dissatisfaction with previous performance. The present results are also consistent with Bandura and Cervone's (1983) in showing that effort change was more strongly linked with expectancy than with dissatisfaction, although the two predictors accounted for considerably less of the effort change variance in the present study than did Bandura and Cervone's composite 'expectancy plus dissatisfaction' variable. Overall, the results of the present study offer some tentative support for both the control systems and the social cognitive approaches to goal–setting and feedback.

The path analyses also supported the proposed integration of the control systems and social cognitive models. All predicted paths were significant in both the levels and change analyses and the variables predicted by the integrated model accounted for a greater proportion of the variance in effort level (20.9%) and effort change (17.21%) than the control systems (14.08% and 11.76%) or social cognitive (9.87% and 7.29%) models. The integrated model also accounted for a significant proportion of the goal level variance (13.77%) while the control systems model did not, and slightly more of the goal change variance (6.12%) than the control systems model (5.67%).

In addition, the results supported the integrated model predictions that self–evaluations and goals mediate the effect of discrepancy on effort change, rather than Bandura and Cervone's (1986) prediction that discrepancy moderates the effect of self–evaluations and goal change on effort change. The direct contribution of self–evaluation and goals to effort change and non–significant discrepancy x self–

evaluation and discrepancy x goal change interactions contrast with Bandura and Cervone's finding that goal change failed to influence effort change in the marked discrepancy group, and that self-evaluations failed to influence effort change in the minimal discrepancy and congruence groups. These findings are consistent with the earlier suggestion that Bandura and Cervone's (1986) results arose partly from attenuated variability arising from dividing their sample into small, relatively homogeneous groups. However, the significant discrepancy x self-evaluation interaction in the levels analysis indicated that people who were dissatisfied with discrepancy made higher levels of effort than other people. Since the normative data indicated that effort levels generally decreased across the tests, this finding offered some support for the logic underlying Bandura and Cervone's (1986) moderator prediction.

The goodness of fit results also favoured the integrated model. The Q indices for the analyses using levels scores as criterion variables showed that the predicted paths in the integrated model accounted for 90.73% of the variance which would be explained if all logically-possible paths were included, while that for the social cognitive model accounted for 88.27% and the control systems model predicted paths explained only 59.23%. However, all three models produced Q indices which exceeded the required level of .90 for the analyses using residualised change scores as criterion variables. Since goals and discrepancy influenced performance level, but not change, the differences between the levels and change Q indices could be due to the omission of ability as a predictor.

Although the integrated model Q was slightly lower than those for the earlier models, the X values show that the predicted paths in the integrated model accounted for a greater proportion of the variance in total change scores than either of the original models. The integrated model Y values for both the levels and change analyses were also considerably higher than those for the original models, while the integrated model PGFIs were slightly higher than those for Bandura and Cervone's model and considerably stronger than those for Campion and Lord's model. The low Y values for the original models showing that the predicted and omitted paths together account for relatively little of the total variance in scores indicate that some relevant variables were excluded from each, while the small PGFIs for Campion and Lord's

model show that much of the goodness of fit was achieved at the expense of parsimony. Together, these results suggest that incorporating different measures of Bandura and Cervone's (1983) concept of self-efficacy with Campion and Lord's distinction between cognitive and behavioural change offers a more comprehensive model to help predict when people choose to increase effort rather than reduce goals.

In spite of the support for the existing models and the proposed integration, effort explained relatively small proportions of the variance in performance level and change, and the omitted parameters tests identified weaknesses in the integrated model by suggesting that discrepancy, rather than self-evaluations, influences expectancy, goals and skills self-efficacy. This weakness was further compounded by the results of the components analyses which cast considerable doubt over the tenability of the discrepancy explanation of feedback functioning which underpins all three models. Although the tests of the initial models found that discrepancy between previous goals and performance made significant contributions to the variables predicted by Campion and Lord (1982) and Bandura and Cervone (1983), the components analyses suggested that the performance component accounted for most of discrepancy's contribution to self-evaluations, expectancy and skills self-efficacy, and that the previous goal contribution simply reflected the positive links between the variables at the previous time.

The Time 3 results offered some support for Campion and Lord's prediction that people who experience discrepancy between their previous goals and performance increase their effort to try to achieve congruence in future. However, when current goal was entered, the positive beta for previous goals became negative. These results indicate that the people who increased effort the most were those who increased their goals after performing poorly, and not those who maintained their goals after experiencing discrepancy, as predicted by the control systems theory. Campion and Lord's (1982) use of zero-order correlations to assess the link between discrepancy and a difference score measure of effort change did not assess the contribution of current goals, and failed to identify the potential for goal change to be confounded with discrepancy.

The graphic analyses failed to support the discrepancy explanation of goal level and change by showing that the extent of goal change failed to vary consistently with

the mean discrepancy scores for different groups at the same time, or for the same groups at different times. Further analyses showed that the contribution of the two discrepancy component variables was interactive, rather than 'additive', as implied by the conceptualisation of discrepancy as the difference between previous goals and performance. The significant interactions indicated that good performers tended to reduce their goals less, and set higher goals than poor performers, but only if previous goal levels were high. People who set low goals previously increased them slightly, regardless of performance level, but continued to set lower goals than people whose previous goals were high.

In addition to the disconfirming evidence provided by the graphic analyses, the proposed link between discrepancy and goal change appears to be flawed at both a conceptual and a practical level. At a conceptual level, the proposition that discrepancy (previous goals minus performance) predicts goal change (current goals minus previous goals) simply includes previous goal variance in both the predictor and criterion. If the previous goal variance remains, as when difference scores are used, the link between discrepancy and goal change is artificially inflated by the perfect correlation between the previous goal component which the predictor and criterion share; if the previous goal component is removed from the criterion by using adjusted change scores, the previous goal component necessarily becomes error variance and reduces the prediction; if the previous goal variance is removed from both predictor and criterion, the contribution of discrepancy to goal change can be attributed totally to that of performance to current goal level. Thus, logically, any discrepancy effects must be due to the performance component because adding and removing a constant amount of variance to the predictor and criterion variables is unlikely to increase the explanatory power of the other component.

The proposition that discrepancy predicts goal change is also flawed at a practical level because it assumes that discrepancy is not confounded with its components and that goal change is independent of previous goal level. However, people who set high goals and those who perform poorly do not have an equal chance of experiencing either discrepancy or congruence because the probability of achieving a goal diminishes as goal levels increase and performance decreases. The confounding of discrepancy with its components was demonstrated by the results in Figure 4.1

which showed that the group which set high goals and performed poorly had the highest mean discrepancy levels while the mean scores for the group which set low goals and performed well all fell in the congruence range. The confounding of discrepancy with its components is further compounded by the general tendency for pre-scores to show relatively strong negative correlations with unadjusted change scores (Cohen & Cohen, 1983). This effect was demonstrated in the graphic analyses.

The preceding discussion indicates that the contribution of discrepancy to goal change reflects the joint effect of the over-representation of people who set high goals or performed poorly among those who experienced discrepancy, together with the tendency for people to reduce high goals and increase low goals. Consequently, the link between discrepancy and goal change can be attributed to the effect of two statistical artifacts: the probability of achieving a goal and the tendency for goal scores to regress to the mean. Campion and Lord's use of chi squares to compare the numbers of people who increased versus decreased goals according to whether they achieved them disguises, rather than avoids, the problems arising from such statistical artifacts.

The general tendency for only one component to be significantly linked with the criteria, or for both betas to have the same sign suggests that problems with discrepancy were related to the concept itself rather than with the use of the algebraic difference score to measure the concept. These results offer no support for the tenability of the discrepancy explanation of goal and effort change proposed by Campion and Lord (1982), and suggest that the model should be revised to include previous performance instead of discrepancy as the only exogenous variable.

Chapter 5

Assessment of Effort, Self-Evaluations and Perceived Feedback Accuracy

A number of issues raised by the earlier analyses needed to be clarified before the integrated model was revised. In particular, possible causes of the relatively weak link between effort and performance, the role of Bandura and Cervone's concept of self-evaluations, and the effect of students' perceptions of the accuracy of their feedback need to be explored further to help ensure the usefulness of any revised model utilising these concepts.

Tests of the original models showed that dissatisfaction, high goals and high expectancies predicted effort level and change, but that effort made a relatively small contribution to performance. Although error variance in the performance measure arising from the chance factor inherent in multi-choice tests reduces the link between effort and performance, the small proportion of explained variance may indicate that performance is determined primarily by ability, for which there was no independent measure at Time 3. The significant contributions which goals and discrepancy made to performance level suggest that this possibility needs to be assessed.

An alternative explanation is offered by the consistency between the present pattern of findings and a recent study by Cervone, Jiwani and Wood (1991). These authors found that people who were dissatisfied with poor performance put more effort into decision making than those who were satisfied but failed to improve their performance on a complex task because they used less effective task strategies. Their results, like other research cited earlier (eg. Wood & Bandura, 1989a; 1989b; Wood et al, 1987) stress the importance of using effective task strategies, and raise questions about the appropriateness of incorporating the amount of effort put into three study strategies into a composite effort measure, as was done in the present study. Initially, it was assumed that multi-choice tests represent a relatively straight-forward task for university students, and that attending classes, making study notes, and spending time studying would all contribute to performance. Some support for these assumptions was offered by the preliminary analyses which showed that all three strategies contributed to self-rated effort at each time, and to students' perceptions of their understanding of the material on three or more occasions. However, results for the initial models in

the present study and Cervone and colleagues (1991) findings indicate that the contribution of each of the strategies to performance on the tests should be established empirically to assess the effectiveness of each strategy, and the appropriateness of combining them with self-ratings of effort into a composite measure.

A second issue arises from the results of the integrated model which indicated that the predicted effects of self-evaluations on skills self-efficacy, goals and expectancies were relatively weak. These results are consistent with a recent study by Bandura and Jourden (1991) whose path analyses showed that satisfaction failed to predict goals or the expectancy dimension of self-efficacy. Other recent studies which have examined these variables have failed to report any links between satisfaction and self-efficacy (Cervone et al, 1991; Stock & Cervone, 1990) or satisfaction and goals (Cervone et al, 1991).

Results of the present study's validity analyses for the positively-worded satisfaction questions suggest that the weak effects of self-evaluations may be due to people who are satisfied with their feedback finding it unmotivating. Together, these findings cast doubt on the possibility that self-evaluations mediate the effect of performance feedback on self-efficacy and goals, and on Bandura's (1986) suggestion that high levels of satisfaction can create inducements for future performance. However, none of the studies examined possible moderator effects, even though Bandura and Cervone (1986) proposed that discrepancy interacts with self-evaluations, and Baron and Kenny (1986) note that searching for moderators is a typical response when predictors account for unexpectedly low proportions of variance. Bandura and Cervone's (1986) results and the significant contribution which the discrepancy x self-evaluation interaction made to effort level in the integrated model analyses suggest that the effect of self-evaluations on other variables may be moderated by the performance component of discrepancy. This possibility predicts that people who are dissatisfied make high levels of effort only if previous performance was poor, while those who are satisfied show increases in their skills self-efficacy, goals and expectancies if previous performance was good, but decreases if previous performance was poor.

A final consideration arises from the reliability and validity analyses which revealed a tendency for poor performers to rate their feedback as less accurate than

good performers did. This finding suggests that the weaknesses in the integrated model may result from perceptions of feedback accuracy moderating the effect of performance or self–evaluations on other outcomes. If so, performance can be expected to be associated with self–evaluations, skills self–efficacy, goals and expectancies, only if people believe that their feedback provides accurate information about their performance. Consequently, the effects of both performance and self–evaluations could depend on perceptions of feedback accuracy, and the failure of self–evaluations to mediate links between performance and other variables could be due to the moderating effect of perceived accuracy rather than performance. This possibility is consistent with Lord and Hange's (1987) contention that distorting negative feedback offers an alternative to increasing effort or reducing goals in response to negative feedback.

In view of the problems identified in the preliminary analyses and tests of the initial models, the aims of this chapter were to (a) assess causes of the poor capacity of the composite effort variable to predict performance and (b) examine possible moderator effects which may explain the failure of self–evaluations to mediate links between the performance component of discrepancy and other responses.

Effects of Effort on Performance

Two potential explanations for the relatively low multiple correlations for performance level and change were examined. The possibility that some variables included in the composite effort measure were inappropriate was assessed by determining whether self–rated effort and effort put into the three study strategies all contributed additional variance to performance level and change independently of each other. The possibility that performance was determined by ability rather than by effort was assessed in a further analysis which examined the relative contributions of short answer test scores from the previous test and the four effort measures to subsequent performance level and change at Times 4 and 6, which were the only periods for which short answer scores from previous tests were available.

The betas in the first column of Table 5.1 show that self–rated effort made significant contributions to performance level and change at each period, independently of the study strategies. The frequency with which students made study

Table 5.1: Contribution of Effort Variables to Performance.

	Performance Levels			Performance Change		
Times *Predictors*	Effort βs	Effort & Abl. βs	*r*	Effort βs	Effort & Abl. βs	*r*
Time 2						
Effort	.1296***		.16			
Notes	.1168*		.16			
Attend	.1167*		.12			
Study	−.0387		.02			
R	.2285					
Time 3						
Effort	.2017***		.22	.1827***		.21
Notes	.1065*		.17	.1057*		.17
Attend.	.1034*		.14	.1189**		.16
Study	−.1170*		−.00	−.0911		.02
R	.2783			.2717		
Time 4						
Effort	.2340***	.2154***	.24	.2077***	.1964***	.24
Notes	.1021*	.1067*	.18	.0853	.0881	.16
Attend.	−.0452	−.0685	.01	−.0633	−.0775	.00
Study	−.0401	−.0225	.08	.0338	.0445	.13
Ability		.3327***	.34		.2026***	.21
R	.2667	.4253		.2606	.3296	
Time 5						
Effort	.1849**		.18	.1645**		.14
Notes	.0317		.09	.0164		.06
Attend.	−.0153		.03	−.0171		.01
Study	−.0201		.07	−.0565		.02
R	.1859			.1489		
Time 6						
Effort	.2175***	.2118***	.36	.2407***	.2384***	.39
Notes	.0972*	.0796	.25	.0710	.0640	.24
Attend.	.2269***	.1575***	.33	.2804***	.2528***	.39
Study	.0541	.0914	.25	.0651	.0800	.26
Ability		.3298***	.38		.1311**	.20
R	.4363	.5419		.4891	.5055	

notes also contributed to performance level at all periods except Time 5, and to performance change at Time 3 while class attendance contributed to performance level at Times 2, 3, and 5 and to performance change at Times 3 and 6. In contrast with the other components of composite effort, the number of hours spent studying failed to contribute to either performance level or change except at Time 3 when it made a negative contribution to performance level. Correlations between hours spent studying and performance were also low at all except Time 6, as were those for attendance at Times 4 and 5, and study note use at Time 5.

Ability, as measured by short answer scores for the previous test, made significant contributions to performance level and change at Times 4 and 6 and explained a greater proportion of the variance in performance level than any of the effort measures. Ability and self-rated effort made similar contributions to performance change at Time 4, but ability explained less of the performance change variance than either self-rated effort or class attendance at the final period. The ability betas remained significant in both the levels (Time 4 β =.21***; Time 6 β =.15***) and change analyses (Time 4 β =.23***; Time 6 β =.17***) after the entry of previous performance.

These results show that self-rated effort and ability were consistent predictors of performance level and change and that making study notes and attending classes contributed to performance at some test periods, while the number of hours spent studying did not. These findings indicate that the inclusion of study strategies in the composite effort measure, and the omission of an ability measure both limited the capacity of the models to predict performance level and change.

Performance, Self-Evaluations and Accuracy Moderators

The possibilities that (a) the effect of self-evaluations on variables predicted by the integrated model depended on performance levels, and (b) that the effect of both self-evaluations and performance depended on perceptions of feedback accuracy were tested in a single set of analyses by regressing each criterion on three blocks of variables which contained (1) the main effects for performance, self-evaluations and perceived accuracy, (2) the three two-way interactions and (3) one three-way interaction. Partial correlations for the two-way interactions obtained after the entry

Table 5.2: Perceived Accuracy, Performance and Self-Evaluation Interactions

Criteria Steps	Main Effects: Perf	Main Effects: Self Evaluation	Main Effects: Accuracy	Interactions: Perf x S.Eval	Interactions: Perf x Accuracy	Interactions: S.Eval x Accuracy	Interactions: Perf x S.Eval x Accuracy
Eff Level							
1	**.183****	**-.222*****	**.062**	*.096**	*.229*****	*.203*****	
2	.088	-.221***	.088	.046	.167**	.086	.014
Eff Change							
1	**.035**	**-.155***	**.047**	*.064*	*.138***	*.094**	
2	-.037	-.159*	.055	.050	.134*	-.001	-.009
Exp. Level							
1	**.221*****	**-.022**	**.027**	*-.022*	*.101**	*.097**	
2	.379**	-.026	.056	-.196	.089	.052	-.051
Exp Change							
1	**.086**	**.045**	**.025**	*-.010*	*.063*	*.049*	
2	.175	.040	.040	-.111	.070	.011	-.047
Goal Level							
1	**.440*****	**-.170****	**.043**	*.008*	*.104**	*.145*****	
2	.496***	-.164**	.074	-.097	.018	.136*	-.035
Goal Change							
1	**.288*****	**-.048**	**.016**	*.017*	*.079*	*.104**	
2	.300*	-.043	.037	-.040	.019	.093	-.009
Skill Level							
1	**.248*****	**-.022**	**.081**	*-.023*	*.116***	*.063*	
2	.427**	-.036	.102*	-.300***	.162**	-.024	.092
Skill Change							
1	**.174****	**-.000**	**.081**	*.005*	*.107**	*.065*	
2	.256	-.009	.096*	-.110	.130*	-.015	.094
Self-Eval							
1	**.705*****		**.074***		.027		
2					.019		

Note. Step 1 Shows betas for main effects in bold and partial correlations for interactions with main effects removed in italics.

Step 2 Shows betas when all variables entered

of the main effects (shown in italics in Table 5.2, Step 1) were examined to determine whether redundancy between the interactions left all nonsignificant. Similarly, the betas obtained when all variables were entered were assessed to determine whether the three–way interaction accounted for the contribution of any main effects or two–way interactions (see Table 5.2, Step 2).

As shown in Table 5.2, self–evaluations and the performance x accuracy interaction contributed to effort level and change. Performance and the performance x accuracy interaction contributed to expectancy level but none of the main effects or interactions influenced expectancy change. Performance, self–evaluations and the self–evaluation x accuracy interaction influenced goal level, and performance and the self–evaluation x accuracy interaction contributed to goal change. Performance, accuracy and the performance x accuracy interaction contributed to skills ratings level, and the performance x self–evaluation interaction became significant after the entry of the nonsignificant three–way interaction. Perceived accuracy and the performance x accuracy interaction influenced changes in skills ratings, while performance and perceived accuracy both contributed to self–evaluations but none of the interactions were significant. Together, this pattern of results suggests that perceptions of feedback accuracy moderates the effect of performance feedback on effort level and change, expectancy level, and skills self–efficacy level and change, and of self–evaluations on goal level and change.

When significant interactions reveal a violation of the homogeneity of regression assumption, they can be simply reported, or an attempt can be made to eliminate the interactions by splitting the sample on the moderator variable (Cohen & Cohen, 1983). In this case, the sample was split according to feedback accuracy ratings (the variable involved in all except one interaction) to determine whether the moderating effect of perceived feedback accuracy was responsible for the weaknesses in the integrated model results and the failure to support the discrepancy explanation of feedback functioning. The Time 3 data for the two accuracy groups were analysed separately to establish whether self–evaluations made significant contributions to skills self–efficacy, goals, expectancies and effort only if people perceived their feedback as accurate. The contributions of previous goals and performance to the criterion variables were also re–examined to determine whether the discrepancy explanation

Table 5.3: Integrated Model – High Accuracy Group at Time 3.

	Levels Analyses			Change Analyses		
Criteria *Predictors*	Predicted Path βs	Omitted Path βs	*r*	Predicted Path βs	Omitted Path βs	*r*
Effort						
Goals	.3548***	.3229***	.37	.3575***	.3610***	.32
Expect	.1868***	.1647**	.24	.0892	.0887	.12
S-Eval	-.0992	-.1396	.03	-.2164***	-.1586*	-.11
Skills		.0794	.23		.0429	.14
Pperf		.0478	.13		-.0913	-.04
R	.4149	.4225		.3856	.3912	@.60
adj R^2	.1624	.1654		.1406	.1395	
Expectancy						
Skills	.2680***	.2255***	.30	.1360*	.1251*	.16
S-Eval	.1485**	.0116	.21	.1152*	.0540	.15
Goals		.0505	.20		-.0054	.09
Pperf		.1795*	.27		.0872	.16
R	.3338	.3602		.1967	.2045	@.24
adj R^2	.1058	.1186		.0326	.0296	
Goals						
Skills	.3259***	.2742***	.37	.1571**	.1215*	.20
S-Eval	.1784***	-.0471	.25	.1953***	.0204	.23
Pperf		.1693	.37		.2455**	.30
Acc		-.0579	.01			
PfxAcc		.1882*	.36			
R	.4045	.4675		.2764	.3194	@.60
adj ^{2}	.1583	.2060		.0705	.0934	
Skills						
S-Eval	.2203***	-.0102	.22	.2012***	.0246	.20
Pperf		.3097***	.30		.2371**	.26
R	.2203	.3022		.2012	.2560	@.72
adj R^2	.0455	.0855		.0375	.0596	

Note. @ *Across-time correlations*

was more tenable in the high than low accuracy group. Results showing better support for the integrated model and the discrepancy explanation among those who perceived their feedback as accurate would be consistent with Lord and Hanges's (1987) contention that distorting feedback offers an alternative to reducing goals or increasing effort for people who receive negative feedback.

Analyses by Accuracy Groups

The low accuracy group included people who rated their feedback as 'not at all' accurate or as accurate 'to a small extent' while the high accuracy group contained those who rated their feedback as accurate 'to some extent' or 'to a great extent'. Residualised change scores were computed for each accuracy group because the across–time correlations for the groups differed (see Appendix 6.6). The three two–way interactions were also assessed to determine whether splitting the sample was successful in removing the interactions, but the three–way interactions were not re–examined because none were significant across the whole sample.

Path analyses for the 316 people in the high accuracy group are shown in Table 5.3 where the omitted parameters tests include betas for significant accuracy main effects and interactions. Goals predicted both levels and changes in effort while expectancy contributed to effort level only, and self–evaluations to effort change only. The predicted paths from skills ratings and self–evaluations to levels and changes in goals and expectancies, and from self–evaluations to skill rating level and change were significant, but all self–evaluation betas became nonsignificant after the entry of performance. Performance accounted for the effect of self–evaluations on skill ratings level and change, goal change and expectancy level, and the performance x accuracy interaction accounted for the effect of self–evaluations on goal level. Crossbreaks demonstrated that this interaction resulted from good performers who rated their feedback as having great accuracy setting the highest goals while poor performers who rated their feedback the same way set the lowest goals.

The results for the 216 people in the low accuracy subsample in Table 5.4 show that the predicted paths from expectancy, goals and self–evaluations to levels and changes in effort were significant, but the performance x accuracy interaction contributed additional variance to effort level and accounted for the effect of self–

Table 5.4: Integrated Model – Low Accuracy Group at Time 3.

	Levels Analyses			Change Analyses		
Criteria *Predictors*	Predicted Path βs	Omitted Path βs	*r*	Predicted Path βs	Omitted Path βs	*r*
Effort						
Goals	.2552***	.3185***	.35	.2570***	.3418***	.34
Expect	.3199***	.3276***	.38	.3187***	.3311***	.38
S–Eval	–.2726***	–.1777*	–.30	–.1821**	–.0331	–.21
Skills		–.0313	.14		–.0408	.14
Pperf		.2609	–.20		.0678	–.19
Acc		.0648	–.10		.0857	–.04
PfxAcc		.4664***	.26		.3478*	.22
R	.5398	.5873		.4957	.5498	@.45
adj R^2	.2813	.3229		.2347	.2788	
Expectancy						
Skills	.2594***	.2158**	.26	.1936**	.1824*	.19
S–Eval	–.0136	–.0188	–.01	.0196	.0289	.02
Goals		.1321	.21		.0364	.09
Pperf		.0303	.05		–.0089	.03
R	.2596	.2918		.1948	.1976	@.42
adj R^2	.0586	.0678		.0289	.0208	
Goals						
Skills	.3186***	.3079***	.32	.2114**	.2156**	.21
S–Eval	–.1042	–.0205	–.10	–.0321	.2257	–.03
Pperf		–.0300	.16		–.2334	.13
Acc		–.0658	–.13		–.0031	–.05
PfxAcc		–.3854*	–.17		–.4720*	–.15
SEvxAcc		.3054^{ns}	.13		.4227*	.06
R	.3340	.4560		.2110	.3267	@.49
adj ^{2}	.1032	.1852		.0400	.0811	
Skills						
S–Eval	.0125	–.0385	.01	–.1034	–.0569	–.01
Pperf		.4931*	.06		.5835**	.01
Acc		–.0789	–.09		.0190	.01
PfxSEv		–.4438*	–.00		–.5837**	–.07
R	.0125	.1932		.0134	.2146	@.64
adj R^2	–.0045	.0191		–.0045	.0280	

Note. @ *Across–time correlations*

evaluations on effort change. The predicted paths from skills ratings to levels and changes in expectancies and goals were significant but those from self–evaluations were not. None of the omitted paths or interactions contributed to expectancy level or change, but the performance x accuracy interaction made a significant contribution to goal level, and both accuracy interactions made significant contributions to goal change. The skills ratings regressions show that performance and the performance x self–evaluation interaction contributed to levels and changes in skills ratings, but the predicted path from satisfaction was not significant.

Overall, the higher number of significant predicted paths and smaller number of significant interactions which were found in the high accuracy group results indicate that the integrated model received somewhat better support among people who rated their feedback as accurate than among those who believed their feedback was inaccurate. However, the omitted path results indicating that self–evaluations failed to contribute to skills self–efficacy, goals and expectancies show that the moderating effect of perceptions of feedback accuracy did not account for all weaknesses found in the results for the whole sample.

Assessment of Discrepancy within Accuracy Groups

The Time 3 data for each accuracy group were reanalysed and Edwards' (1994) criteria were used to reassess the discrepancy explanation for the effect of feedback on effort, expectancies, skills self–efficacy and self–evaluations within each accuracy group. Goal level and goal change results were assessed graphically using data collected at each measurement period.

The Time 3 discrepancy components results for the two groups (see Tables 5.5 and 5.6) show that there were no significant interactions between the discrepancy component variables when the sample was split by perceived accuracy level. In the low accuracy group, current goals and previous performance contributed to effort level and change, and previous goals influenced levels of skills ratings, goals and expectancies, but neither component contributed to changes in skills ratings or expectancies. The low accuracy group was responsible for the rudimentary discrepancy effect observed in the whole sample, but the difference between the size of the betas (β .65 versus β –.22) indicates that this effect was still weak.

Table 5.5: Low Accuracy Group Discrepancy Components at Time 3.

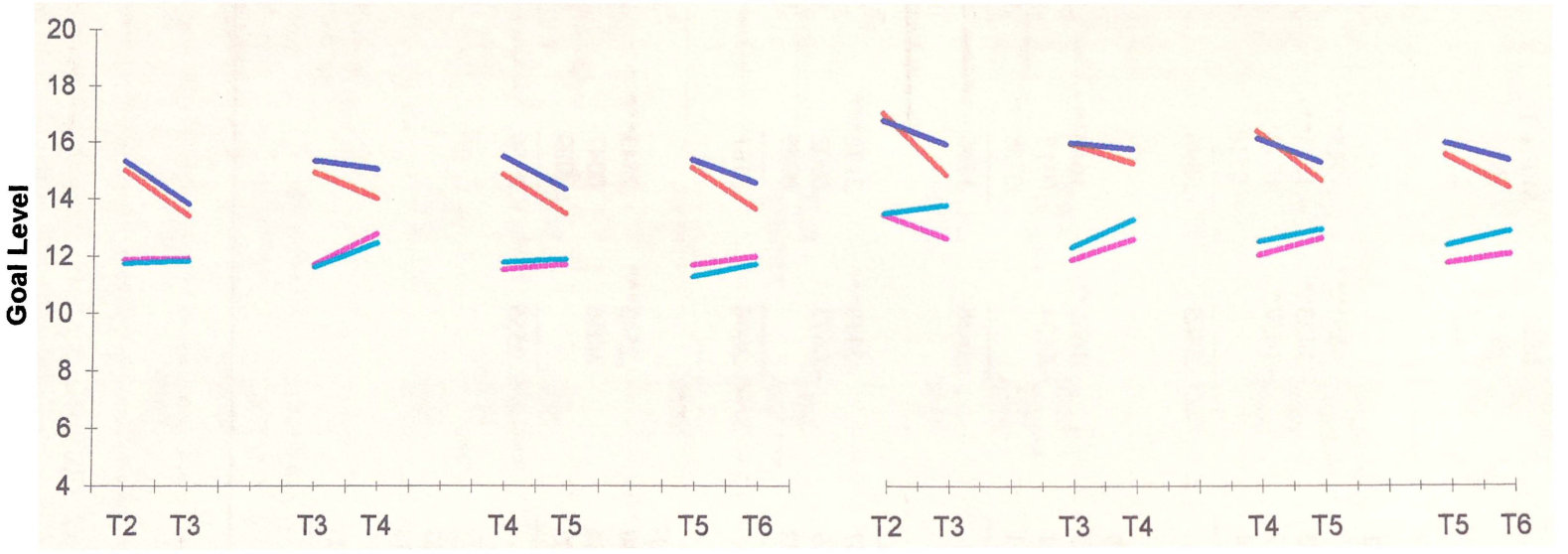
	Levels Analyses			Change Analyses		
Criteria *Predictors*	M.E. βs	M.E. + I βs	*r*	M.E. βs	M.E.+ I βs	*r*
Effort						
Discrep			.28			.19
Goalc	.3842***	.3837***	.35	.4479***	.4474***	.34
Perfp	−.2611***	−.2599***	−.20	−.2491***	−.2480***	−.19
Goalp	.0151	.0169	.17	−.1356	−.1337	.06
PpxGp		.0077	.02		.0080	.04
R	.4336	.4337		.4393	.4393	
Expect						
Discrep			.08			−.02
Perfp	.0332	.0363	.05	.0250	.0324	.03
Goalp	.1768**	.1821**	.18	.0044	.0152	.01
PpxGp		.0216	−.02		.0526	.04
R	.1834	.1846		.0256	.0570	
Goals						
Discrep			.20			−.10
Perfp	.1123	.1191	.16	.1248	.1362	.13
Goalp	.4730***	.4829***	.49	−.0136	−.0022	.00
PpxGp		.0482	−.08		.0551	.03
R	.4978	.5000		.1277	.1383	
Skills						
Discrep			.14			−.03
Perfp	.0272	.0255	.06	.0092	.0084	.01
Goalp	.2710***	.2685***	.27	−.0400	−.0412	−.04
PpxGp		−.0119	−.08		−.0057	.00
R	.2752	.2755		.0401	.0404	
Self-Eval						
Discrep			−.61			
Perfp	.6508***	.6479***	.63			
Goalp	−.2239***	−.2282***	.18			
PpxGp		−.0210	−.08			
R	.6650	.6653				

Note. M.E. = Main Effects.
M.E.+ I = Main Effects with Interaction
PpxGp = Previous performance previous goal interaction

Table 5.6: High Accuracy Group Discrepancy Components at Time 3.

	Levels Analyses			Change Analyses		
Criteria *Predictors*	M.E. βs	M.E.+ I βs	*r*	M.E. βs	M.E.+ I βs	*r*
Effort						
Discrep			.01			.08
Curr. Goals	.3623***	.3676***	.37	.4851***	.4913***	.32
Prev. Perf	-.0040	-.0052	.13	-.1823**	-.1838**	-.04
Prev. Goals	.0116	.0193	.22	-.1637*	-.1547*	.08
PpxPg		-.0436	.04		-.0510	.01
R	.3679	.3703		.3865	.3896	
Expect						
Discrep			-.19			-.15
Prev. Perf	.2626***	.2625***	.27	.1661**	.1660**	.16
Prev. Goals	.0563	.0353	.11	-.0134	-.0317	.02
PpxPg		.0869	.11		.0758	.08
R	.2802	.2926		.1638	.1795	
Goals						
Discrep			.02			-.24
Prev. Perf	.2517***	.2516***	.37	.3119***	.3118***	.30
Prev. Goals	.5365***	.5180***	.59	-.0673	-.0902	.00
PpxPg		.0762	.22		.0945	.09
R	.6399	.6442		.3046	.3181	
Skills						
Discrep			-.07			-.20
Prev. Perf	.2387***	.2388***	.30	.2543***	.2543***	.26
Prev. Goals	.2932***	.3021***	.34	.0056	.0047	.06
PpxPg		-.0370	.05		.0039	.02
R	.4161	.4177		.2555	.2556	
Self-Eval						
Discrep			-.63			
Prev. Perf	.7561***	.7561***	.74			
Prev. Goals	-.0539	-.0551	.11			
PpxPg		.0051	.03			
R	.7463	.5571				

Note. Prev. = Previous measurement period
Curr. = Current measurement period
M.E. = Main Effects.
M.E.+ I = Main Effects with Interaction
PpxPg = Previous performance previous goal interaction



	Time 2	Time 3	Time 4	Time 5	Time 2	Time 3	Time 4	Time 5
HiGoal LoPerf $\bar{X}$ Discrep	5.46	7.26	6.25	3.85	5.01	5.95	4.89	1.91
LoGoal LoPer $\bar{X}$ Discrep	2.62	4.16	3.28	0.36	2.36	2.81	1.79	-0.85
HiGoal HiPerf $\bar{X}$ Discrep	1.79	3.48	1.71	-0.17	0.28	1.36	0.33	-1.36
LoGoal HiPerf $\bar{X}$ Discrep	-1.55	0.05	-1.46	-3.96	-2.78	-1.41	-2.57	-4.32

Figure 5.1: Contribution of Discrepancy Components to Goals in High and Low Accuacy Groups

In the high accuracy group, current goals influenced effort level and change, but neither discrepancy component contributed to effort level and both made negative contributions to effort change. Both components made positive contributions to levels of skills ratings and goals, but previous performance influenced self–evaluations and expectancy level, and changes in skills ratings and expectancies while previous goals did not.

Differences between the mean pre– and post–goal scores at each measurement period are shown in Figure 5.1. Results for the low accuracy group indicate that both groups which set high goals previously reduced them, while those which set low goals tended to increase their goals at Time 4 and maintain them at other times. The group which set high goals previously and performed poorly showed the most decrease in goals at Time 6 when their mean discrepancy scores were lowest and least decrease at Time 4 when mean discrepancy was highest. Similarly, the group which set low goals previously and performed well increased goals at Time 4 when their mean discrepancy level was highest but maintained their goals at other times when their mean discrepancy scores fell in the congruence range. Differences in goal change shown by the high versus low performance groups were all small.

The Time 3 results for the high accuracy group show that the three groups which experienced discrepancy between their previous goals and performance reduced their goals while the group which achieved congruence increased goals. Differences between the pre– and post–goal scores for each group reflected their mean discrepancy scores at this period. However, at later periods, both groups which set high goals previously reduced them while those who set low goals previously increased them. At Time 4 when mean discrepancy scores were highest, both high goals groups showed their smallest decrease in goals and the group which set low goals and performed well demonstrated greater increase in goals than at other times when their mean discrepancy scores were lower.

These results offer limited support for the tenability of the discrepancy explanation of feedback functioning in both accuracy group. Results of the components analyses failed to satisfy Edwards' (1994) criteria which require that the components make contributions to criteria which are significant, and equal in size but opposite in direction to each other. Graphic analyses showed that the pattern of goal

change for the high accuracy group at the initial period were consistent with a discrepancy effect. However, the general tendency for the groups which set high goals previously to reduce their goals and for those which set low goals previously to increase then suggest that regression to the mean offers a better explanation for the extent of goal change demonstrated by the high accuracy group at the later times and for that of the low accuracy group at all periods.

Conclusion

The results of the effort–performance link showed that self–rated effort and ability contributed to performance level and change, and that the effectiveness of the three study strategies varied across the tests. These findings indicate that both the inclusion of ineffective study strategies with self–rated effort, and the omission of an ability measure contributed to the relatively weak links between effort and performance observed in the tests of the initial models. The tendency for the effectiveness of the study strategies to vary across the tests indicates that it would be appropriate to use self–rated effort and exclude the specific strategies from the effort measure, if the aim is to predict performance. However, this approach does not resolve problems arising from error variance in the multi–choice test performance measure, or those arising from unmeasured causes such as students' academic ability, or the test strategies used. In addition, the exclusion of the behaviourally–oriented study strategies is likely to reduce the construct validity of the effort variable as a measure of motivation because the effort put into the strategies legitimately reflects students' willingness to perform well, even if some strategies failed to achieve the desired ends. Given that self–rated effort and ability consistently predicted subsequent performance, the latter criterion was excluded from further analysis. Further tests focused on a composite effort variable which included the three self–reported behaviours and global self–ratings because this offered a more comprehensive operationalisation of effort expended than global self–ratings alone. Emphasising effort is consistent with the purpose of the present theoretical model which is aimed at identifying factors which explain willingness to perform well, rather than actual performance.

The present results suggest that perceptions of feedback accuracy may play a more important role in a goal–setting and feedback model than the self–evaluative

reactions to the feedback proposed by Bandura and Cervone (1983, 1986). Perceived feedback accuracy moderated the effect of performance feedback on most criteria and there was little evidence that performance feedback moderated the effect of self–evaluations on goals or expectancies. These results also suggested that the significant contribution which the discrepancy x self–evaluation interaction made to effort level in the integrated model results was due to the moderating effect of perceived feedback accuracy on the previous performance component of discrepancy rather than the moderating effect of either discrepancy or performance on self–evaluations.

However, there was little evidence that the moderating effect of perceived feedback accuracy accounted for weaknesses in the integrated model or failure to support the discrepancy explanation for feedback functioning. Although the predicted path results suggested that self–evaluations influenced skills self–efficacy, goals and expectancies only if people rated their feedback as accurate, the omitted parameters tests showed that performance or the interaction between performance and self–evaluations accounted for these effects. The nonsignificant contribution which self–evaluations made to effort level show further limitations to the usefulness of this concept by indicating that people who were dissatisfied with feedback they believed to be accurate simply increased their effort to a level which was similar to that made by people who were satisfied.

Results showing fewer significant predicted paths and more significant interactions demonstrated even less support for the integrated model among people who rated their feedback accuracy as low. The weak effects of self–evaluations and performance in the low accuracy group are unlikely to simply reflect attenuated variability in the performance and self–evaluation scores because both predictors were more highly correlated with effort in the low accuracy group than in the high accuracy subsample.

Similarly, the discrepancy components results offered little evidence that a discrepancy between previous goals and performance explained the responses of either accuracy group, and the graphic analyses suggested that regression to the mean offered a more consistent explanation of goal change than did the concept of discrepancy. However, the components analyses illustrated the moderating effect of perceived accuracy found in the results for the whole sample by showing that the low accuracy

group tended to maintain high skills self–efficacy, goals and expectancies if their previous goals were high, and increase effort if they maintained high goals after performing poorly. In contrast, the high accuracy group tended to show increases in their skills self–efficacy and expectancies if they performed well, and increased effort if they increased their goals after performing poorly. These results offer some support for the assumption that distorting or rejecting feedback offers an alternative to reducing goals (Lord & Hanges, 1987). However, the strong negative contribution of previous performance to effort change suggests that people who rate their feedback as inaccurate do not simply ignore it, at least in the initial stages of an ongoing task.

Together, the discrepancy components findings and those showing that perceived accuracy moderated the effect of performance or self–evaluations on other criteria suggest that a revised model should take the moderating effect of perceptions of feedback accuracy into account and focus on predicting and explaining the responses of people who indicate that they have received and accepted their feedback by rating it as relatively accurate. However, any revision should also be tested in the low accuracy group to examine the effects of perceptions of feedback accuracy on subsequent responses.

Overall, the present findings offer limited support for the assumption that positive or negative self–evaluations have direct, or interactive effects on the cognitive outcomes which were predicted from the social cognitive framework (Bandura and Cervone 1983; 1986). These results are unlikely to simply reflect problems with the composite self–evaluation measure because the earlier analyses indicated that the criterion validity was adequate at the initial times. However, the validity assessments which showed that dissatisfaction was relatively strongly and consistently correlated with ratings of the motivational value of the feedback, and with giving up suggest that negative self–evaluations may have an indirect effect on other criteria. Consequently, the possibility that perceptions of the motivating or debilitating effects of feedback mediate the impact of negative self–evaluations on cognitive and behavioural change needs to be considered in revising the integrated model.

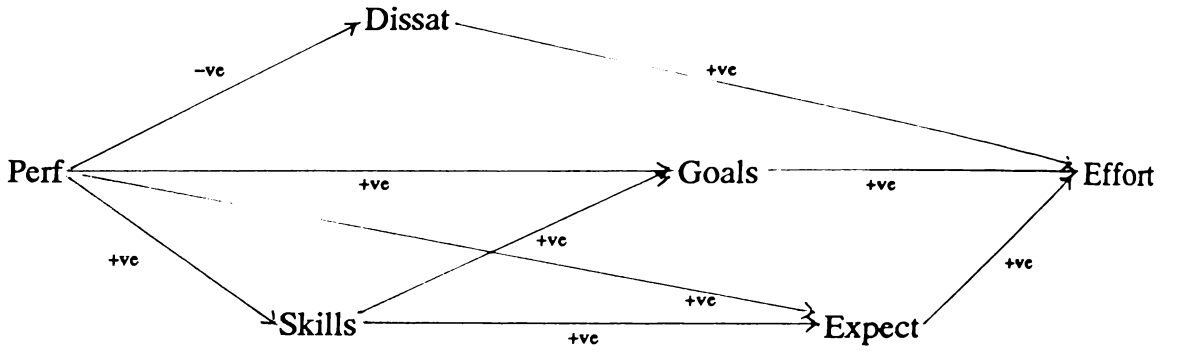
Chapter 6

Model Revisions

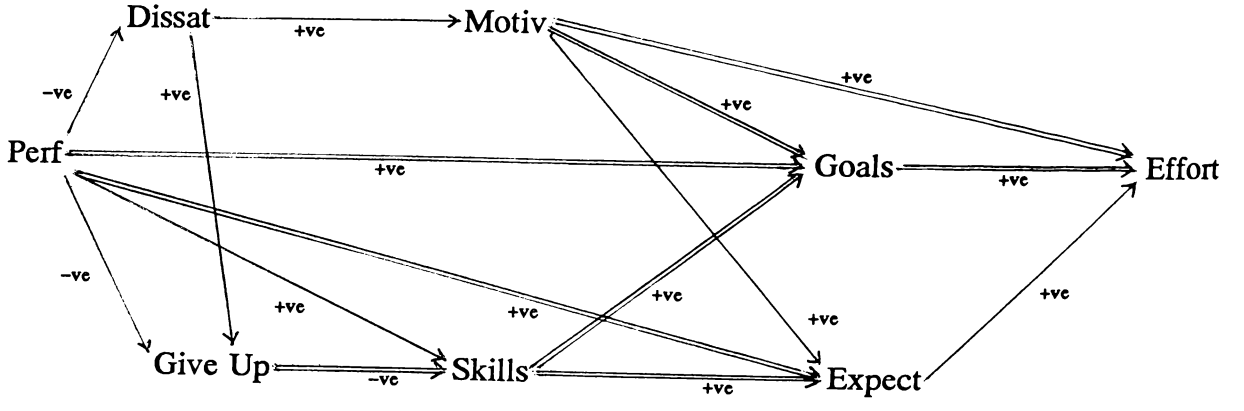
Two revisions of the original integrated model were developed and compared and the effect of perceptions of feedback accuracy on subsequent responses was assessed. Like the original integrated model, both revisions incorporate Bandura and Cervone's (1983; 1986) concept of self–evaluations and the skills and goal expectancy dimensions of their concept of self–efficacy. However, the revisions use the negatively–worded dissatisfaction dimension to measure self–evaluations because the validity analyses indicated that the positively–worded dimension had poor criterion and discriminant validity at the later periods. Since the earlier analyses indicated that the discrepancy explanation of feedback functioning was not tenable, both revisions include previous performance feedback instead of discrepancy between previous goals and performance as the only exogenous variable.

Both revisions assume that people who receive negative feedback can increase effort or reduce goals (Campion and Lord, 1983) but recognise 'feedback distortion' (Lord and Hanges, 1987) as a third possible response by focusing on explaining and predicting the responses of people who believe that their feedback provided an accurate source of information about their performance. However, perceived accuracy is not specified as a variable in the model because the earlier analyses indicated that it moderated the effect of performance and satisfaction on other variables, rather than having a direct effect. Moderators indicate a possible violation of the additivity assumption which underpins the use of path analysis. Failure to recognise this possibility can result in a model which offers an incorrect explanation of the links between variables (Billings & Wroten, 1978). The moderating role of feedback accuracy ratings in the models is implied by the separate analyses of the high and low accuracy groups.

Both revisions also differ from the original model by attempting to predict effort rather than performance. The exclusion of performance as an endogenous variable results in the models focusing on factors which explain willingness to perform well, rather than actual performance. Other differences from the original integrated model, and predictions for the *performance – dissatisfaction* and *motivation* revisions of the integrated model are discussed below.



6.1a: Performance–Dissatisfaction Revision



6.1b Motivation Revision

Notes. +ve = positive path

-ve = negative path

Perf = Performance Feedback
Motiv = Feedback Motivation Ratings
Expect = Expectancies

Dissat = Dissatisfaction
Skills = Skills Self–Efficacy

Double arrow in Motivation Model applies to levels and change predictions, single arrow applies to levels predictions only.

Figure 6.1: Path Diagrams for Revised Models

Performance–Dissatisfaction Revision

The performance–dissatisfaction model represents a relatively straightforward revision of the integrated model. The theory–trimming approach used in the development results in a revision which includes six variables and nine paths in both the levels and change analyses. In addition to the changes noted above, this revision contrasts with the original integrated model in that dissatisfaction is expected to partially mediate the effect of performance on effort, but not on skills self–efficacy, goals or expectancies.

As shown in Figure 6.1a, the performance–dissatisfaction model predicts that effort level and change are influenced by dissatisfaction (dissat), goals and expectancies (expect), while goal level and change are influenced by feedback about previous performance (perf) and skills self–efficacy (skills). Performance feedback is also predicted to affect dissatisfaction and levels and changes in skills self–efficacy. At a descriptive level, this model proposes that feedback about poor performance results in dissatisfaction which encourages people to increase effort, particularly if they set high goals and have high expectancies of achieving their goals. However, goals and expectancies are expected to be low if negative feedback undermines recipients' confidence in their task–specific skills. Conversely, positive feedback which indicates good performance can enhance skills self–efficacy, and encourage people to raise their goals and expectancies, and subsequent effort. Thus, in the performance–dissatisfaction model, self–evaluations (dissatisfaction) indicate when poor performers increase effort, while performance feedback and the skills dimension of self–efficacy determine when goals and expectancies change.

Motivation Revision

The motivation model has the same basic structure as the performance–dissatisfaction revision but the complexity is increased by the inclusion of two additional variables, and by differences between the levels and change predictions. This revision draws on the results of earlier analyses which demonstrated the criterion validity of the dissatisfaction dimension of self–evaluations by showing that it was consistently linked with feedback motivation ratings and giving up.

The validity findings, together with the nonsignificant predicted paths in the

integrated model suggest that the motivating or debilitating effects of feedback mediate the effect of dissatisfaction on subsequent responses. Specifically, the motivating effects of feedback (the extent to which feedback increased the importance of good performance and encouraged students to work harder or make more effort) are expected to account for any effects of dissatisfaction on goals, expectancies, and effort, while the extent to which feedback made students feel like giving up is predicted to account for links between dissatisfaction and skills self–efficacy. Giving up is not expected to influence feedback motivation ratings because any links between these variables are assumed to arise from their shared antecedent, dissatisfaction. Similarly, no causal link between motivation ratings and skills self–efficacy is proposed as there is no logical reason why the motivating effects of the feedback should influence confidence in task–specific skills, or why skills self–efficacy should have a direct effect on whether the feedback is experienced as motivating.

The other major difference between the motivation model and the simpler revision concerns the paths which are predicted in the levels analyses and omitted from the change analyses. These predictions assume that poor performers maintain low skills self–efficacy, that people who find their feedback motivating increase their goals while maintaining high expectancies, and that people who have high expectancies of achieving their goals maintain the high effort levels which led to their good performance previously.

The motivation model is summarised in Figure 6.1b where predictions which are relevant to both the levels and change analyses are depicted by a double arrow and those which apply to the levels analyses only are indicated by a single arrow. Changes in dissatisfaction and giving up were not examined as they are assumed to be determined by the feedback, while motivation ratings were excluded from the change analyses because the questions were worded to emphasise increases rather than levels.

The paths in the motivation model diagram predict that performance feedback (perf) has a negative effect on dissatisfaction (dissat) which, in turn, has a positive effect on motivation ratings (motiv). Dissatisfaction also makes a positive contribution to giving up while performance feedback (perf) makes a negative contribution, and skills self–efficacy (skills) level is influenced by performance feedback and giving up, but change in skills self–efficacy is affected by giving up only. Motivation ratings,

skills self–efficacy and performance feedback all make positive contributions to goal level, goal change and expectancy level, while expectancy change is influenced by skills self–efficacy and performance feedback, but not by motivation ratings. Motivation ratings and goals are also predicted to influence effort level and change, while expectancy is assumed to make an additional contribution to levels, but not changes in effort.

In descriptive terms, the paths in the motivation model predict that poor performance causes dissatisfaction which, as a general rule, results in people perceiving their feedback as highly motivating. However, this model acknowledges the potentially debilitating effect of feedback (Bandura, 1986; Kluger & DeNisi, 1993) by recognising that dissatisfaction can lead people to give up, particularly if they received negative feedback about their previous performance. The combination of predicted and omitted paths from performance feedback and giving up to levels and changes in skills self–efficacy indicates that poor performers continue to rate their skills as poor, but decrease their skills ratings only if their feedback made them feel like giving up. Low confidence in task skills together with poor performance results in reduced expectancies, goals, and subsequent effort.

The omitted paths from motivation ratings to expectancy change and from expectancy to effort change, together with the predicted paths, propose that people who receive positive performance feedback and those who have high skills self–efficacy increase their expectancies, regardless of whether they find their feedback motivating. High expectancies on their own encourage such people to maintain high effort levels, as there is no reason to increase their effort. In contrast, high motivation ratings, together with good performance and high skills self–efficacy result in increased goals, and high motivation ratings and high goals encourage an increase in effort. These predictions attempt to resolve weaknesses in Campion and Lord's model by proposing that skills self–efficacy, performance feedback and perceptions of the motivating effects of feedback determine goal change while goal level and the motivating effects of feedback influence effort change, regardless of performance feedback or the self–efficacy dimensions.

A potential threat to the validity of this model arises from the possibility of moderator effects which cast doubt on the completeness and correctness of the

explanation by showing that some paths are interactive rather than additive (Billings & Wroten, 1978). In particular, performance feedback may moderate the contribution of feedback motivation ratings to other variables so that people who experience their feedback as motivating increase their goals if their feedback indicated they performed well previously but increase their effort if their feedback showed they performed poorly. The possibility that good performers increase goals if they find their feedback motivating, but increase their expectancies if they do not suggests that performance feedback and motivation ratings may also interact to influence expectancy change. Alternatively, when the less valid positive dimension is excluded from the self-evaluation measure, more support may be found for Bandura and Cervone's (1986) contention that performance feedback moderates the effect of dissatisfaction on other responses. A performance x dissatisfaction interaction predicts that people increase effort if they are dissatisfied with poor performance, increase goals if dissatisfied with good performance but increase expectancies if satisfied with good performance.

Moderator effects could also determine whether dissatisfaction results in feedback making people feel motivated or feel like giving up. Dissatisfaction could interact with performance feedback to influence giving up, as people who are dissatisfied with good performance are less likely to feel like giving up than those who are dissatisfied with poor performance. Alternatively, previous skills self-efficacy may interact with dissatisfaction so that people who are dissatisfied with their performance experience feedback as motivating if they are confident in their task-related skills but feel like giving up if they believe their skills to be poor. The possibility that skills self-efficacy from the previous measurement period determines whether dissatisfaction results in feedback being experienced as motivating or debilitating is consistent with Bandura's (1982; 1986) conceptualisation of self-efficacy.

Analysis of the Revised Models

The primary aim of this chapter was to assess and compare the plausibility of the relatively simple performance-dissatisfaction model with that of the more complex motivation revision. Because both models were designed to explain responses to feedback, comparisons of the plausibility of the models focused on people who

indicated that they had attended to, and accepted their feedback by rating their test mark as relatively accurate. Using only the high accuracy group to test the models assumes that feedback must be accepted by the recipient if it is to influence subsequent responses (Ilgen et al, 1979; Taylor et al, 1984).

Although focusing on the high accuracy group to test the plausibility of the models is consistent with current theorising, the low accuracy group's results for the integrated model and discrepancy components analyses raised some questions over whether people who rate their feedback as inaccurate simply ignore it. Consequently, the models were analysed using the low accuracy group, and their results were compared with their counterparts who rated their feedback as more accurate to assess the nature and extent of the effect of perceptions of feedback accuracy on subsequent responses.

As with the initial models, the revisions were evaluated primarily according to the significance of the predicted and omitted paths, generalised squared multiple correlations, goodness of fit and parsimony. Data collected at each of the four later measurement periods were analysed to assess the replicability of the results. The interactions which were discussed as a potential threat to the model and the accuracy interactions identified in the earlier analyses were tested in subsequent steps of the omitted parameters tests to determine whether the models were incomplete or incorrect. Significant interactions and main effects for perceived feedback accuracy and previous skills self–efficacy are reported, but were excluded from the goodness of fit results because more interactions were tested for the motivation model than for the performance–dissatisfaction model. This would inflate the Q indices for the motivation model and prevent the goodness of fit results being used to compare the plausibility of the two revisions.

Finally, the correlations were decomposed to compare the relative strength of direct and indirect paths and to identify mis–specified pathways. The link between the exogenous variable, performance feedback, and effort was the main focus of the decompositions. The performance–goals and performance–expectancy correlations were also decomposed for the motivation model. The latter correlations were not decomposed for the performance–dissatisfaction model because these sections of this model were just–identified so the sum of the paths must equal zero (Pedhazur, 1982).

Results

The sample size for the high accuracy group was 315, 257, 255 and 275 across the four periods while that for the low accuracy group was 215, 231, 208 and 171. Given that multiple regression requires a ratio of 20 subjects for each variable (Tabachnick & Fidell, 1989), these sample sizes appear to be adequate, although the low accuracy subsample at the final period was close to the minimum of 160 which is required for the motivation model analyses. Omitted parameters tests, correlation matrices and mean scores and standard deviations for the accuracy groups appear in Appendix 6.

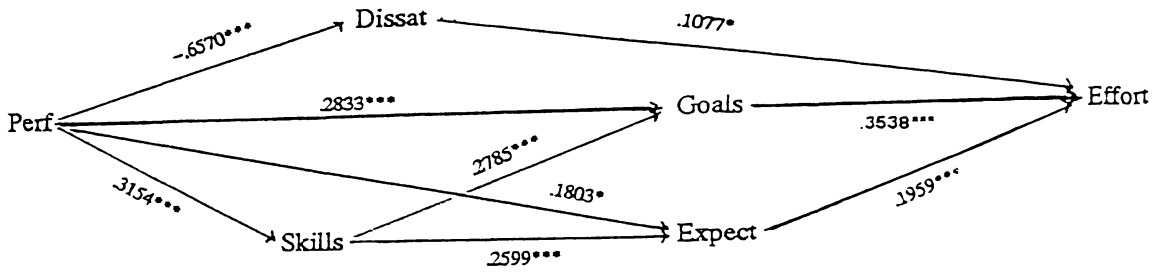
High Accuracy Group: Performance–Dissatisfaction Model

The path diagrams for the performance–dissatisfaction model show that one of the nine predicted paths in the levels analyses was not significant after the first period (see Figure 6.2a), while the number of non–significant predicted paths in the change analyses ranged from two at Time 3 to five at Time 5 (see Figure 6.2b). Dissatisfaction failed to contribute to either levels or changes in effort after Time 3, and performance contributed to expectancy change at Time 4 only. The contributions of performance feedback to changes in skills ratings and goals, and of skills ratings to goal change were also nonsignificant at half the measurement periods but other nonsignificant predicted paths were less consistent.

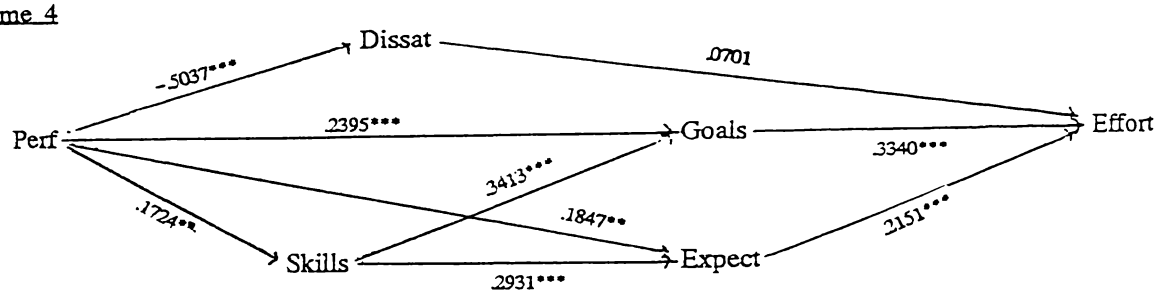
While there were no significant omitted paths at the initial period, three were significant at Time 4, two at Time 5 and seven at the final period (see Appendix 6.1). Dissatisfaction accounted for the predicted effect of performance on effort change after Time 3 and made additional contributions to goal level at two periods. Goals made a significant negative contribution to expectancy change at Time 5, but positive contributions to both levels and changes in expectancies at Time 6. No other omitted paths were significant at more than one measurement period.

The analyses also identified 12 significant interactions and four main effects for perceived feedback accuracy across the four times, but these were inconsistent (see Appendix 6.1). Performance interacted with perceived accuracy to influence effort level or change at Time 3 or Time 4, but with dissatisfaction to influence effort change at Time 6. Similarly, expectancy level and change were influenced by the

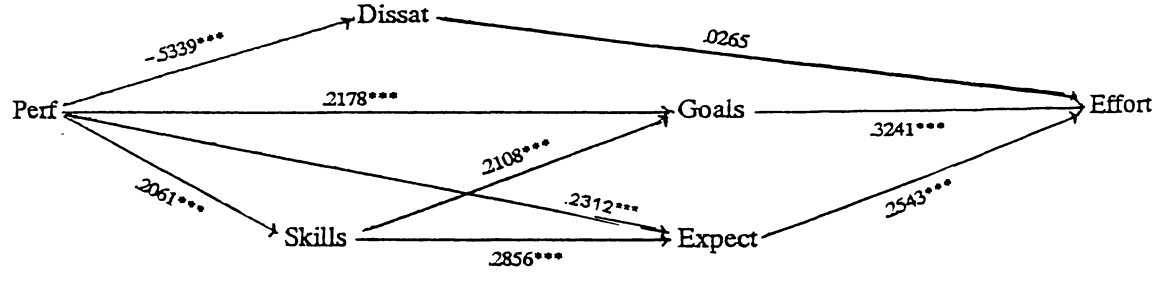
Time 3



Time 4



Time 5



Time 6.

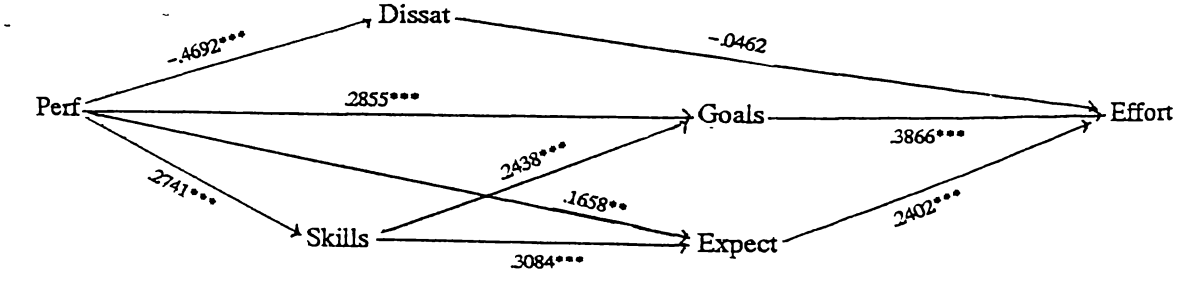
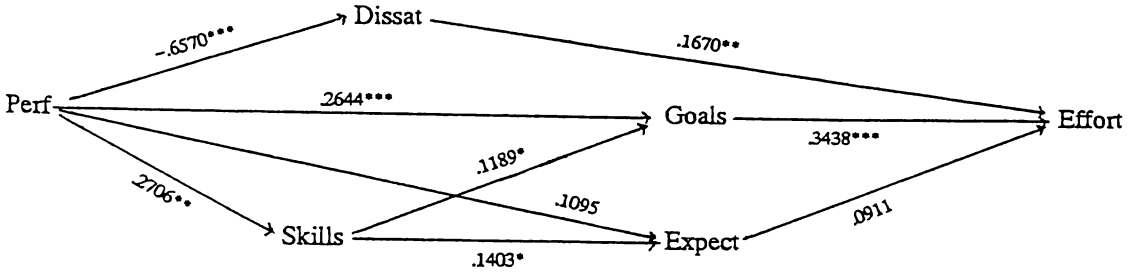
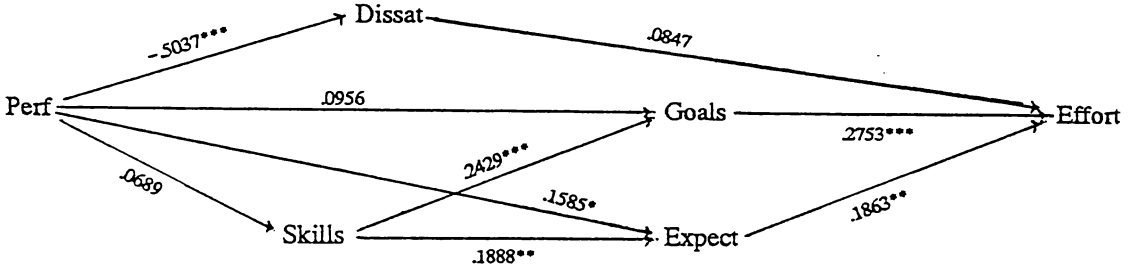


Figure 6.2a: Performance–Dissatisfaction Model Path Diagram: High Accuracy Group Levels Analyses

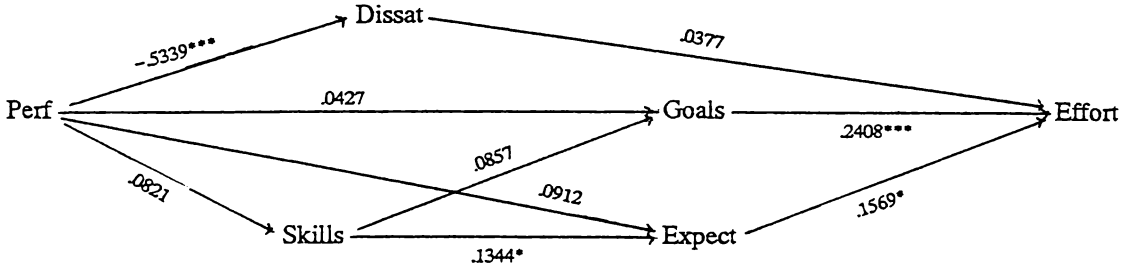
Time 3



Time 4



Time 5



Time 6

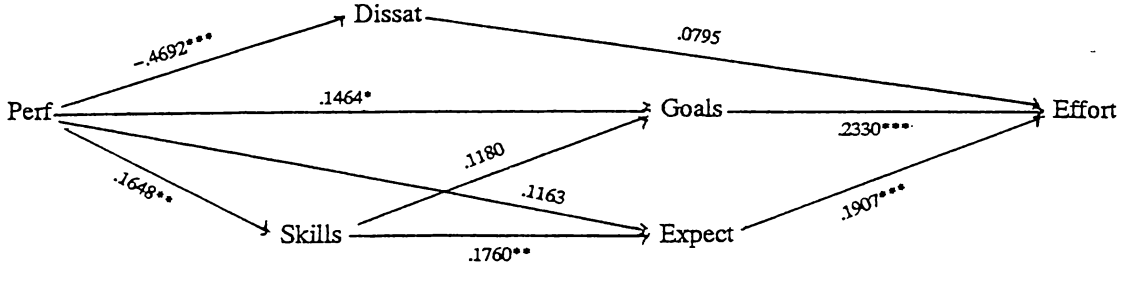


Figure 6.2b: Performance–Dissatisfaction Model Path Diagram: High Accuracy Group Change Analyses

Table 6.1: Performance–Dissatisfaction Model High Accuracy Group Goodness of Fit Results

Times	Levels Residuals		Change Residuals	
	Restricted	Full	Restricted	Full
Time 3				
Effort	.8184	.8129	.8600	.8509
Expect	.8704	.8638	.9568	.9530
Goals	.7924	.7875	.8961	.8954
Skills	.9005	.9003	.9268	.9265
Dissat	.5684	.5684	.5684	.5684
X/Y	.7111	.7170	.6108	.6176
Q	.9918		.9890	
PGFI	.3967		.3956	
Time 4				
Effort	.8099	.8069	.8708	.8573
Expect	.8613	.8558	.9289	.9137
Goals	.7979	.7772	.9239	.9155
Skills	.9703	.9639	.9953	.9685
Dissat	.7463	.7463	.7463	.7463
X/Y	.5970	.6139	.4449	.4817
Q	.9725		.9236	
PGFI	.3890		.3694	
Time 5				
Effort	.8216	.8132	.9140	.9115
Expect	.8378	.8317	.9686	.9383
Goals	.8892	.8800	.9893	.9892
Skills	.9575	.9477	.9933	.9743
Dissat	.7150	.7150	.7150	.7150
X/Y	.5810	.5967	.3780	.4106
Q	.9737		.9206	
PGFI	.3895		.3682	
Time 6				
Effort	.7307	.7137	.8880	.8441
Expect	.8494	.8229	.9443	.8936
Goals	.8209	.8038	.9552	.9525
Skills	.9247	.9000	.9728	.9355
Dissat	.7799	.7799	.7799	.7799
X/Y	.6326	.6686	.3923	.4758
Q	.9462		.8245	
PGFI	.3785		.3298	

accuracy x performance interaction at Time 4, but by accuracy and the accuracy x dissatisfaction interaction at Time 6. Perceived accuracy interacted with performance to make a positive contribution to goal level at Time 3, but negative contributions to goal level and goal change at Time 5, when perceived accuracy also made a positive contribution to goal change. At Time 4, perceived accuracy interacted with dissatisfaction to influence goal level, and perceived accuracy and the dissatisfaction x accuracy interaction made significant contributions to skills ratings level at Time 6. The performance x accuracy interaction accounted for the contribution of the predicted path from performance to goal level at Time 3, while the dissatisfaction x accuracy interaction accounted for that of the omitted paths from dissatisfaction to expectancy change at Time 4, and to skills rating level at Time 6.

Tests of goodness of fit and parsimony are shown in Table 6.1. In the levels analyses, the Q and parsimony indices respectively decreased from .99 and .40 at Time 3 to .94 and .38 at Time 6 while the X and Y values were highest at Time 3 (.71 and .72 respectively) and lowest at Time 5 (.58 and .60). The change analyses show a similar pattern with the highest Q (.99), PGFI (.40), X (.61) and Y (.62) values at Time 3 and the lowest Q (.82) and PGFI (.33) at Time 6 and lowest X (.38) and Y (.41) values at Time 5.

The decompositions results in Table 6.2 show reasonably strong positive correlations between performance and effort level while those between performance and effort change were weak. In the performance–dissatisfaction model these correlations were represented by five indirect paths, of which one was negative. The positive path via goals was strongest at each time in the levels analyses while the negative path was also the strongest in the change analyses. Differences between the total effects and correlations were less than .05 at the two earlier periods for the levels analyses, and at Time 5 for the change analyses.

Summary. The Q indices suggest that the paths in the performance–dissatisfaction model represented an adequate fit to the levels data at each measurement period, and to the change data at all except the final time. However, dissatisfaction mediated the effect of performance feedback on changes in skills self-efficacy, and failed to contribute to effort level or change after the first period. The effect of performance feedback on expectancy change was inconsistent, and skills

Table 6.2: Performance–Dissatisfaction Model Performance–Effort Decompositions for High Accuracy Group.

	Indirect Paths via					Total Effects	*r*	Difference
	Dissat	Goals	Expect	Skills Goals	Skills Expect			
Levels Analyses								
Time 3	−.0708	.1022	.0353	.0311	.0161	.1119	.1439	.03 > .05
Time 4	−.0353	.0800	.0397	.0197	.0109	.1150	.1557	.04 > .05
Time 5	−.0141	.0706	.0588	.0141	.0150	.1443	.2147	.07 > .05
Time 6	.0217	.1104	.0398	.0258	.0203	.2180	.1163	.11 > .05
Change Analyses								
Time 3	−.1097	.0974	.0164	.0302	.0075	.0418	−.0240	.07 > .05
Time 4	−.0427	.0659	.0344	.0162	.0094	.0833	−.0087	.09 > .05
Time 5	−.0201	.0524	.0363	.0105	.0092	.0883	.0650	.02 < .05
Time 6	−.0373	.0665	.0316	.0156	.0161	.0925	−.0732	.17 > .05

self–efficacy influenced goal change at the two earlier periods only. In addition, the decompositions showed that the paths in this model correctly specified the positive correlations between performance feedback and effort level found in the high accuracy group at the two earlier periods only, and the near zero relationship between performance feedback and effort change at Time 5 only. These results indicate that the plausibility of the performance–dissatisfaction model's explanation for the effect of performance feedback on effort level and change among people who rate their feedback as accurate is limited.

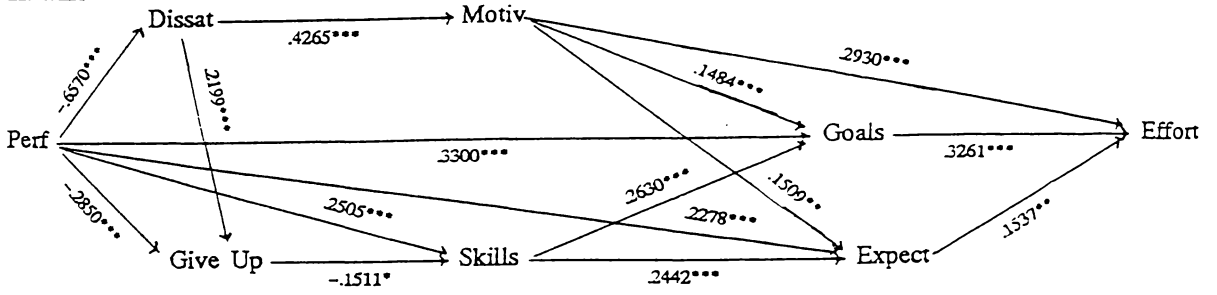
High Accuracy Group: Motivation Model.

The path analyses for the motivation model (see Figure 6.3) show that all 15 predicted paths in the levels analyses were significant at the first and final periods but performance failed to contribute to skills ratings at Time 4 and Time 5 and motivation ratings did not influence expectancy at Time 4. All 12 predicted paths in the change analyses were significant at Time 4 but the skills–goal change and performance–expectancy change paths were not significant at any other period and the performance–goal change path was not significant at Time 5.

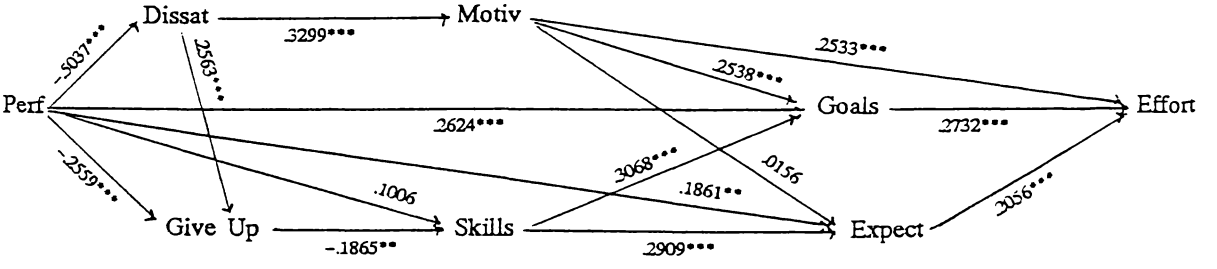
The omitted parameters tests shown in Appendix 6.2 indicate that a total of five omitted paths in the levels analyses and 14 in the change analyses were significant at various times. Of the paths which were expected to influence levels, but not changes in criteria, expectancy contributed to effort change at two periods, motivation ratings influenced expectancy change at all except Time 4, while performance (Time 3) or dissatisfaction (Times 4 to 6) influenced changes in skills ratings. In addition, goals had a negative effect on expectancy change at Time 5 and a positive effect on expectancy level and change at Time 6. No other omitted paths were significant at more than one period.

Of the 14 significant interactions, only six were due to those discussed as potential threats to the motivation model (see Appendix 6.2). Performance interacted with motivation ratings to contribute to effort level at Time 4, and with dissatisfaction to influence expectancy level and change at the same period. At Time 4, previous skills ratings had a direct positive effect on feedback motivation ratings, a direct negative effect on giving up, and interacted with dissatisfaction to influence giving up

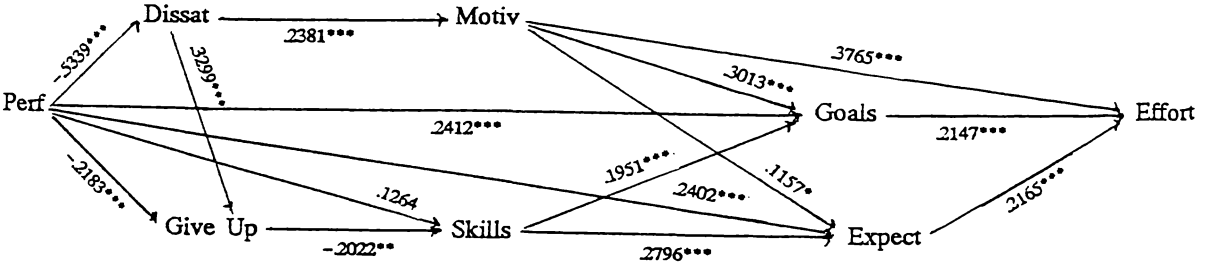
Time 3.



Time 4.



Time 5.



Time 6.

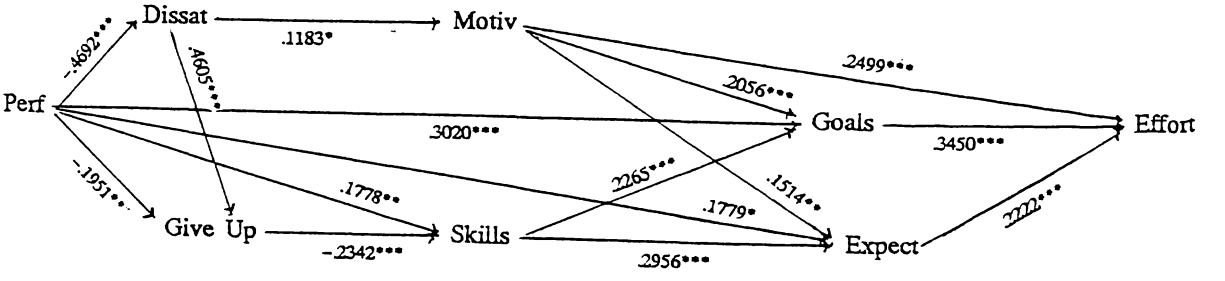
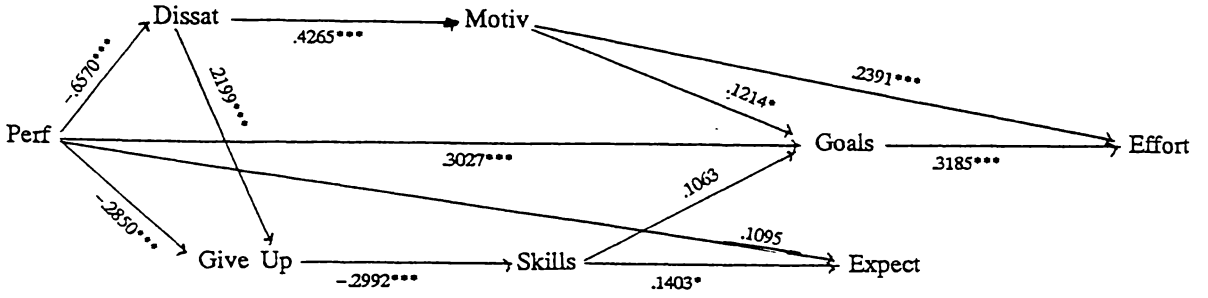
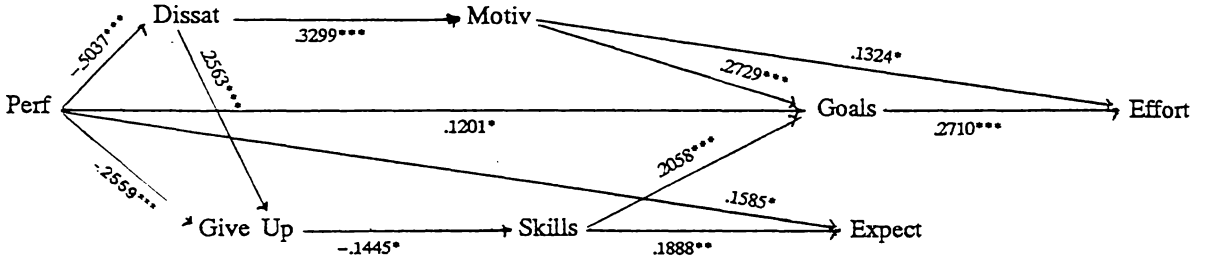


Figure 6.3a: Motivation Model Path Diagram: High Accuracy Group Levels Analyses

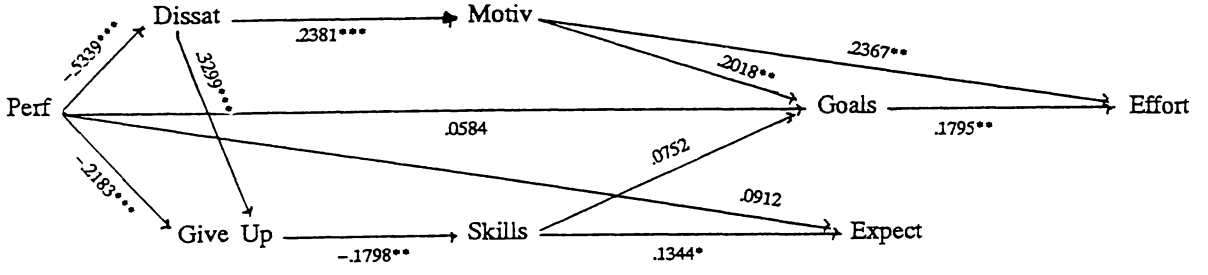
Time 3.



Time 4.



Time 5.



Time 6.

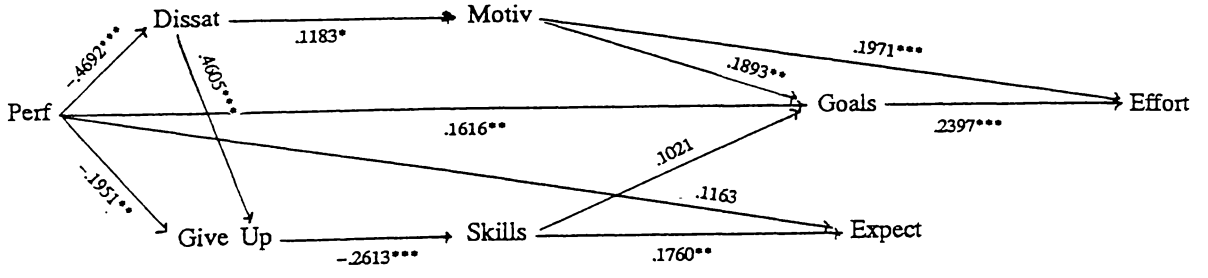


Figure 6.3b: Motivation Model Path Diagram: High Accuracy Group Change Analyses

Table 6.3: Motivation Model, High Accuracy Group Goodness of Fit Results

	Levels Residuals		Change Residuals	
Times	Restricted	Full	Restricted	Full
Time 3				
Effort	.7440	.7311	.8328	.8203
Expect	.8497	.8340	.9586	.9337
Goals	.7725	.7718	.8827	.8824
Skills	.8819	.8730	.9105	.8835
Motiv	.8181	.8114	.8181	.8114
Give Up	.7880	.7880	.7880	.7880
Dissat	.5684	.5684	.5684	.5684
X/Y	.8422	.8507	.7649	.7830
Q	.9900		.9769	
PGFI	.4597		.5582	
Time 4				
Effort	.7554	.7515	.8894	.8433
Expect	.8611	.8534	.9289	.9076
Goals	.7350	.7289	.8511	.8434
Skills	.9406	.9093	.9791	.9493
Motiv	.8912	.8776	.8912	.8776
Give Up	.8028	.8028	.8028	.8028
Dissat	.7463	.7463	.7463	.7463
X/Y	.7599	.7765	.6324	.6778
Q	.9786		.9330	
PGFI	.4544		.5331	
Time 5				
Effort	.6937	.6722	.8869	.8662
Expect	.8244	.8122	.9686	.9130
Goals	.7990	.7835	.9521	.9316
Skills	.9230	.9175	.9677	.9293
Motiv	.9433	.9279	.9433	.9279
Give Up	.7666	.7666	.7666	.7666
Dissat	.7150	.7150	.7150	.7150
X/Y	.7819	.8004	.5908	.6518
Q	.9769		.9064	
PGFI	.4536		.5179	
Time 6				
Effort	.6736	.6540	.8846	.8185
Expect	.8267	.8052	.9443	.8686
Goals	.7790	.7676	.9197	.9184
Skills	.8793	.8666	.9317	.9074
Motiv	.9860	.9842	.9860	.9842
Give Up	.6656	.6656	.6656	.6656
Dissat	.7799	.7799	.7799	.7799
X/Y	.8048	.8210	.6336	.6973
Q	.9803		.9086	
PGFI	.4552		.5192	

independently of both significant main effects. However, at Time 3 and Time 6, giving up was influenced by the negative dissatisfaction x performance interactions as well as the performance and dissatisfaction main effects.

The eight remaining interactions were due to the moderating effect of perceived feedback accuracy on performance or dissatisfaction. Perceived accuracy moderated the effect of dissatisfaction on goal level, expectancy change and skills ratings level at one of the measurement periods. The other significant interactions were the same as those for the performance–dissatisfaction model, but the interactive effect of performance and dissatisfaction on Time 6 effort level was not significant when motivation ratings and giving up were included in the model. The performance x accuracy interaction accounted for the predicted effect of performance on goal level at Time 3, and for the contributions of two of the significant omitted paths. In other cases, the interactions contributed additional variance to that of the predicted and omitted paths.

The goodness of fit results in Table 6.3 show that all Q, PGFI, X and Y values were highest at Time 3 and lowest at Time 5. The Q values declined from .99 to .98 in the levels results and from .98 to .91 in the change analyses while the PGFI scores decreased from .46 to .45 and from .56 to .52. The X and Y values, respectively decreased from .84 and .85 to .78 and .80 in the levels analyses and from .75 and .78 to .59 and .65 in the change analyses.

As shown in Table 6.4, the correlations between performance and levels and changes in goals and expectancies were all positive, but the levels correlations were stronger than those for the change analyses. The performance–goal section of the motivation model included the direct positive path, an indirect negative path and three indirect positive paths. In the levels analyses, the direct positive path was strongest at each time, followed by the positive path via skills ratings at the first and final times, and by the negative path via dissatisfaction and motivation ratings at the intermediary periods. The direct path was also strongest in the change analyses, followed by the negative path via dissatisfaction and motivation ratings. All differences between the correlations and total effects were less than .05.

Table 6.4: Motivation Model Performance - Goals and Performance - Expectancy Decompositions for High Accuracy Group

	Levels Analyses								Change Analyses							
	Paths Via:					Total Effects	*r*	Diff.	Paths via:					Total Effects	*r*	Difference
Corr.	Dissat Motiv	Dissat Give Up Skills	Direct	Skills	Give Up Skills				Dissat Motiv	Dissat Give Up & Skills	Direct	Skills	G.Up Skills			
Perf-Goals																
Time 3	-.0416	.0057	.3300	.0695	.0113	.3713	.3711	.00 <.05	-.0340	.0023	.3027	.0266	.0091	.2823	.3019	.02 <.05
Time 4	-.0422	.0074	.2624	.0309	.0146	.2731	.2983	.03 <.05	-.0453	.0038	.1201	.0207	.0077	.0863	.1374	.05 =.05
Time 5	-.0383	.0069	.2412	.0247	.0056	.2431	.2612	.02 <.05	-.0257	.0024	.0584	.0095	.0030	.0381	.0604	.02 <.05
Time 6	-.0114	.0115	.3020	.0403	.0103	.3527	.3523	.00 <.05	-.0105	.0058	.1616	.0182	.0052	.1621	.1788	.02 <.05
Perf-Expect																
Time 3	-.0432	.0053	.2278	.0612	.0105	.2625	.2622	.00 <.05		.0031	.1095	.0351	.0060	.1537	.1537	.00 <.05
Time 4	-.0026	.0070	.1861	.0293	.0139	.2337	.2353	.00 <.05		.0045	.1585	.0190	.0090	.1910	.1911	.00 <.05
Time 5	-.0147	.0100	.2402	.0353	.0123	.2831	.2901	.01 <.05		.0048	.0912	.0170	.0059	.1189	.1189	.00 <.05
Time 6	-.0084	.0150	.1779	.0526	.0135	.2505	.2503	.00 <.05		.0089	.1163	.0313	.0080	.1645	.1645	.00 <.05

Table 6.5 Motivation Model Performance – Effort Decompositions for High Accuracy Group

	Paths Via											Total Effects	*r*	Difference
	Dissat Motiv,	Dissat Motiv, Goals	Dissat Motiv Expect	Dissat GiveUp Skills Goals	Dissat GiveUp, Skills Expect	Goals	Expect	Skills Goals	Skills Expect	GiveUp, Skills, Goals	GiveUp Skills Expect			
Level Analyses														
Time 3	−.0821	−.0136	−.0065	.0018	.0008	.1076	.0350	.0215	.0094	.0037	.0016	.0792	.1439	.07 >.05
Time 4	−.0421	−.0115	−.0005	.0020	.0014	.0717	.0383	.0084	.0060	.0040	.0029	.0806	.1557	.08 >.05
Time 5	−.0479	−.0082	−.0032	.0015	.0022	.0518	.0520	.0053	.0077	.0018	.0027	.0657	.2147	.15 >.05
Time 6	−.0139	−.0039	−.0019	.0040	.0033	.1042	.0395	.0139	.0117	.0036	.0030	.1635	.1163	.05 <.05
Change Analyses														
Time 3	−.0670	−.0132		.0018		.1051		.0210		.0036		.0513	−.0240	.08 >.05
Time 4	−.0220	−.0114		.0020		.0711		.0084		.0040		.0520	−.0087	.06 >.05
Time 5	−.0301	−.0069		.0012		.0433		.0044		.0015		.0136	.0650	.05 =.05
Time 6	−.0109	−.0027		.0027		.0724		.0097		.0025		.0736	−.0733	.15 >.05

The performance–expectancy link also included a direct path, an indirect negative path and three indirect positive paths in the levels analyses, but the negative path via dissatisfaction and motivation ratings was omitted from the change analyses by the exclusion of the path from motivation ratings to expectancy change. The direct path was the strongest in both levels and change analyses, followed by the negative path in the levels analyses, and the positive path via skills ratings in the change analyses. All correlations decomposed adequately in both the levels and change analyses.

All paths linking performance to effort were indirect (see Table 6.5). The levels analyses included three negative and eight positive paths, while the omission of the path from expectancy to effort change left four positive and two negative paths in the change analyses. In the levels analyses, the positive path via goals was the strongest at all except Time 5, when the positive path via expectancy was marginally stronger. The positive path via goals was also strongest in the change analyses. The total effects considerably underestimated the positive correlations between performance and effort level at all except Time 6, while the differences between the total effects and change correlations approximated the required level at Time 5 (.051) but were larger at other times.

The correlations between performance and motivation ratings and those between skills ratings and effort level were decomposed to determine whether these links contributed to the failure of the correlations between performance and effort to decompose. The performance – motivation correlation could be decomposed at Time 3 (r −.2824; TE −.2802) and Time 6 (r −.0571; TE −.0555), but the indirect path over–estimated the correlations at Time 4 (r −.0666; TE −.1662; difference = .10) and at Time 5 (r −.0669; TE −.1271; difference = .06). The two indirect paths from skills ratings to effort level underestimated the correlations at Time 3 (r .2271; TE .1233; difference =.10) and Time 4 (r .2129; TE .1436; difference = .07) but approximated those at Time 5 (r .1415; TE .1024) and Time 6 (r .1788; TE .1438). The omitted parameters tests show that performance made positive contributions to motivation ratings at Time 4 (β .14) and Time 5 (β .06) and skills ratings had a positive effect on effort level at Time 3 (β .07) and Time 4 (β .02), but these and other omitted paths were not significant.

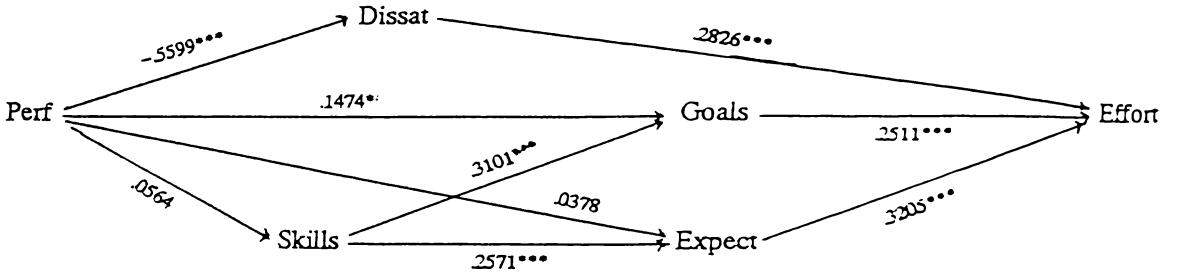
Summary. The Q indices indicate that the paths in the motivation model represented an adequate fit to the high accuracy group's levels and change data at all measurement times. Perceptions of the motivating effects of feedback consistently mediated the effects of dissatisfaction on levels and changes in goals and effort, and the extent to which feedback made recipients feel like giving up mediated the effect of dissatisfaction on levels of skills self-efficacy. However, the effects of feedback motivation ratings on expectancy level and change were inconsistent, and giving up failed to mediate the effect of dissatisfaction on changes in skills self-efficacy after the initial time. The effects of performance feedback on goal and expectancy change, and of skills self-efficacy on goal change were also inconsistent across time. All of the positive correlations between performance feedback and levels and changes in goals and expectancies decomposed adequately, but most of those between performance feedback and levels and changes in effort did not. These results, together with the significant interactions demonstrate limitations to the plausibility of the motivation model's explanation for the effect of performance feedback on effort among people who rated their feedback as accurate.

Low Accuracy Group: Performance-Dissatisfaction Model

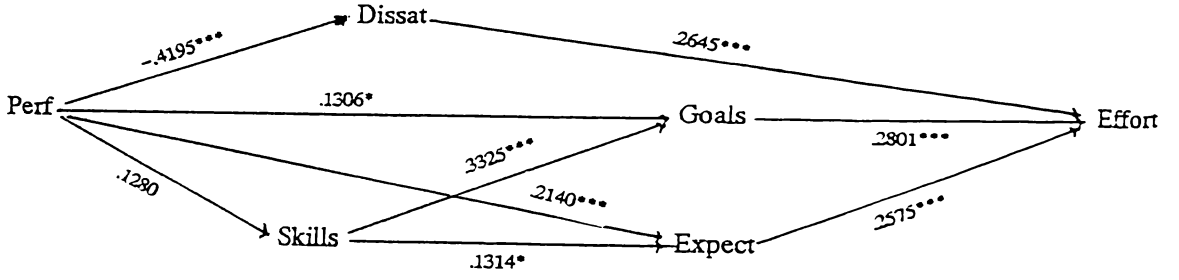
The number of significant predicted paths in the levels analysis of the performance-dissatisfaction model ranged from eight out of nine at Time 4, to six at Time 6 while those for the change analyses decreased steadily from six to three across the four periods (see Figure 6.4). Performance failed to contribute to levels or changes in skills ratings at any of the periods, or to expectancy level or change, except at Time 4. Performance also failed to predict goal change at any of the times, although it contributed to goal level at all except the final period. In addition, skills ratings did not contribute to goal change at the two later times and the contribution of expectancy to effort change was not significant after the first period. The only predicted paths which were significant at all times were those from performance to dissatisfaction, and from dissatisfaction to effort level and change.

Betas for nine omitted paths and eight interactions were significant at various times among the low accuracy group (see Appendix 6.3). The omitted path from dissatisfaction influenced goal level at the two earlier periods, while goals made

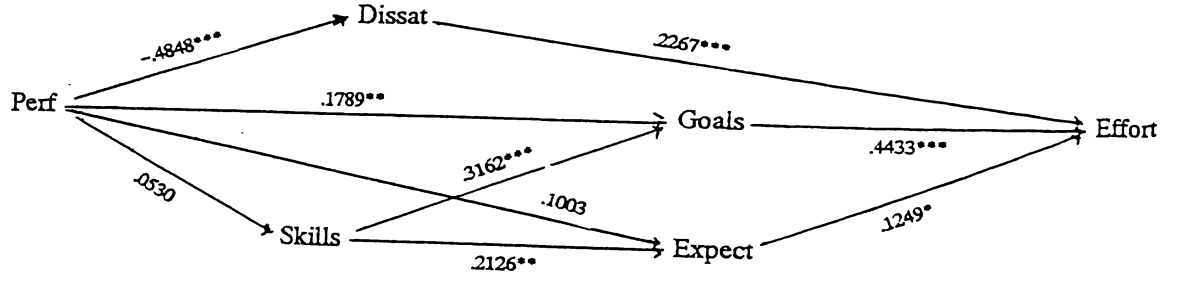
Time 3



Time 4



Time 5



Time 6.

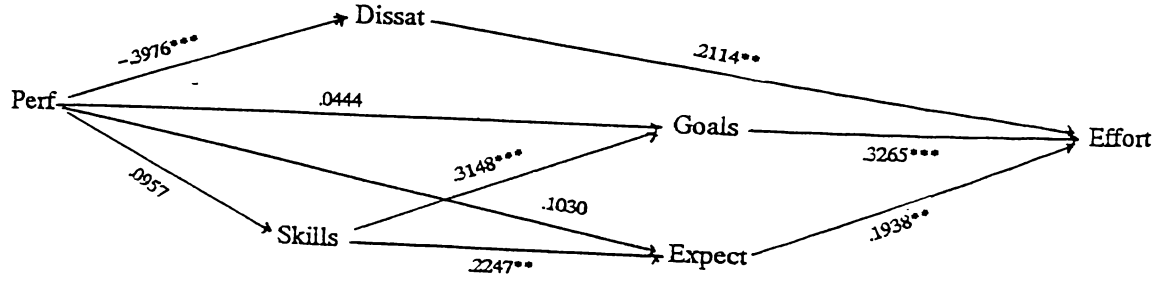
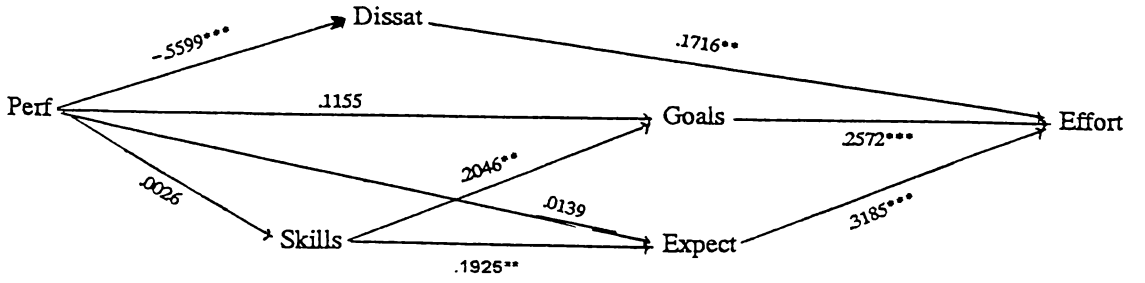
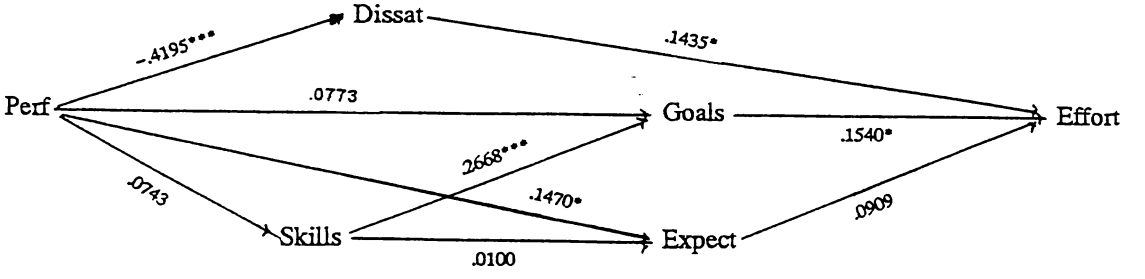


Figure 6.4a Performance–Dissatisfaction Model Path Diagram: Low Accuracy Group Levels Analyses

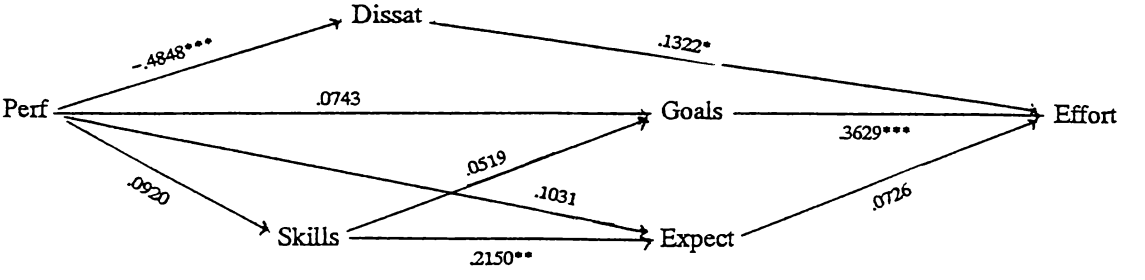
Time 3



Time 4



Time 5



Time 6.

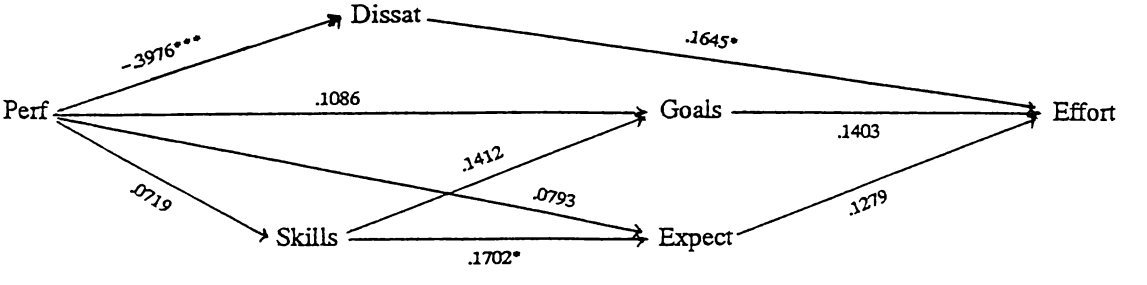


Figure 6.4b Performance–Dissatisfaction Model Path Diagram: Low Accuracy Group Change Analyses

Table 6.6: Performance-Dissatisfaction Model Goodness of Fit Results Low Accuracy Group

Times	Levels Residuals		Change Residuals	
	Restricted	Full	Restricted	Full
Time 3				
Effort	.7032	.6880	.7578	.7193
Expect	.9314	.9148	.9624	.9612
Goals	.8769	.8195	.9421	.9212
Skills	.9968	.9964	.9999	.9985
Dissat	.6865	.6865	.6865	.6865
X/Y	.6070	.6472	.5284	.5634
Q	.9379		.9379	
PGFI	.3752		.3751	
Time 4				
Effort	.7931	.7794	.9487	.8792
Expect	.9297	.9039	.9779	.9328
Goals	.8612	.8468	.9176	.9151
Skills	.9836	.9780	.9945	.9944
Dissat	.8240	.8240	.8240	.8240
X/Y	.4853	.5192	.3024	.3851
Q	.9347		.7853	
PGFI	.3739		.3141	
Time 5				
Effort	.7447	.7410	.8491	.8426
Expect	.9425	.9324	.9408	.9258
Goals	.8624	.8572	.9914	.9890
Skills	.9972	.9972	.9915	.9889
Dissat	.7650	.7650	.7650	.7650
X/Y	.5382	.5482	.3993	.4164
Q	.9818		.9589	
PGFI	.3927		.3836	
Time 6				
Effort	.7984	.7777	.9341	.9148
Expect	.9345	.9003	.9622	.9321
Goals	.8963	.8930	.9654	.9644
Skills	.9908	.9741	.9948	.9859
Dissat	.8419	.8419	.8419	.8419
X/Y	.4422	.4872	.2733	.3174
Q	.9076		.8611	
PGFI	.3630		.3444	

negative contributions to expectancy level and change at Time 4 and positive contributions to the same variables at the final period. Performance accounted for the predicted effects of dissatisfaction on effort level (Time 6) and effort change (Times 3 and 4), although the effect on effort change was moderated by perceived feedback accuracy at Time 3. The interaction between performance and dissatisfaction contributed additional variance to effort and goal levels at Time 4, and was the only significant predictor of skills ratings level (Times 3 and 4) and skills ratings change (Times 3 and 6). However, the contribution of this interaction to changes in skills ratings was positive at Time 3 and negative at Time 6.

As shown in Table 6.6, all Q indices for the low accuracy group levels analyses exceeded .90, while those for the change analyses at Time 4 (.79) and Time 6 (.86) did not. Parsimony indices ranged from a high of .39 for the Time 5 levels analysis to a low of .31 for the Time 4 change regression and Y values decreased from .64 to .49 and from .56 to .32 in the levels and change analyses respectively.

The decomposition results in Table 6.7 show that the correlations between performance and effort level and change for the low accuracy group were all negative and most were reasonably strong. The negative path via dissatisfaction was generally the strongest of the five paths. The total effects considerably underestimated all of the negative correlations except that between performance and effort level at Time 5. The direct effect of performance on effort level at Times 3 and 6 and on effort change at Times 3 and 4 may account for the failure of some of the correlations to decompose.

Summary. The Q indices suggest that the paths in the performance–dissatisfaction model represented an adequate fit to the low accuracy group's levels data at all the times, and to the change data at half the measurement periods. However, performance feedback generally had no effect on levels and changes in expectancies and skills self–efficacy, or on goal change. Expectancies failed to influence effort change after the first period, skills self–efficacy had no effect on goal change at the two later times, and the negative correlations between performance and effort level and change could be decomposed adequately at Time 5 only. These results indicate that the performance–dissatisfaction model offers a relatively poor explanation for the effects of performance feedback on subsequent effort among people who rate their feedback as inaccurate.

Table 6.7: Performance–Dissatisfaction Model Performance – Effort Decompositions for the Low Accuracy Group

	Indirect Paths via					Total Effects	*r*	Difference
	Dissat	Goals	Expect	Skills & Goals	Skills & Expect			
Levels Analyses								
Time 3	−.1582	.0370	.0121	.0044	.0046	−.1001	−.1966	.10 > .05
Time 4	−.1110	.0366	.0551	.0119	.0043	−.0030	−.1020	.10 > .05
Time 5	−.1099	.0793	.0125	.0074	.0014	−.0092	−.0136	.00 < .05
Time 6	−.0841	.0145	.0200	.0098	.0042	−.0356	−.1656	.13 < .05
Change Analyses								
Time 3	−.0961	.0379	.0120	.0045	.0046	−.0370	−.1907	.15 > .05
Time 4	−.0602	.0201	.0195	.0066	.0015	−.0126	−.2389	.23 > .05
Time 5	−.0641	.0649	.0073	.0061	.0008	.0150	−.0526	.07 > .05
Time 6	−.0654	.0062	.0132	.0042	.0028	−.0390	−.1325	.09 > .05

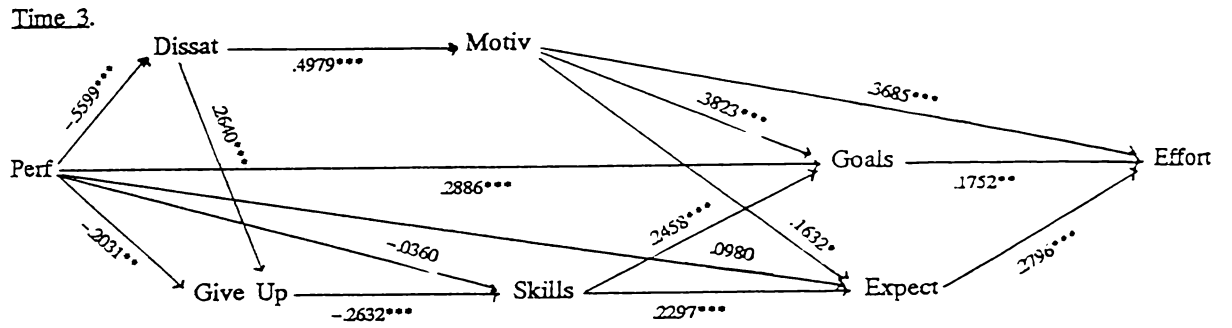
Low Accuracy Group: Motivation Model.

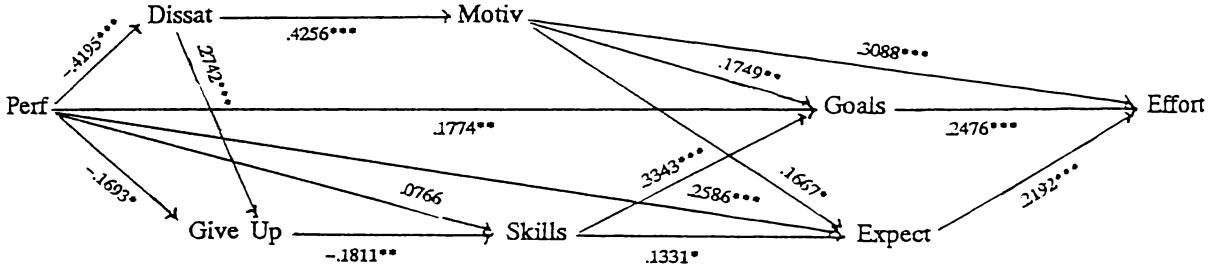
The number of the 15 predicted paths which were significant in the levels analyses ranged from 14 at Time 4 to 12 at the two later periods (see Figure 6.5a) while those for the change analyses decreased steadily from eleven to five out of twelve across the four periods (see Figure 6.5b). Performance failed to predict skill rating levels at any period or expectancy level or change, except at Time 4. Other predicted paths which were not significant at half the measurement periods were those from performance, motivation ratings and skills ratings to goal change, and from giving up to changes in skills ratings.

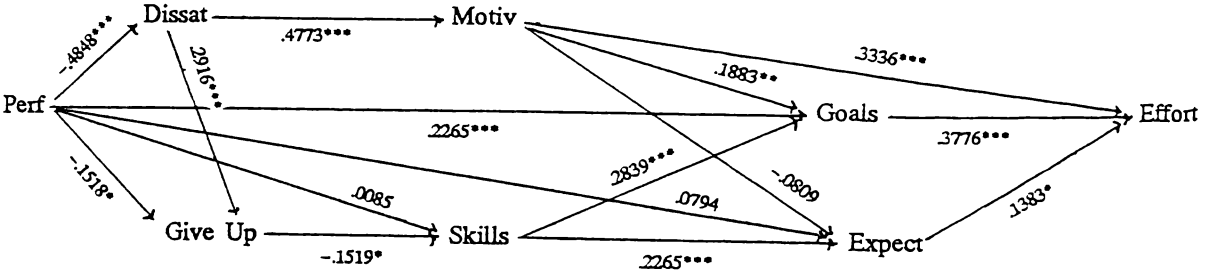
A total of 16 omitted paths were significant at various times, of which the most frequent were those from motivation ratings to skills ratings level (Times 3, 5 and 6) and skill ratings change (Times 5 and 6), and from giving up to feedback motivation ratings. Goals made negative contributions to expectancy level and change at Time 4, and positive contributions to these criteria at Time 6 although the Time 6 betas became nonsignificant after other omitted paths were entered. Finally, of the paths which were predicted in the levels, but omitted from the change model, one of the motivation – expectancy change paths was significant, as were two of those from expectancy to effort change.

Of the nine significant interactions which were found in the low accuracy group, four arose from that between performance and dissatisfaction which was considered a potential threat to the motivation model. This interaction made positive contributions to goal and skill rating levels at Time 4 and changes in skills ratings at Time 3, but negative contributions to changes in skills ratings at Time 6 and effort change at Time 4. Although there were no significant interactions between performance and motivation, or between previous skills ratings and dissatisfaction, previous skills ratings had a negative effect on giving up at Times 3 and 4 and a positive effect on motivation ratings at Time 5.

Other interactions arose from the moderating effect of perceived accuracy which interacted with performance to influence effort level and change at Time 3 and motivation ratings at Time 5, and with dissatisfaction to contribute to giving up at Time 6. Perceived accuracy also had a direct effect on motivation ratings at Time 5 and on giving up at Time 6. The dissatisfaction x accuracy interaction accounted for







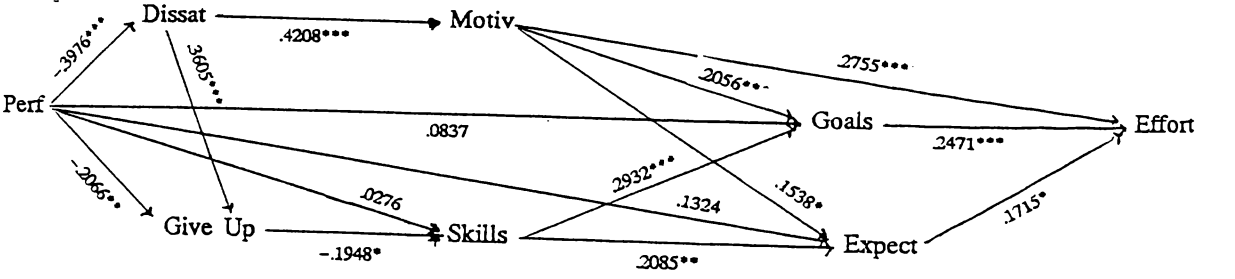
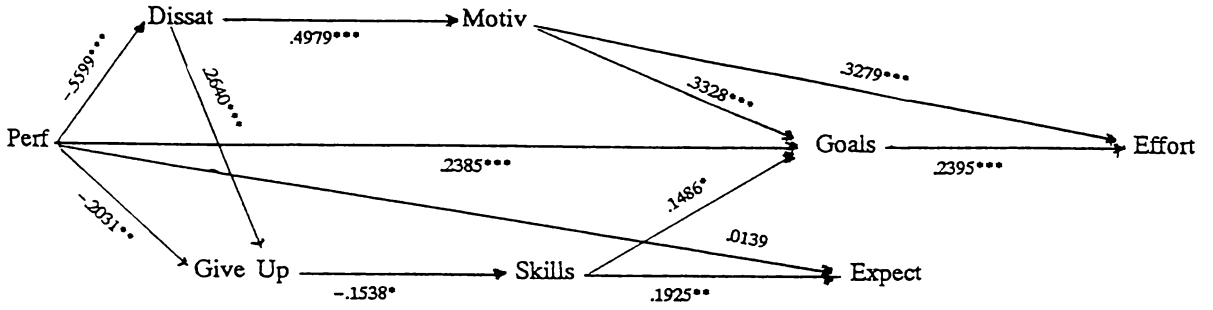
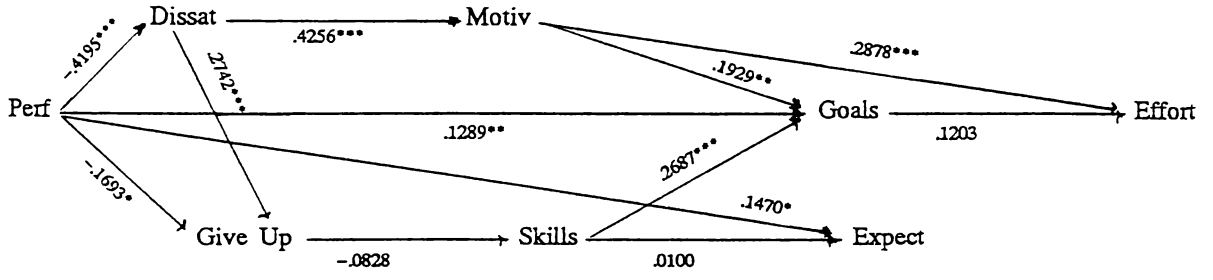


Figure 6.5a: Motivation Model Path Diagram: Low Accuracy Group Levels Analyses

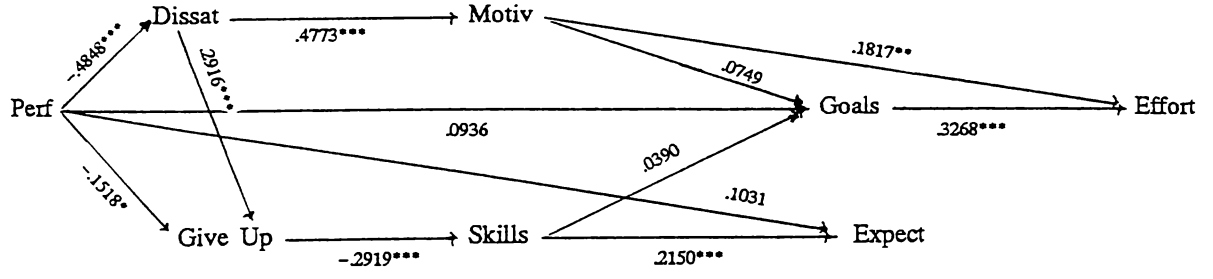
Time 3



Time 4.



Time 5.



Time 6.

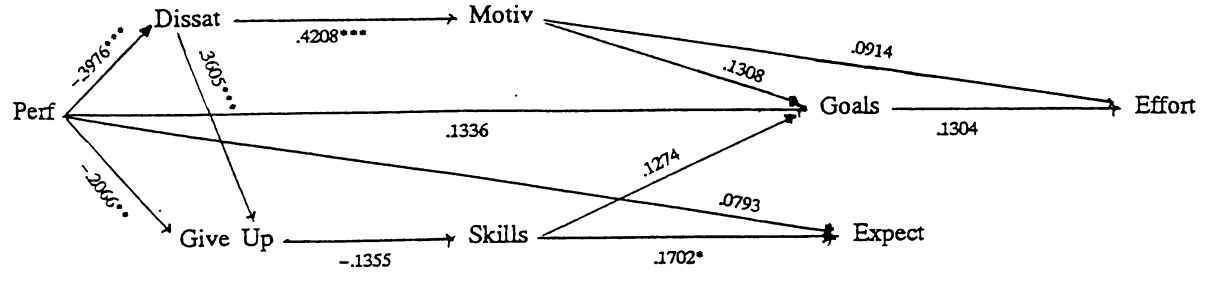


Figure 6.5b: Motivation Model Path Diagram: Low Accuracy Group Change Analyses

Table 6.8: Motivation Model Goodness of Fit Results Low Accuracy Group

	Levels Residuals		Change Residuals	
Times	Restricted	Full	Restricted	Full
Time 3				
Effort	.6609	.6281	.7856	.6474
Expect	.9090	.9021	.9642	.9493
Goals	.7539	.7069	.8488	.8186
Skills	.9361	.9037	.9764	.9540
Motiv	.7521	.7352	.7521	.7352
Give Up	.8298	.8289	.8289	.8289
Dissat	.6865	.6865	.6865	.6865
X/Y	.8184	.8486	.7313	.7992
Q	.9644		.9150	
PGFI	.4478		.5229	
Time 4				
Effort	.7697	.7411	.8949	.8350
Expect	.9040	.8771	.9779	.9034
Goals	.8329	.8275	.8830	.8808
Skills	.9353	.9521	.9931	.9860
Motiv	.8189	.7660	.8189	.7660
Give Up	.8573	.8573	.8573	.8573
Dissat	.8240	.8240	.8240	.8240
X/Y	.6864	.7229	.5561	.6455
Q	.9495		.8615	
PGFI	.4504		.5401	
Time 5				
Effort	.6885	.6819	.8393	.8245
Expect	.9365	.9254	.9408	.9241
Goals	.8302	.8266	.9863	.9779
Skills	.9761	.9458	.9148	.8854
Motiv	.7722	.7469	.7722	.7469
Give Up	.8490	.8490	.8490	.8490
Dissat	.7650	.7650	.7650	.7650
X/Y	.7379	.7606	.6427	.6800
Q	.9702		.9451	
PGFI	.4504		.5401	
Time 6				
Effort	.7708	.7393	.9695	.9127
Expect	.9119	.8910	.9622	.9228
Goals	.8558	.8323	.9654	.9406
Skills	.9575	.9208	.9816	.9767
Motiv	.8229	.8195	.8229	.8195
Give Up	.7682	.7682	.7682	.7682
Dissat	.8419	.8419	.8419	.8419
X/Y	.6935	.7324	.5295	.5899
Q	.9469		.8976	
PGFI	.4396		.5129	

the predicted effect of dissatisfaction on giving up at Time 6 while the other significant interactions and main effects for perceived accuracy and previous skills ratings contributed additional variance to the prediction of the criteria.

All Q indices for the levels analyses exceeded .90 but the change analysis Q indices were lower at Time 4 (.86) and only approximated the required level at Time 6 (.8976). PGF indices ranged from .45 (Time 5) to .44 (Time 6) in the levels results and from .54 (Time 5) to .49 (Time 4) in the change analyses. In the levels and change results respectively, the Y values decreased from .85 to .73 and .80 to .59 across the measurement periods.

The decomposition results in Table 6.9 show that performance was positively correlated with levels and changes in goals and expectancies. Total effects which differed by less than .05 from the correlations show that the paths linking performance to goal level and change (five paths), expectancy level (five paths), and to expectancy change (four paths) represented these sections of the model adequately. The direct path linking performance to goal level and change was the strongest at each period, even though most were nonsignificant in the change analyses. The path via dissatisfaction and motivation ratings was the second strongest path in the levels analyses but was positive at Time 5 and negative at other periods. The three small indirect paths in the change analyses were similar in size.

Of the eleven indirect paths which linked performance to effort level (see Table 6.10), the strongest were the negative path via dissatisfaction and motivation ratings (Times 3 and 6) or the positive paths via goals and expectancies. In the change analyses, the positive path via goals was strongest at Time 5 while the negative dissatisfaction – motivation path was strongest at other times. However, the total effects under–estimated the strength of the negative correlations between performance and effort change at all periods, and those between performance and effort level at all except Time 5.

Decompositions of the correlations between performance and motivation ratings indicate that the indirect path under–estimated the correlations at Time 3 (r −.3599; TE −.2788) and Time 4 (r −.2687; TE −.1785) but approximated those at Time 5 (r −.2490; TE −.2314) and Time 6 (r −.1813; TE −.1617). The under–estimation of the earlier correlations reflects the negative contributions of performance and giving up,

Table 6.9: Motivation Model Performance - Goals and Performance - Expectancy Decompositions for Low Accuracy Group

	Levels Analyses								Change Analyses							
	Paths Via:					Total Effects	*r*	Diff.	Paths via:					Total Effects	*r*	Difference
Corr.	Dissat Motiv	Dissat Give Up Skills	Direct	Skills	Give Up Skills				Dissat Motiv	Dissat Give Up & Skills	Direct	Skills	Give Up Skills			
Perf-Goals																
Time 3	-.1066	.0096	.2886	-.0088	.0131	.1959	.1647	.03 <.05	-.0928	.0058	.2385	-.0053	.0079	.1541	.1271	.03 <.05
Time 4	-.0312	.0070	.1774	.0256	.0102	.1900	.1732	.02 <.05	-.0344	.0056	.1289	.0206	.0082	.1289	.1114	.02 <.05
Time 5	-.0436	.0061	.2265	.0024	.0065	.1980	.1946	.00 <.05	-.0173	.0008	.0936	.0003	.0009	.0783	.0770	.00 <.05
Time 6	-.0344	.0082	.0837	.0081	.0118	.0774	.0745	.00 <.05	-.0219	.0036	.1336	.0035	.0051	.1239	.1221	.00 <.05
Perf-Expectancy																
Time 3	-.0455	.0089	.0980	-.0083	.0123	.0654	.2052	.01 <.05		.0075	.0139	-.0069	.0103	.0248	.0248	.00 <.05
Time 4	-.0298	.0028	.2586	.0102	.0041	.2418	.2308	.01 <.05		.0002	.1470	.0003	.0008	.1483	.1483	.00 <.05
Time 5	.0187	.0049	.0794	.0019	.0052	.1101	.1115	.00 <.05		.0046	.1031	.0050	.0018	.1145	.1145	.00 <.05
Time 6	-.0257	.0058	.1324	.0058	.0084	.1266	.1245	.00 <.05		.0048	.0793	.0068	.0047	.0956	.0956	.00 <.05

Table 6.10: Motivation Model Performance - Effort Decompositions for the Low Accuracy Group

	Paths Via											Total Effects	*r*	Difference
	Dissat Motiv,	Dissat Motiv, Goals	Dissat Motiv Expect	Dissat GiveUp, Skills Goals	Dissat GiveUp, Skills Expect	Goals	Expect	Skills Goals	Skills Expect	GiveUp, Skills, Goals	GiveUp, Skills Expect			
Level Analyses														
Time 3	-.1027	-.0187	-.0127	.0017	.0025	.0506	.0274	-.0016	-.0023	.0023	.0034	-.0501	-.1966	.15 >.05
Time 4	-.0551	-.0077	-.0065	.0017	.0006	.0439	.0567	.0063	.0022	.0025	.0009	.0456	-.1020	.15 >.05
Time 5	-.0772	-.0165	.0026	.0023	.0007	.0855	.0110	.0009	.0003	.0025	.0007	.0128	-.0136	.03 <.05
Time 6	-.0461	-.0085	-.0044	.0020	.0010	.0207	.0227	.0020	.0010	.0029	.0014	-.0053	-.1656	.16 >.05
Change Analyses														
Time 3	-.0909	-.0222		.0008		.0571				.0011		-.0540	-.1907	.14 >.05
Time 4	-.0514	-.0041		.0003		.0155				.0005		-.0393	-.2389	.20 >.05
Time 5	-.0420	-.0057		.0005		.0306				.0006		-.0160	-.0526	.04 <.05
Time 6	-.0153	-.0029		.0003		.0174				.0005		-.0000	-.1325	.13 >.05

although these were not significant at Time 3. The total effects for the two indirect paths from skills ratings to effort level were similar to the correlations at Time 3 (*r* .1440; TE .1073), Time 4 (r .0889; TE .1119) and Time 6 (*r* .1017; TE .1082) but underestimated that at Time 5 (*r* .2217; TE .1385). Given that the correlations between performance and effort were negative in the low accuracy group, these results suggest that the problems with the link between performance and motivation ratings contributed to the failure of the correlations to decompose at the earlier times. The direct effect of performance on effort change at the two earlier periods and other significant omitted paths will also contribute to the failure of the correlations to decompose.

Summary. The Q indices indicate that the paths in the motivation model represented an adequate fit to the low accuracy group's levels data at all times, and to the change data at all except Time 4. The extent to which feedback was experienced as motivating generally mediated the effect of dissatisfaction on goal, expectancy and effort levels, and on changes in goals and expectancies at the two earlier times. Giving up also mediated the effect of both dissatisfaction and performance on levels of skills self–efficacy, but the effect of dissatisfaction on changes in skills self–efficacy was inconsistent. However, none of the predicted variables influenced goal change at the two later times, and neither perceptions of the motivating effects of feedback nor goals predicted effort change at the final time. The positive correlations between performance feedback and levels and changes in goals and expectancies decomposed adequately at each time, but the paths in the motivation model generally underestimated the negative correlations between performance feedback and levels and changes in effort which were found in the low accuracy group. These results demonstrate limitations to the plausibility of the motivation model's explanation for the effect of performance feedback on effort among people who rate their feedback as inaccurate.

Descriptive Data

As a final step, the across–time correlations were compared to determine whether the low accuracy group was more consistent in their skills ratings, goals, expectancies and effort than the high accuracy group. This possibility is consistent

Table 6.11: Across-Time Correlations for Accuracy Groups

Variables	Time 3	Time 4	Time 5	Time 6
Effort				
High Accuracy	.6031	.6260	.6608	.6506
Low Accuracy	.4541	.6573	.6505	.7143
Expectancy				
High Accuracy	.5584	.4604	.6313	.4700
Low Accuracy	.4232	.7426	.4335	.4229
Goals				
High Accuracy	.5857	.6691	.6189	.6319
Low Accuracy	.4812	.5870	.7104	.6878
Skills				
High Accuracy	.7261	.7626	.8148	.7714
Low Accuracy	.6478	.7526	.7742	.8092

with the literature which assumes that feedback which is perceived to be inaccurate is rejected and ignored (Ilgen et al, 1979; Lord & Hanges, 1987). Mean scores for the two accuracy groups were examined to assess the possibility that inconsistencies in the change results for the models reflected variations in patterns of responses across time. Differences between mean pre– and post–scores were of particular interest because significant path coefficients using residualised change scores could reflect either greater increases or smaller decreases in scores. Finally, the accuracy groups were broken into good versus poor performers to examine the joint effects of perceived feedback accuracy and performance feedback on effort level and change which were demonstrated by differences in the direction of the correlations between performance and effort change for the two accuracy groups.

The results in Table 6.11 show that the high accuracy group's across–time correlations for skills self–efficacy, goals and effort remained relatively stable over the measurement periods, while those for the low accuracy group generally increased. Correlations for skills ratings were stronger than those for other variables while the expectancy correlations were generally the weakest and showed considerable variation in both accuracy groups. Differences of more than .10 between the squared across–time correlations for the two groups indicate that the people in the low accuracy group were less likely to maintain their previous skills ratings, goals, expectancies and effort than the high accuracy group at the initial period. At Time 4, low accuracy people were more consistent in their expectancies but less consistent in their goals than the high accuracy group, but this pattern reversed at Time 5 when high accuracy people were more consistent in their expectancies but less consistent in their goals. Other differences between the across–time correlations for the two groups were smaller.

Differences between the pre– and post scores in Figure 6.6 indicate that both accuracy groups decreased their skills ratings, goals and expectancies at Time 3 and Time 5, but the low accuracy group maintained or increased effort while the high accuracy group decreased their effort. At Time 4, both groups showed some increase in their mean skills ratings and goals and the low accuracy group decreased their expectancies and maintained effort while the high accuracy group increased their expectancies and reduced effort. At the final time, both groups tended to increase their skills ratings and expectancies but reduced their goals, and the low accuracy group

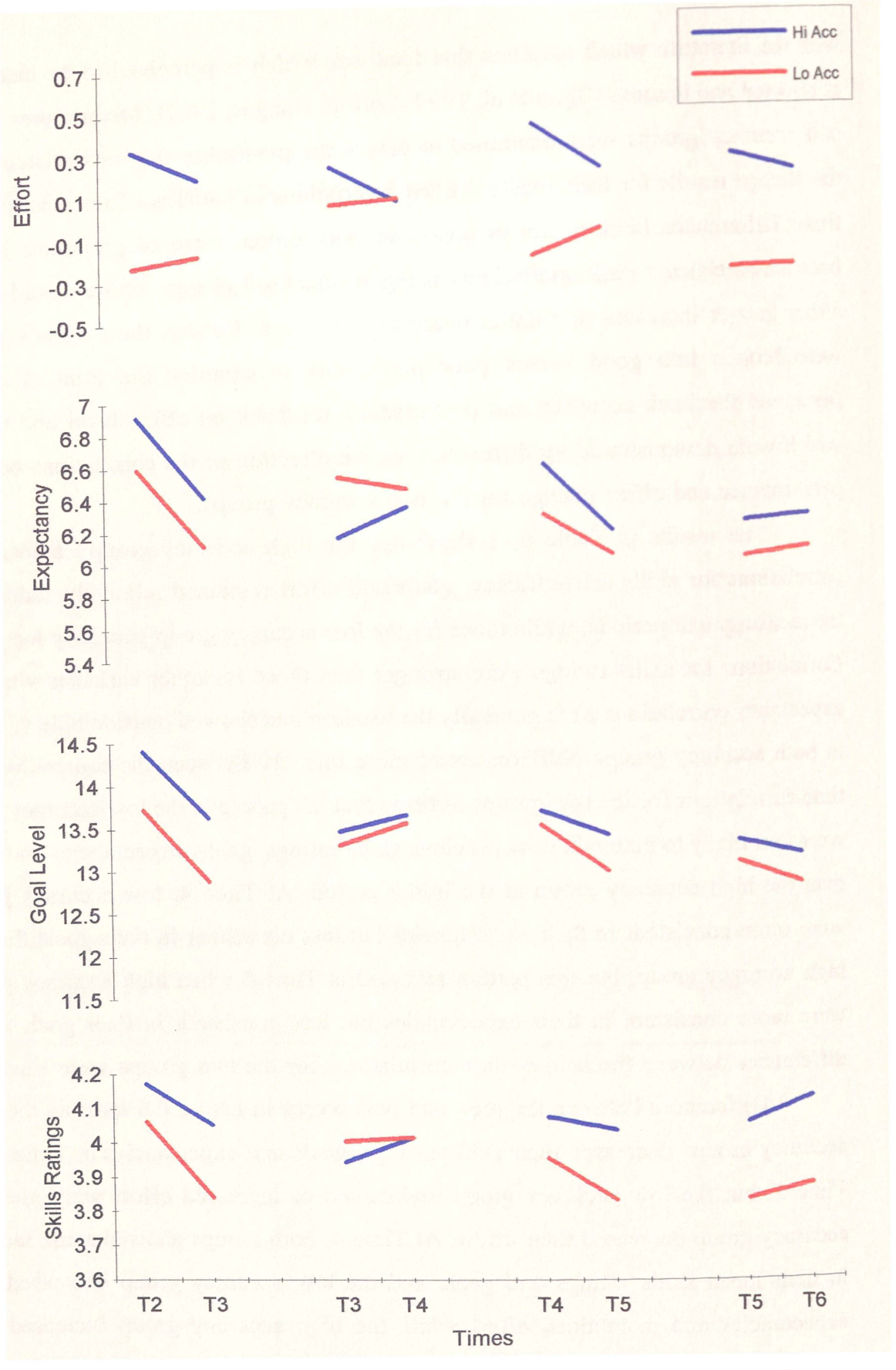


Figure 6.6: Mean Pre and Post Scores for High and Low Accuracy Groups

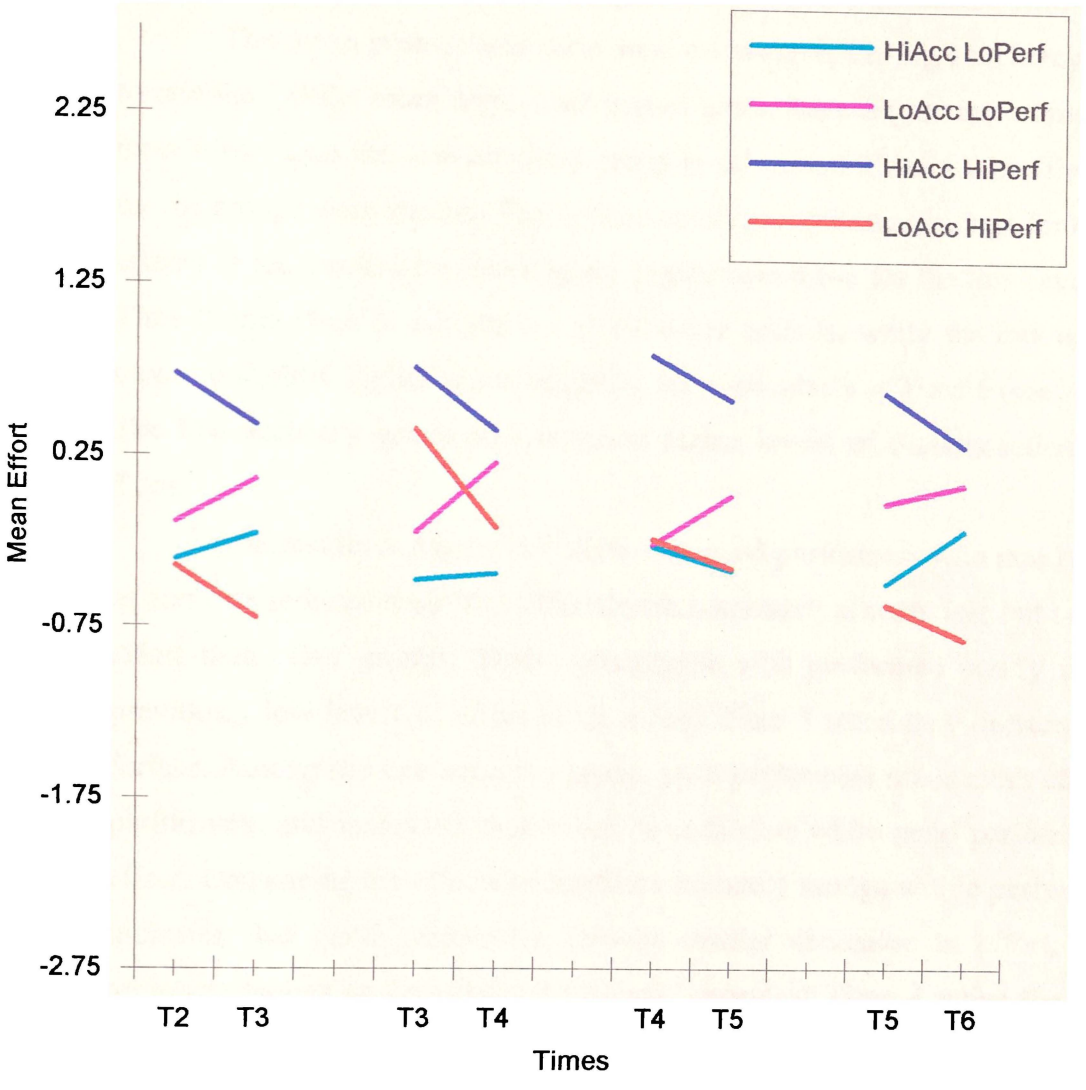


Figure 6.7: Mean Pre and Post Effort Scores by Accuracy and Performance

maintained their effort while the high accuracy group reduced effort.

The mean post–scores show that, on average, the high accuracy group tended to rate their skills more highly, set higher goals, have higher expectancies and make more effort than the low accuracy group at all except Time 4 when the mean scores for the groups were similar. The high accuracy group's mean ratings for the motivating effects of feedback were also slightly higher than those for the low accuracy group at Time 3 and Time 6, but similar at the other periods, while the low accuracy group reported slightly higher levels of giving up, particularly at Time 6 (see Appendix 6.6). The low accuracy group also reported higher levels of dissatisfaction at all except Time 4.

The results in Figure 6.7 show that good performers who rated their feedback as accurate reduced their high effort levels somewhat at each time but still made more effort than other groups. Their counterparts who performed poorly increased their previously low levels of effort at all except Time 5 when they decreased their effort further. Among the low accuracy group, poor performers made more effort than good performers, and increased their effort at each time while good performers decreased effort. Comparing the effects of feedback accuracy ratings within performance groups indicates that good performers showed similar decreases in effort, regardless of accuracy ratings or previous effort level, except at Time 4 when the low accuracy group showed its highest previous effort score and decreased effort more than the high accuracy group. However, differences in the mean effort scores indicate that poor performers who rated their feedback as inaccurate consistently made more effort than their counterparts who rated their feedback as accurate, and increased effort more at all except the final time.

Summary. The pattern of across–time correlations and differences between the mean pre– and post–scores offer little evidence to support the possibility that people who rate their feedback as inaccurate simply ignore it and maintain their previous responses, particularly at the initial time. However, the variations in the change results for both groups suggest that some of the inconsistent path analysis results could reflect differences in patterns of responses across the measurement periods. The non–significant correlations between performance feedback and residualised effort change scores for the high accuracy group suggest that differences between the mean previous

and current effort scores for good versus poor performers reflect regression to the mean. However, the pattern of change for the low accuracy group indicates that poor performers increased effort while good performers decreased their effort at each time. Like the across–time correlations, these results cast doubt on the assumption that feedback must be accepted if people are to respond to it.

Comparisons of the Plausibility of the Two Revised Models.

Given that the models were designed to explain peoples' responses to performance feedback, comparisons of the plausibility of the two revisions focused on the results produced by people who indicated that they had received and attended to their feedback by rating it as accurate.

Support for the Motivation Model

Although the path analyses demonstrated limitations to both revisions, the results generally suggest that the motivation model offers a somewhat more plausible explanation for the way performance feedback which is perceived as accurate influences subsequent responses than does the performance–dissatisfaction model. Over all measurement periods, the motivation model produced a higher proportion of significant predicted paths than the performance–dissatisfaction model, although the revisions produced similar proportions of significant omitted paths. Q indices of greater than .90 demonstrate that the paths predicted in the motivation model demonstrated an acceptable fit to the levels and change data at each period. The performance–dissatisfaction model Q indices for the levels analyses also exceeded .90 at each time, but the change analysis Q of .82 showed an inadequate fit to the change data at the final period.

The PGFI and Y values also favour the motivation model, and differentiate between the two revisions more clearly. While none of the performance–dissatisfaction model PGFIs exceeded .40, those for the motivation model approximated .45 in the levels analyses, and exceeded .50 in the change analyses. These results indicate that the tendency for goodness of fit to be achieved at the expense of parsimony was less pronounced in the motivation model.

The levels analyses for both models produced Y values which exceeded .50 at

each time, but those for the performance–dissatisfaction model change analyses did so at Time 3 only. By showing that the predicted and omitted paths together accounted for less than half of the total variance in the residualised change scores at three of the four measurement periods, these results suggest that relevant variables were excluded from the performance–dissatisfaction model. In contrast, the *X* values for the motivation model show that the predicted paths, on their own, accounted for at least 59% of the total change score variance, while the *Y* values show that the predicted and omitted paths together accounted for a minimum of 65% of the total variance in change scores. These differences suggest that the perceived motivating and debilitating effects of feedback represent two of the relevant variables which were excluded from the performance–dissatisfaction model.

Problems Shown by Interactions

Although the preceding criteria offer some support for the revisions, the significant interactions point out problems with both models. However, relatively few of the interactions which were discussed as potential threats to the motivation model were significant, and those which were tended to be small and to affect the Time 4 data only. The contribution of the interaction between performance feedback and dissatisfaction to giving up was stronger than most others, but occurred at only half of the measurement periods. Similarly, previous skills self–efficacy contributed to feedback motivation ratings and giving up, and interacted with dissatisfaction to influence giving up, but these results were significant at Time 4 only. Like the earlier analyses investigating the bi–polar satisfaction variable, these results offer limited support for the assumption that performance feedback moderates the effect of dissatisfaction on effort (Bandura & Cervone, 1986) or other variables. Similarly, they provide little support for the other prediction from Bandura and Cervone's (1983, 1986) framework, that self–efficacy determines whether dissatisfaction results in feedback being experienced as motivating or debilitating.

Of greater concern was the tendency for perceptions of feedback accuracy to moderate the effect of performance and dissatisfaction on other variables, even after perceived feedback accuracy had been reduced to a dichotomous variable by splitting the sample at the midpoint of the accuracy measure. Like the interactions described

above, most perceived accuracy moderators were significant at some periods but not others, although those contributing to goals were more frequent. However, perceived accuracy interacted with performance at Times 3 and 5, but with dissatisfaction at Time 4, and the beta for the interaction between perceived accuracy and performance was positive at Time 3 and negative at Time 5.

Crossbreaks which were used to examine the goal results showed that the extreme goals at the earlier periods (and goal change at Time 3) occurred within the high accuracy group, with people who performed well (Time 3) or who were satisfied (Time 4) setting the highest goals, and poor performers or the dissatisfied setting the lowest. These results are consistent with each other if it can be assumed that multicollinearity arising from the strong correlation between performance and dissatisfaction accounts for the tendency for perceived accuracy to interact with dissatisfaction at one time and with performance at others. However, the Time 5 results contrast with those found at both earlier periods by showing that the extreme goals were set by the low accuracy group and the extreme goal changes were found among poor performers. Together, the Time 5 results indicate that good performers set higher goals than poor performers, but only if they doubted the accuracy of their feedback, while people who rated their feedback as highly accurate increased their goals more than those who were less certain of their feedback accuracy, but only if they performed poorly. The results for the interactions at the earlier times are more plausible that those found at Time 5.

Although the significant interactions demonstrate violations of the homogeneity of regression assumption, the tendency for the predicted paths to remain significant after the entry of the interactions and perceived accuracy main effects suggests that clear violations of the additivity assumption were limited. Exceptions were the interactions showing that the Time 3 contribution of performance to goal level depended on accuracy ratings, the Time 4 contribution of performance to expectancy level and change depended on dissatisfaction, and the Time 5 results demonstrating that the previously significant contribution of feedback motivation ratings to goal change was accounted for by perceived accuracy and the interaction between accuracy and performance. In all other cases, the main effects and interactions simply contributed additional variance to the prediction of the criteria, thereby reducing the

goodness of fit. Under such circumstances, the interactions suggest that the proposed model is incomplete, rather than incorrect. Overall, the present results emphasise the importance of perceptions of feedback accuracy but the rather erratic nature of the interactions does little to suggest that most moderators tested here make consistent, meaningful contributions to variables in the model.

Problems Shown by Decompositions

The results of the decompositions also pointed out weaknesses in both models. The positive correlations between performance feedback and effort level indicate that good performers made more effort than poor performers at each period, while the weak change correlations tended to favour good performers at Time 5 and poor performers at Time 6, but showed little difference at the earlier times. The relative strength of the indirect paths in the performance–dissatisfaction model suggest that people who set high goals as a result of good performance were the most likely to maintain high levels of effort at each time, and to increase their effort at the three later periods. Differences of less than .05 between the total effects and correlations indicate that the paths from performance to effort level at the two earlier times, and to effort change at Time 5 were correctly specified. However, larger differences show that the paths in this model underestimated the effort made by good performers at Time 5 and poor performers at Time 6, and the extent to which poor performers increased effort at both earlier times. The omitted parameters results showing that performance feedback had a direct negative effect on effort level and change at the final time explain why the Time 6 correlations failed to decompose.

The decompositions offered somewhat mixed support for the motivation model. The positive correlations between performance feedback and levels and change in goals and expectancies indicate that good performers generally had higher goals and expectancies, and increased their goals and expectancies more than poor performers. Although the direct paths accounted for the majority of the variance in all of the correlations, the strongest of the indirect paths indicate that good performers were particularly likely to maintain high goals and expectancies if they had high skills self–efficacy, and that poor performers tended to set high goals and increase their goals if their performance feedback made them feel dissatisfied and motivated. Differences of

less than .05 between the total effects and correlations show that the links between performance feedback and levels and changes in goals and expectancies were specified adequately in this model.

However, decompositions of the link between performance feedback and effort identified problems with the motivation model. The relative strength of the indirect paths indicate that good performers were most likely to make high levels of effort if they set high goals or had high expectancies of achieving them, while poor performers tended to make high levels of effort if dissatisfied and motivated by their performance feedback. The positive path via goals also accounted for the single largest portion of variance in effort change, followed by the negative path via dissatisfaction and motivation ratings. However, the total effects underestimated the strength of the positive correlations for the levels analyses at all except Time 6, when the negative path via dissatisfaction and motivation ratings was weakest. The difference of .051 indicates that the total effects approximated the positive correlation at Time 5, but larger differences show that the paths underestimated the increase in effort made by poor performers at the other periods.

Significant omitted paths showing that performance feedback had a direct positive effect on effort level at Time 5 and a direct negative effect on effort change at Time 6 explain the differences between the total effects and correlations at the later periods. Similarly, the tendency for the indirect path via dissatisfaction to overestimate the strength of the negative link between performance and feedback motivation ratings at Times 4 and 5, and for the skills ratings – effort level link to underestimate the positive correlations at Time 3 and Time 4 suggests that problems with these sections of the model contributed to the failure of the positive effort level correlations to decompose at the two earlier times. However, neither these links nor the significant paths identified by the omitted parameters tests explain why the increased effort shown by poor performers was underestimated by the paths in the motivation model at the two earlier times. Given that the motivation model included more variables and pathways, the accumulated contributions of nonsignificant omitted paths (Billings & Wroten, 1978) could explain why the Time 3 and Time 4 performance–effort correlations decomposed in the performance–dissatisfaction model, but not in the motivation model.

In spite of the problems with the interactions and decompositions, the overall pattern of findings indicate that the motivation model offers a more plausible framework than the performance–dissatisfaction model. However, the tendency for the levels analyses to offer more support for the model than the change analyses shows that the motivation model was better at explaining when people maintain, rather than change, their skills self–efficacy, goals, expectancies and effort. In addition, the results from the initial time were more supportive of the model than those from the later times.

Differences Over Time

The Time 3 results show that people who received negative performance feedback were dissatisfied, that poor performance and dissatisfaction made students feel like giving up, and that poor performance and giving up undermined confidence in academic skills. People who were dissatisfied experienced their feedback as more motivating than those who were satisfied, which encouraged them to increase their goals and expectancies of achieving them. Good performers also increased their goals and maintained high expectancies, while those with high skills self–efficacy increased their expectancies and maintained high goals. People who set high goals or who were highly motivated by their feedback increased their effort, while those who had high expectancies maintained their previous high levels of effort. Apart from the two non–significant predicted paths and two significant omitted paths in the change analyses, these results are consistent with predictions.

However, this pattern changed somewhat at the later times. The effect of performance feedback on dissatisfaction, giving up, skills self–efficacy level and goal change was stronger at the initial time than at any later ones, although the effects on skills self–efficacy and goals tended to increase again at the final time. The predicted contribution of giving up to changes in skills self–efficacy was significant at the initial and final periods, but the results supported a prediction from the original integrated model by showing that dissatisfaction influenced changes in skills self–efficacy after Time 3. In addition, the relatively strong effects of performance feedback on giving up, and of dissatisfaction on feedback motivation ratings became progressively weaker over time, while the effect of dissatisfaction on giving up became stronger.

The goal and expectancy regressions showed that students who experienced their feedback as motivating increased their goals at all periods, and their expectancies at all except Time 4 when skill self–efficacy level mediated the effect of feedback motivation ratings on expectancy level and change. People with high skills self–efficacy increased both goals and expectancies at Time 4, but increased expectancies and maintained goals at other times, although the effect on expectancy change was mediated by goals at Time 6. Good performers increased goals and maintained expectancies at the initial and final times, but, at Time 4, they also increased their expectancies if they were satisfied, and at Time 5 they simply maintained high goals and expectancies.

Goals had no effect on expectancies at the earlier periods, as predicted, but the Time 5 results show that people who set high goals reduced their high expectancies, but at the final time those who set high goals increased their expectancies and had higher expectancies of achieving their goals than people who set low goals. People who set high goals or who found their feedback motivating increased effort, but those with high expectancies also increased effort at Time 4 and Time 6, and performance made a direct negative contribution to effort change at the final period only.

In addition, the differences between the mean pre– and post scores suggest that, on average, the high accuracy group tended to decrease their skills self–efficacy, goals and expectancies at the initial time particularly, and at Time 5 to a smaller extent. However, at Time 4, scores on these variables generally increased, while at the final time there was some tendency for skills self–efficacy and expectancies to increase and goals to decrease.

Together, this pattern of findings suggests that responses to feedback tended to change over the duration of the course. The tendency for performance to have more influence at the initial time suggests that the informational content of the feedback has more impact at the early stages when skills self–efficacy and goals are likely to be tentative, than later when dissatisfaction and the motivating effects of feedback become more important. In addition, the Time 6 results differ from those of all other periods by showing that poor performers increased their effort to a similar level to that made by good performers, and goals made a significant positive contribution to expectancy level and change. The direct contribution of performance feedback is likely

Table 6.12: Average Percentage of Variance Accounted for by Paths in Models for Two Accuracy Groups.

Goodness of Fit Measures	Levels Analyses		Change Analyses		Total	
	Motiv Model	Pf–Dissat Model	Motiv Model	Pf–Dissat Model	Motiv Model	Pf–Dissat Model
Q Indices						
Hi Accuracy	98.14	97.11	93.12	91.44	95.63	94.27
Lo Accuracy	95.78	94.05	90.48	88.58	93.13	91.32
X Values						
Hi Accuracy	79.72	63.04	65.54	45.66	72.63	54.35
Lo Accuracy	73.41	51.82	61.49	37.59	67.45	44.70
Y Values						
Hi Accuracy	81.22	64.91	70.25	49.64	75.73	57.27
Lo Accuracy	76.61	55.05	67.87	42.06	72.24	48.55

Note. All values are averaged over four measurement periods and shown as percentages.

to reflect a tendency for poor performers to make a final attempt to pass the course, while the positive effect of goals on expectancy suggests that, with practice at answering the same questions, and with the course about to end, students may have set their tests goals at a level which they felt they had a reasonable chance of achieving. This possibility indicates a reciprocal causal link between goals and expectancies at the final time and implies a breakdown of the unidirectional assumption which underpins the use of path analysis.

Comparisons of the Accuracy Groups

The results show that both model revisions obtained better support from the group which rated their feedback as accurate than among those who had doubts about the accuracy of their feedback. A greater proportion of the predicted paths were significant in the high accuracy group for both the performance–dissatisfaction (77.8% versus 63.9%) and the motivation (90.7% versus 77.8%) model, and most of the high accuracy group goodness of fit indices were slightly stronger than those of their counterparts.

The goodness of fit results for the accuracy groups and models are summarised in Table 6.12 which shows Q, X and Y values which have been averaged over the four measurement periods. These results suggest that the predicted paths in both models generally demonstrated an acceptable fit to the levels data for both groups and the change data for the high accuracy group, but the overall fit between the paths in the performance–dissatisfaction model and the low accuracy group's change data was inadequate. The mean X and Y scores show that the paths in both models accounted for a higher proportion of the total variance in the levels and change scores in the high accuracy group than in the low accuracy group. However, the differences between the models were greater than those between the accuracy groups. The mean X scores indicate that the predicted paths in the motivation model accounted for more than 70% of the total variance in the levels scores and more than 60% of that in the change scores for both groups. In contrast, the predicted paths in the performance–dissatisfaction model accounted for an average of 63% and 52% of the total variance in the levels scores for the high and low accuracy groups respectively, and less than 50% of that in the change scores for both accuracy groups. Together, these results

support the assumption that the models would receive better support from the high accuracy group, but show that the motivation model offers a more adequate framework than does the performance–dissatisfaction model in both accuracy groups.

The effects of perceived accuracy of feedback are revealed by the correlations showing that performance was generally more strongly linked with skills self–efficacy, goals and expectancies if accuracy ratings were high than if they were low, and that performance was positively correlated with effort level and independent of effort change in the high accuracy group, but negatively correlated with effort level and change in the low accuracy group (see Appendix 6.5 for a summary of correlations). These links are reflected in the results for the performance–dissatisfaction model showing that performance feedback had a stronger effect on goal level, and was more likely to influence expectancy level and goal change if accuracy ratings were high than if they were low. Similarly, performance feedback influenced levels of skills self–efficacy, and performance or dissatisfaction contributed to changes in skills self–efficacy in the high accuracy group, but these predictors interacted to make positive contributions to skill self–efficacy change at the earlier times, but a negative contribution at the final time when accuracy ratings were low. Finally, effort change was predicted by goals and expectancies if accuracy ratings were high, but by goals and dissatisfaction if accuracy ratings were low, although performance or the performance x accuracy interaction accounted for some of the effects of dissatisfaction in the low accuracy group. The last finding suggests that the independent contributions which both dissatisfaction and expectancy self–efficacy made to effort change in Bandura and Cervone's study (1986) reflects a failure to recognise the moderating effect of perceived feedback accuracy.

The motivation model results clarify reasons for some differences between the accuracy groups by showing that giving up partially or completely mediated the effects of performance and dissatisfaction on skills self–efficacy level, and feedback motivation ratings mediated the effect of dissatisfaction on effort level and change, and partially mediated the effect of performance on goals and expectancies in both accuracy groups. The results for the motivation model tend to emphasise the similarities between the two accuracy groups by showing that performance influenced dissatisfaction, dissatisfaction contributed to feedback motivation ratings and giving

up, and giving up influenced skills self–efficacy level in both accuracy groups. Feedback motivation ratings and skills self–efficacy contributed to goal and expectancy level at three or more times, and motivation ratings, goals and expectancies influenced effort level, regardless of accuracy ratings. The results for both groups also showed that skills self–efficacy was more likely to influence changes in expectancies than goals and that feedback motivation ratings generally influenced effort change. The omitted parameters results for both models also showed that high goals were linked with reduced expectancies at Time 4 (low accuracy) or Time 5 (high accuracy), but with increased expectancies at the final time, although motivation ratings accounted for the effect of goals at Time 6 in the low accuracy group.

The motivation model also revealed differences between the groups by showing that people who experienced their feedback as motivating were more likely to increase their goals, expectancies and effort if they believed their feedback was accurate than if they did not, while skills self–efficacy was more likely to mediate the effect of motivation ratings on expectancy change if accuracy was low, than if it was high. Poor performers increased effort, regardless of motivation ratings and goals at the two initial times among people who doubted the accuracy of their feedback, and at the final time among those who believed their feedback was accurate. In addition, if accuracy ratings were high, the significant contributions of dissatisfaction to motivation ratings became progressively weaker across the periods while its effect on giving up became stronger. In contrast, the effect of dissatisfaction on motivation ratings remained strong and relatively stable in the low accuracy group, although the effect on giving up increased at the final period, particularly among people who rated their feedback as 'not at all accurate'. Both the betas weights and the correlations indicate that dissatisfaction was more strongly linked with motivation ratings than with giving up at each time in the low accuracy group, while in the high accuracy group, dissatisfaction was more strongly linked with motivation ratings at the initial period, but with giving up at both later times.

The motivation model results for the low accuracy group are similar to those of the high accuracy subsample in showing that the predicted paths accounted for more of the variance in the levels than change scores, and greater proportions of variance in scores collected at the initial time than at subsequent periods. In the low

accuracy group's levels analyses, the predicted paths tended to become weaker although most remained significant, but the proportion of significant predicted paths declined from 91.7% to 41.7% in the change analyses. Good performers and people who found their feedback motivating increased their goals at the two earlier times but simply maintained high goals at the later times when the adjusted goal change mean scores and standard deviations were lower. People who found their feedback motivating also increased effort initially, but this effect became progressively weaker, and they maintained high levels of effort at the final time. People who set high goals increased effort at some times but maintained effort at others, and poor performers increased effort, regardless of motivation ratings or goals at the two earlier times but maintained effort at the later periods. These results suggest that the capacity of the model to predict responses of people who rated their feedback as inaccurate became weaker over the duration of the course.

Conclusion

Overall, the path analyses and goodness of fit results suggest that the motivation model offered a more plausible explanation for the effect of performance feedback on subsequent cognitive and behavioural responses than the performance–dissatisfaction model in both accuracy groups. The findings offered some support for the prediction that including perceptions of the motivating and debilitating effects of feedback would help overcome one of the major weaknesses found in the original integrated model. Results showing that feedback motivation ratings had a relatively consistent effect on levels and changes in goals, expectancies and effort supported predictions that the perceived motivating impact of the feedback mediates the effect of self–evaluations on other criteria. Although giving up contributed to levels of skills self–efficacy at each time, and to changes in skills self–efficacy at the first and final times, there was less support for the prediction that the extent to which the feedback made students feel like giving up would account for any effect of dissatisfaction on skills self–efficacy. While these results suggest that the potentially debilitating effects of feedback may have a limited role in the model, any tendency for students who felt like giving up to withdraw from the course would contribute to weaknesses in this variable.

There was poor support for the predictions that people who find their feedback motivating simply maintain high expectancies, and that people with high expectancies maintain, rather than increase effort. Rather than showing that people who found their feedback highly motivating increased goals and maintained high expectancies, the results indicate that people with high skills self–efficacy tended to maintain their goals and increase their expectancies. In addition, goals and feedback motivation ratings were more consistent predictors of effort change than was expectancy. Together, these results indicate that performance feedback and perceptions of the motivating effect of that feedback were more useful than the self–efficacy dimensions in resolving the weakness in Campion and Lord's (1982) model which failed to explain when performance feedback would result in cognitive or behavioural change. However, limitations to the motivation model were demonstrated by the nonsignificant predicted paths, significant omitted paths and interactions, and failure of many of the correlations between performance and effort to decompose. These weaknesses, together with the variations in recipients' responses to feedback over the duration of the course demonstrate that the motivation model failed to offer a consistently adequate explanation of the data of either accuracy group.

Although the motivation model was more plausible than the performance–dissatisfaction model, both revisions obtained better support among people who believed their feedback was accurate than among those who doubted the accuracy of their feedback. These results, and the significant contributions the accuracy interactions made to criteria in both subsamples, confirm that some responses to feedback were influenced by recipient's perceptions of the accuracy of their performance feedback. The crucial differences between the accuracy groups were demonstrated most clearly by the correlations between performance and other criteria, and changes in the effects of dissatisfaction on the extent to which feedback was experienced as motivating or debilitating. Results showing that performance feedback generally had less effect on skills self–efficacy, goals and expectancies when people rated their feedback as inaccurate are consistent with the possibility that some people respond to negative feedback by distorting it (Lord & Hanges, 1987). However, the tendency for the high accuracy group to produce across–time correlations which were similar to, or higher than those of the low accuracy group offer little evidence that

people who distort their feedback simply ignore and maintain their previous levels of skills self–efficacy, goals, expectancies and effort.

Differences in the effects of dissatisfaction on motivation ratings and giving up, and in the correlations between performance and effort also cast doubt on the possibility that people who rate their feedback as inaccurate fail to respond to it. The motivation model results showed that dissatisfaction was more strongly linked with motivation ratings than with giving up in the low accuracy group, while the motivating effect of dissatisfaction decreased as the debilitating effect increased when accuracy ratings were high. These results suggest that when people are dissatisfied with their performance, rejecting feedback may help them maintain motivation and discourage them from giving up, while continuing to accept negative feedback may have a debilitating rather than motivating effect.

The possibility that distorting feedback may serve a positive function for poor performers is consistent with the correlations between performance and effort and mean scores for groups which showed that poor performers who rated their feedback as inaccurate generally increased effort more and made more effort than good performers, while those who accepted their feedback maintained lower levels of effort than good performers. However, the path analyses showed that feedback motivation ratings continued to predict goal and effort change in the high accuracy group only, and the effect of giving up on changes in skills self–efficacy was inconsistent in both accuracy groups. While these findings could reflect weaknesses in the measures of feedback perceptions, they may also indicate that some benefits to be gained from distorting perceptions of feedback accuracy may disappear over time. The major benefit could be to discourage people who perceive their performance as poor from reducing their goals and effort and withdrawing from the situation.

Chapter 7.

General Discussion

Overall, the present findings offer somewhat mixed support for the possibility that integrating key concepts from the control-systems (Campion & Lord, 1982) and social cognitive (Bandura & Cervone, 1983; 1986) approaches would offer a more comprehensive framework to explain the effect of feedback and goals on cognitions and behaviours than the original models. The motivation revision of the original integrated model offered a more plausible framework to help understand the effects of feedback than any of the other four models tested here, but the limitations shown by the path analyses suggest that it is more useful in helping identify issues which need further clarification than in providing a comprehensive explanatory framework. This problem is not surprising because a number of analyses revealed flaws and limitations to the key concepts from the control systems and social cognitive approaches which were not apparent from the path analyses which were used to replicate the results of Campion and Lord's (1982) and Bandura and Cervone's (1983) earlier studies. These and other findings cast doubt on the theoretical assumptions which underpinned all of the models which were tested in this study.

Results for the original models gave some initial support for the possibility that integrating Bandura and Cervone's (1983; 1986) concepts of self-evaluations and self-efficacy with Campion and Lord's (1982) discrepancy explanation of feedback functioning would offer a more useful framework than either of the original models. Path analyses of the control systems model produced results which were similar to Campion and Lord's (1982) bivariate analyses and consistent with their contention that people who experience discrepancy can reduce their goals or increase effort to achieve congruence in future. The social cognitive model path analyses also produced results which were similar to Bandura and Cervone's (1983) correlations and supported their predictions about the combined effects of high self-efficacy and negative self-evaluations on increases in effort.

The path analyses for the integrated model showed that the predicted paths explained greater proportions of the variance in goals and effort, accounted for a higher proportion of the total variance in all criteria and generally showed a better fit to the data than either of the original models. The results also offered some support

for the assumption that the inclusion of Bandura and Cervone's concept of self–evaluations and the skills and expectancy dimensions of their concept of self–efficacy would resolve weaknesses in Campion and Lord's model. The contributions of skills self–efficacy to goal change, and of goals, dissatisfaction and expectancy self–efficacy to effort change were consistent with predictions that people who experience a performance–goal discrepancy reduce their goals if they have doubts about their skills, but increase effort if they are dissatisfied with their performance and maintain high goals which they expect to achieve. These results are also consistent with the assumption that people who achieve congruence between their previous goals and performance increase their goals and subsequent effort if they have high self–efficacy. However, failure to support predictions that satisfaction mediates the effect of performance–goal discrepancies on changes in skills self–efficacy, goals and expectancies raised questions over whether self–evaluations had any direct effect on cognitive changes.

Problems with Existing Research

In spite of the initial support for the original models, a number of analyses revealed problems with Campion and Lord's (1982) discrepancy explanation and Bandura and Cervone's (1983) concepts of self–evaluations and self–efficacy. Other analyses pointed out a further problem with the original models by demonstrating that responses to feedback depend to some extent on recipient's perceptions of the accuracy of that feedback.

Discrepancy Explanation

The components regressions and graphic analyses cast doubt on one of the key concepts by failing to support the tenability of Campion and Lord's (1982) discrepancy explanation of feedback functioning which contends that people can respond to a performance – goal discrepancy by increasing effort or reducing goals. When effort change was regressed on the two variables which comprise the discrepancy scores, the results from the initial period satisfied Edwards' (1994) criteria which require both betas to be significant, and equal in magnitude but opposite in direction to each other. However, neither component beta was significant at the final time, and current goals

accounted for the effect of previous goals at the initial period. This pattern of results indicates that the greatest increase in effort was demonstrated by people who raised their goals after performing poorly rather than by those who experienced a discrepancy between their previous goals and performance.

The graphic analyses which assessed the discrepancy explanation of goal change demonstrated the confounding of discrepancy with its component variables by showing that the group which set high goals and performed poorly had the highest mean discrepancy scores while those for the group which set low goals and performed well all fell in the congruence range. The results also showed that both low goal groups generally increased their goals slightly, regardless of performance level while the high goal groups decreased their goals, particularly if they performed poorly. In addition, results showing that differences between mean previous and current goal scores generally failed to reflect differences between the mean discrepancy scores for the four groups at the same time, or those for the same groups at different times cast further doubt on the discrepancy explanation for goal change. Subsequent analyses failed to support the discrepancy explanation of feedback functioning among people who perceived their feedback as accurate or among those who doubted the accuracy of their feedback.

Together, the discrepancy analyses suggested that the concept, rather than the algebraic difference score measure, was at fault. The regression analyses indicated that the performance component offered a better explanation for levels of satisfaction and changes in the skills and expectancy dimensions of self-efficacy than did discrepancy. The regression analyses also indicated that the apparent effect of discrepancy on effort change arose from the contribution of performance, and that any effect of previous goals could be attributed to its links with current goals and its role as a component of goal change rather than discrepancy. Finally, the graphic analyses suggest that links between discrepancy and goal change reflect the probability of attaining a goal which results in the over-representation of poor performers and people who set high goals among those who experienced discrepancy, together with the tendency for goal scores to regress toward the mean. The goal and effort results suggest that the support for the discrepancy reduction explanation demonstrated by earlier research (Bandura & Cervone, 1986; Campion & Lord, 1982; Kernan & Lord, 1988; Matsui et al, 1983;

1987; Podsakoff & Farh, 1989) reflects a failure to recognise that discrepancy effects are confounded with those of their components, and that previous goals is a component of both goal change and discrepancy.

Although the present study found no support for Campion and Lord's (1982) discrepancy reduction hypothesis, the component analyses for both accuracy groups indicated that poor performers who set high goals showed the greatest increases in effort, while good performers who set low goals showed the least increase. These results are generally consistent with Campion and Lord's (1982) contention that people can respond to negative feedback (a poor performance score) by increasing effort or by reducing goals, but emphasise the effort–regulating effect of current goals and previous performance rather than the difference between previous goals and performance. The basic assumption underlying the control systems and social cognitive approaches, that task behaviour is motivated by the desire to achieve congruence between goals and performance remains tenable if it can be assumed that people create the potential for future discrepancy by setting goals which exceed their previous performance level and that the anticipation of achieving current goals serves as an incentive for effort. This possibility is consistent with Wood and Bandura's (1989) concept of 'discrepancy production' which proposes that human motivation is characterised by a cyclical process in which individuals create challenges for themselves through the goals they set and seek to accomplish. However, there is little evidence that achievement or non–achievement of previous goals serves as an incentive for subsequent effort as implied by the focus on the difference between previous goals and performance employed by the discrepancy reduction explanation.

Self–Evaluations

The results for the original integrated model and the revisions raised questions about the importance of the concept of self–evaluations in the model by showing that they did not have the direct (1983) or interactive (1986) effect on effort change proposed by Bandura and Cervone, and that they failed to influence cognitive change. The significant contribution which the interaction between discrepancy and the composite satisfaction measure made to effort level in the tests of the integrated model offered some initial support for the logic underlying Bandura and Cervone's (1986)

prediction by suggesting that people who were dissatisfied with discrepancy maintained higher levels of effort than others who were satisfied or who experienced congruence. However, subsequent analyses cast doubt on this explanation. Differences in the results of the performance–dissatisfaction model for the two accuracy groups showed that dissatisfaction had a direct effect on levels and change in effort at the initial time in the high accuracy group, and at subsequent times in the low accuracy group. These results suggest that the effect of dissatisfaction on effort is more likely to depend on perceptions of feedback accuracy that on a discrepancy between previous goals and performance.

Although the results of the performance–dissatisfaction model suggest that the effect of dissatisfaction on effort is moderated by accuracy perceptions, the motivation model results indicate that the effect of dissatisfaction on other variables is generally mediated by perceptions of the motivating or debilitating effects of feedback. People who were dissatisfied with their performance feedback found it more motivating which encouraged them to set higher goals, have higher expectancies of achieving them and to make more effort. People who found their feedback motivating also tended to show greater increases or smaller decreases in goals and effort, although these effects weakened and became non–significant at the final time in the low accuracy group.

The motivation model results also showed that people who were dissatisfied with their performance tended to feel like giving up and rate their academic skills as poor. However, the effect of giving up on changes in skills self–efficacy was inconsistent in the low accuracy group and dissatisfaction had a direct effect on changes in skills self–efficacy after the first period in the high accuracy group. While the latter findings offer little evidence that feeling like giving up undermines skills self–efficacy, they could reflect weaknesses in the research design because people who experienced their feedback as extremely debilitating and reduced their skills ratings the most may have dropped out of the course before completing the feedback assessment measure at the beginning of the next test.

The present results are generally consistent with recent research which has examined the direct effects of self–evaluations on other outcomes. Although Bandura and Jourden (1991) did not assess the effect of dissatisfaction on skills self–efficacy, their results showing that dissatisfaction had no effect on goals or expectancy self–

efficacy are consistent with the present results. Cervone and colleagues' (1991) finding that dissatisfaction resulted in greater decisional effort is similar to the low accuracy groups results, while Stock and Cervone's (1990) finding that dissatisfaction failed to predict persistence is reflected in the high accuracy group's responses. This pattern suggests that most differences between the results of the present and earlier studies may arise from the failure of the existing research to assess possible moderating effects of perceived feedback accuracy, or the mediating effects of recipients' perceptions of the motivating or debilitating effects of performance feedback.

The motivation model results showing that dissatisfaction helps explain the effect of performance on feedback motivation ratings and giving up offer some support for the emphasis which Bandura and Cervone (1983; 1986) placed on the concept of self–evaluations. However, the other findings cast doubt on the centrality of this concept by suggesting that the desire to achieve a positive, or to avoid a negative self–evaluation serves as an incentive for future performance only if the feedback is experienced as motivating rather than debilitating.

Self–Efficacy

The motivation model results also cast doubt on the emphasis which Bandura and Cervone (1983; 1986) placed on the concept of self–efficacy. The results showed that people with high skills self–efficacy set higher goals and had higher expectancies of achieving their goals than those with low skills self–efficacy. However, people with high skills self–efficacy generally increased their expectancies rather than their goals, which encouraged them to increase effort at some periods but simply maintain high levels of effort at others. Results for the high accuracy group generally indicated that good performers increased goals and maintained high expectancies while people who found their feedback motivating increased their goals, expectancies and effort. The low accuracy group showed a similar pattern at the two earlier periods. These results suggest that recipients' perceptions of the motivating impact of their feedback are more useful than Bandura and Cervone's concept of self–efficacy in explaining when poor performers increase effort rather than reduce goals, and when good performers increase goals rather than maintain effort.

The present findings contrast with earlier research which suggested that people

with high self-efficacy increase their goals (Bandura & Wood, 1989; Wood & Bandura, 1989a; 1989b; Wood, Bandura & Bailey, 1990) and effort (Bandura & Cervone, 1983; 1986; Cervone, 1989; Cervone & Peak, 1986; Schunk, 1982). However, in most of the earlier studies linking self-efficacy to goal change, self-efficacy was measured according to the magnitude (subjects' beliefs that they could perform at specific levels) and strength (certainty that they could perform at those levels) dimensions, goal change was measured as the difference between previously assigned goals and subsequent personal goals, and the magnitude dimension of self-efficacy and personal goals were measured using the same response format. Since the self-efficacy magnitude dimension and personal goal questions were very similar, and people are unlikely to set goals below the level they expect to perform, the positive link between self-efficacy and goal change demonstrated in the existing research could be expected, but any causal inference is dubious. Consequently, the present results showing that self-efficacy, as measured by subjects' ratings of their task-specific skills, predicts goal level but not goal change are more plausible than the earlier research.

The extent to which the task was perceived as challenging may help account for the differences in the effect of expectancy self-efficacy on effort change found by the earlier and present research. Cervone (1989; Cervone & Peak, 1986) used anagram and cyclical graph tasks, Schunk (1982) administered subtraction problems to a sample of poor performers, and Bandura and Cervone (1983; 1986) assigned a goal of improving performance. Such tasks are likely to have been seen as more challenging by most subjects than the multi-choice tests used in the present study. Thus, the nature of the task may moderate the effect of expectancy self-efficacy on effort change so that people who have high expectancies of achieving their goals increase effort only if they perceive the task as challenging. This possibility is consistent with Bandura's (1982) discussion of the benefits of some degree of uncertainty in learning situations where people are required to invest effort in preparation, rather than simply in performance. The nature of the task may also moderate the effect of skills self-efficacy on goal change as people who believe they have the necessary skills may be more likely to increase their goals if they find the task interesting, challenging or important than if they do not.

A recent study showing that a single item measuring confidence of achieving a particular goal had lower convergent and predictive validity than multiple–item measures incorporating the self–efficacy magnitude and strength dimensions (Lee & Bobko, 1994) suggests that some of the weaknesses in the expectancy results could be due to the single–item measure used in this study. However, Lee and Bobko's (1994) results could be expected because they used goals and performance as criteria to examine validity in their study. The analyses assessing the validity of the skills self–efficacy and expectancy measures used in the present study showed that both variables were significantly correlated with self–esteem, importance of achieving course goals, need for achievement and effort attributions for achievement success. These findings support the validity of the present measures by demonstrating that both produced results which were consistent with Bandura's (1982; 1986) conceptualisation of self–efficacy. Support was also found for the argument that skills self–efficacy and expectancies tap somewhat different aspects of Bandura and Cervone's (1983; 1986) concept of self–efficacy. Skills ratings demonstrated greater temporal stability than expectancies, and the correlations between the measures were all lower than that required to demonstrate that they tap the same underlying construct (Morrow, 1983). Further, the motivation model path analyses indicated that the two dimensions predicted different outcomes by showing that skills ratings contributed to levels of goals but not effort, and that expectancies contributed to effort level while its links with goal level were inconsistent. Consequently, the moderating effects of some other variable such as the nature of the task are more likely to explain the failure of skills self–efficacy to contribute to goal change and the inconsistent effects of expectancies on effort change than are problems with the self–efficacy measures. The overall pattern suggests that the failure to support predictions is more likely to reflect theoretical weaknesses rather than measurement error.

Perceived Feedback Accuracy

An additional problem which was common to both the control systems and social cognitive approaches arose from their failure to recognise the possibility that some responses to feedback may depend on recipients' perceptions of its accuracy. This possibility was first suggested in the present study by the mean accuracy scores

and positive correlations between performance levels and recipient's ratings of the accuracy of their feedback, and confirmed by the moderating effect of accuracy perceptions on performance or dissatisfaction in the whole sample and in both accuracy groups. These findings were unexpected because considerable effort was made to ensure that the items chosen for the multi-choice tests and marking procedures would produce reliable and valid measures of performance. The precautions taken to ensure the accuracy of the test marks were explained to students at the beginning of the year, and used as illustrations in research lectures dealing with reliability and validity of measurement. Given that relatively few students asked for their tests to be remarked and there is no reason to believe that the marks were not completely correct, it is possible that low accuracy ratings could have been due to some students interpreting the question as asking about the extent to which their mark accurately reflected their academic ability overall rather than their performance on a specific test. This possibility is consistent with Ilgen and colleagues (1979) argument that poor performers may distort their perceptions of the accuracy of their feedback to help maintain a positive self-image.

The effects of perceived feedback accuracy were demonstrated by the correlations and paths which indicated that performance feedback had more effect on skills ratings, goals and expectancies among people who rated their feedback as accurate than among those who doubted the accuracy of their feedback. These results are consistent with the existing literature which assumes that feedback must be accepted if it is to influence subsequent responses (Ilgen et al, 1979), and partially consistent with Lord and Hanges' (1987) contention that distorting feedback offers people who receive negative feedback an alternative to reducing their goals or increasing effort.

However, the across-time correlations and other results indicated that people who rated their feedback as inaccurate did not simply ignore it and maintain their previous responses. The motivation model results showed that dissatisfaction was more strongly linked with feedback motivation ratings than with giving up in the low accuracy group, while the motivating effect of dissatisfaction decreased as the debilitating effect increased when accuracy ratings were high. This pattern was reflected in differences in the performance-effort correlations which showed that poor

performers who rated their feedback as inaccurate increased effort more and made higher levels of effort than good performers, while poor performers who accepted their feedback maintained lower levels of effort than good performers. These results suggest that rejecting negative feedback may serve a positive function by helping people who are dissatisfied with their performance to maintain their motivation and discouraging them from giving up, reducing goals and effort and withdrawing from the situation. In contrast, continuing to accept negative feedback may have a debilitating rather than motivating effect.

The present findings contrast with most of the current theorising which assumes that feedback which is perceived as lacking accuracy, credibility or trustworthiness is not accepted by the recipient, and that feedback which is not accepted fails to influence subsequent responses. While a computerised literature search failed to identify many empirical assessments of these assumptions, a study by Cederblom and Loundsbury (1980) supported the link between perceived accuracy and acceptance of feedback by showing that the perceived validity of peer ratings was positively correlated with recommendations about whether a performance appraisal scheme should be continued.

Most of the empirical support for the possibility that feedback must be accepted if it is to affect subsequent responses is less convincing. Stone and Stone (1984) found some indirect evidence of a possible positive link between perceived feedback accuracy and self–perceived task competence by demonstrating that both were predicted by the favourability of the feedback. However, they failed to test the direct effect of accuracy perceptions on task competence, or the possibility that accuracy perceptions interacted with feedback sign to influence task competence in this or their later study (Stone & Stone, 1985) which examined similar issues. Consequently, their conclusions that feedback must be perceived as accurate if it is to result in behavioural changes (Stone & Stone, 1984) and that distorting negative feedback generally represents a dysfunctional response (Stone & Stone, 1985) do not appear to be justified by their results.

Earley (1986; 1988) and Northcroft and Earley (1989) found a positive link between trust in feedback and performance, and proposed that trust mediated the effect of feedback source on subsequent performance. However, the direction of cause

between trust and performance could not be demonstrated in the Northcroft and Earley (1989) study because trust was measured after feedback was given. Earley (1986; 1988) measured trust in the initial feedback before giving feedback about subsequent performance, but failed to account for the effects of previous performance in his analyses. Given that feedback sign influences perceptions of its accuracy (Ilgen et al, 1979; Jacobs et al, 1973) the proposed mediating effect of trust in feedback could simply reflect a tendency for poor performers to rate their feedback as untrustworthy, and to continue to perform poorly.

The best support for the assumption that feedback must be accepted if it is to affect responses is offered by Podsakoff and Farh's (1989) laboratory experiment which showed that subjects who were given high credibility negative feedback improved their performance more than those given low credibility negative feedback. This finding is consistent with the present results in suggesting that perceived feedback accuracy is more likely to moderate than mediate the effects of performance on outcomes, but contrasts in most other respects. While the effects of accuracy perceptions on subsequent performance were not tested in the present study, differences in the two accuracy groups' correlations between previous performance and effort suggest that low credibility negative feedback would be more likely to result in increased effort and improved performance than high credibility negative feedback. Podsakoff and Farh (1989) also found that high credibility negative feedback subjects set higher goals that all other groups, while the present results suggest that the highest goals would be set by people given highly credible positive feedback. Finally, Podsakoff and Farh (1989) found that feedback sign and credibility had main and interactive effects on dissatisfaction, but not on self–efficacy, while the present results suggest that dissatisfaction is influenced by feedback sign only (see tests of moderators in Chapter 5), and that credibility moderates the effect of feedback sign on skills self–efficacy. Podsakoff and Farh's (1989) findings concerning self–efficacy also contrast with those of Stone and Stone (1984) who found that feedback favourability influenced self–perceived task competence.

Differences between feedback credibility and perceived feedback accuracy and in the research settings may contribute to the differences between Podsakoff and Farh's (1989) and the present results. Podsakoff and Farh manipulated perceptions of the

credibility of the feedback source by telling subjects that the feedback showing that they were above or below average was based on either normative data (high credibility feedback) or on the experimenter's experience (low credibility feedback). In contrast, every effort was made to ensure that the tests used in the present study were reliable and valid, and to reassure participants that their performance feedback was accurate. This difference suggests that Podsakoff and Farh's subjects had a relatively objective basis to assess the validity of their feedback while in the present study, perceived feedback accuracy appears to reflect a subjective judgement which serves a self-protective function for poor performers (Ilgen et al, 1979). To the extent that feedback which can be described objectively as unreliable or invalid is vaguer than reliable, valid feedback, Podsakoff and Farh's results may reflect the beneficial effects of feedback specificity (Locke et al, 1981; Mento et al, 1987; Tubbs, 1986).

The research settings could also contribute to differences between the findings of the studies. Podsakoff and Farh's (1989) and most other earlier research used experimental designs while the present study was conducted in a 'natural' setting. This difference raises the possibility that people who reject negative feedback may respond to it by increasing effort if the task has real consequences, but simply ignore it if not.

Together, these results suggest that considerably more attention should be paid to investigating potential outcomes of rejecting feedback. The results of the present study contrast with other empirical and theoretical work by suggesting that distorting negative feedback may serve a positive function for poor performers by encouraging them to maintain motivation and effort and by discouraging them from giving up and withdrawing from the situation. However, limitations to the present study suggest that further research using better measures of the potentially motivating and debilitating effects of feedback and of perceptions of feedback accuracy is needed to establish potentially positive or negative outcomes of accepting or rejecting performance feedback.

Motivation Model

The overall pattern of findings for the present research suggest that the motivation model offers a more plausible explanation for the effect of performance feedback on subsequent cognitive and behavioural responses than the performance-dissatisfaction model, the original integration or either of the initial models. The

predicted paths in the motivation model demonstrated a better fit to the data, less of the fit was achieved at the expense of parsimony, and the higher proportion of total variance which was accounted for indicated that the perceived motivating or debilitating effects of feedback represented two relevant variables which were excluded from the other models. Results for specific pathways generally supported predictions for the high accuracy group by showing that ratings of the motivating effects of feedback mediated the effect of dissatisfaction on levels and changes in goals and effort and giving up mediated the effect of dissatisfaction on skills ratings. Similar findings for the low accuracy group at the two earlier periods showed that the inclusion of the perceived motivating and debilitating effects of feedback explain some differences between the accuracy groups revealed by the performance–dissatisfaction model and helped resolve weaknesses in the original integrated model.

Although the initial predictions were not supported, the motivation model results also helped resolve the limitation to Campion and Lord's (1982) model by suggesting that poor performers are most likely to reduce goals when they find their feedback unmotivating, but increase effort if the motivating effect of their feedback encourages them to increase or maintain high goals. Similarly, the motivating effects of the feedback appear to encourage good performers to increase goals and subsequent effort. The independent contribution of feedback motivation ratings to goal change also indicates that people who found their feedback motivating tended to increase their goals, even if they did not perform well. By suggesting that recipients who find their feedback motivating are likely to set goals which are higher than their previous performance level, these findings help account for the phenomenon of 'discrepancy production' which is assumed to characterise human motivation (Wood & Bandura, 1989).

Although the motivation model offered a more plausible explanation of the effects of feedback on subsequent responses than the other models, the nonsignificant predicted paths, significant omitted paths and interactions, and failure of many of the correlations between performance feedback and effort to decompose shows that it did not offer a completely adequate explanation of the data. The predicted path results for both accuracy groups suggest that the motivation model could be improved by deleting the paths from performance to expectancy change, and from skills self–efficacy to

goal change. Excluding these paths would eliminate six of the seven nonsignificant predicted paths for the high accuracy group, and five of the fifteen for the low accuracy group, while resulting in only small increases in the total number of omitted paths which were significant. Deleting these paths would result in a model which predicted that good performers and those with high self–efficacy simply maintain high goals unless they experience their feedback as motivating.

Other possible revisions to the motivation model vary according to perceptions of feedback accuracy. Paths which were significant at three of the four measurement periods suggest that excluding those from performance to skills self–efficacy and expectancy level and including one from motivation ratings to skills self–efficacy would improve the model for the low accuracy group, while including paths from dissatisfaction to skills self–efficacy change and from motivation ratings to expectancy change would improve the model for the high accuracy group. The model for the low accuracy group would then predict that people who find their feedback motivating are more likely to set high goals and have high expectancies of achieving them if they have high self–efficacy. The model for the high accuracy group would propose that dissatisfaction results in reduced skills self–efficacy and motivating feedback encourages people to increase both their goals and expectancies of achieving them. However, inconsistencies in the other nonsignificant predicted paths and significant omitted paths, main effects and interactions suggest that many significant path coefficients may have occurred by chance alone. This would not be surprising given the large number of analyses conducted and the use of the .05 probability level to establish statistical significance in this study.

While revising the model to achieve the best fit to the data over all measurement periods may improve the model somewhat, this approach ignores the apparent changes in participants' responses over the duration of the course. Changes in the path analysis results for the high accuracy group, together with the sharp decreases in the mean scores for skills ratings, goals and expectancies between the first two tests suggest that the informational content of the feedback had more effect at the initial time when goals and self–efficacy ratings are likely to be tentative, than at subsequent periods. At the later times, dissatisfaction was more likely to result in feedback being seen as debilitating than motivating, but perceptions of the motivating

effects of feedback continued to predict goal and expectancy change while dissatisfaction had a direct effect on changes in skills self–efficacy. Results for the low accuracy group indicated that poor performers and those who found their feedback motivating increased their goals and effort at the earlier times, but these effects became weaker, and such people simply maintained high goals and effort by the final time, even though the motivating effect of dissatisfaction remained relatively strong. These results suggest that the major benefits to be gained from rejecting negative feedback may disappear as people gain more experience with the task and situation.

The overall pattern of results for this study indicate that many responses to feedback depend on recipients' perceptions of feedback accuracy, and that responses tend to change as familiarity with the task and setting increase. Consequently, it appears to be more appropriate to explore and attempt to understand the nature of such changes than to try to develop a single model which attempts to achieve the best fit to the data over all measurement periods.

Methodological Weaknesses

There were a number of methodological weaknesses in the present study. In particular, the use of a repeated measures design was inappropriate in a setting which is vulnerable to subject loss. The possibility that the withdrawal of poor performers from the course contributed to the decrease in sample size across the measurement periods suggests that the nature of the sample may have changed during the study. This possibility, together with the apparent changes in recipients' responses to feedback shows that it was inappropriate to use data collected over the duration of the course to attempt to replicate results and assess the plausibility of the models.

Another problem arises from the inclusion of only one or two items in several of the measures used in this study. Although the goal–expectancy measure of self–efficacy demonstrated adequate validity, Lee and Bobko's (1994) results suggest that the present measure could be improved by using the sum of a range of certainty ratings (a self–efficacy strength scale) rather than the single item used here. In most cases, single items were also used to assess recipients' perceptions of their feedback. As noted previously, more comprehensive measures of the potentially motivating and debilitating effect of feedback are needed to establish the importance of these

constructs. The possibility that some people interpreted the question about feedback accuracy as relating to how accurately their marks reflected their academic ability rather than test performance suggests that further exploration and better measures are also needed for this construct. An additional problem with the feedback assessment measures arises from the possibility that common method variance resulting from the use of the same response format may have contributed to the strength of the correlations between dissatisfaction, motivation ratings and giving up.

A further problem arose from the way in which effort was measured. Results showing that the effectiveness of putting time into attending classes and making study notes varied, and that spending a great deal of time reading chapters and lecture notes was a relatively ineffective method of studying for tests. Although these problems resulted in the model focusing on predicting effort, rather than performance, the consistent contributions which self–rated effort made to performance suggest that the results should generalise to predict performance as well as motivation. However, this assumption needs to be confirmed with further research using better measures of effort strategies and independent measures of ability.

The inclusion of all items in the same questionnaire and the administration of the questionnaires immediately before the next test introduced further problems by preventing the effects of feedback on withdrawal from the course from being assessed. The timing of the questionnaires may have inflated the links between goals and effort because people are more likely to set higher goals if they have made a great deal of effort than if they have not. Although impractical under the time constraints, it would have been preferable to measure perceptions of feedback, the self–efficacy dimensions and goals immediately after feedback was given, and collected information about the amount of effort made immediately before the next test. A research design of this nature would also allow the assumption that setting high goals causes people to make more effort, and the direction of other causal links to be tested and confirmed.

Finally, the flaws and limitations to the key concepts from the control systems and social cognitive approaches suggest that the development of any model which incorporates these concepts was premature. The use of path analysis to test the models was also premature because it is designed to test a series of interrelated propositions drawn from theory. Therefore, attempts to develop and test a comprehensive model

assume that the propositions the model incorporates have been thoroughly tested and supported. Another problem arises from the theory–trimming approach used to develop the revisions which can result in models which fail to generalise because they are over–fitted to the data. The superiority of the motivation revision over the original models will be partly due to using the same sample to build and test the model.

Although the use of path analysis to test the models was premature, results showing that the models were better at predicting when people maintain, rather than change, their responses suggest that analyzing both levels and change scores was useful. Comparisons of the two sets of results differentiates between situations when people increase their previously high scores, when they maintain their high previous scores and when they increase their previously low scores to a level which is similar to their counterparts. The additional information and the opportunity to identify ceiling effects and regression to the mean which are provided suggests that this dual data analysis strategy offers a useful approach for future research.

Further Research

The limitations discussed previously suggest that the motivation model is more useful in identifying issues needing further theoretical development and areas requiring additional research than in offering a comprehensive framework to explain the effects of feedback on subsequent responses. In particular, the present findings suggest that recipients' perceptions of the accuracy and motivating or debilitating effects of their performance feedback have outcomes which differ from those described by the current literature. While most existing theory and research assumes that feedback must be accepted if it is to influence subsequent responses, the present results suggest that rejecting feedback may serve a positive function for poor performers by helping them maintain their motivation and increase effort, and discouraging them from giving up. This possibility is consistent with Ilgen and colleagues' (1979) suggestion that rejecting feedback can serve a self–protective function for poor performers by helping them maintain a positive self–image.

However, the direct and interactive effects of perceptions of feedback need to be demonstrated more conclusively because motivation ratings continued to predict goal and effort change among people who rated their feedback as accurate but not

among those who rated it inaccurate, and the effects of giving up on changes in skills self–efficacy were inconsistent in both accuracy groups. These results may arise partly from measurement error and weaknesses in the present research design because the feedback perception measures consisted of only one or two items and the questionnaires were administered at a stage when people who experienced their feedback as extremely debilitating are likely to have withdrawn from the course. Therefore, the effects of perceptions of the accuracy and motivating or debilitating effects of feedback on task abandonment, self–efficacy, goals and effort need to be re–examined using more comprehensive operationalisations of the constructs and a more adequate research design.

Possible effects of feedback perceptions on the use of task strategies should also be explored to determine whether people who find their feedback motivating experiment with a greater variety of strategies after failure and learn to identify more appropriate strategies than those who find their feedback debilitating. Such research is necessary to determine whether the outcomes of rejecting negative feedback are functional, as suggested by the present study, or dysfunctional as claimed by Stone and Stone (1984; 1985) and others.

In addition to establishing the outcomes of feedback perceptions, further research is needed to clarify conditions which determine whether dissatisfaction results in people experiencing their feedback as motivating or debilitating. The present results shed some light on this issue by showing that dissatisfaction was more likely to influence motivation ratings than giving up when people rated their feedback as inaccurate, while the debilitating effects increased and the motivating effects decreased over time among people who believed their feedback was accurate. The results also showed that performance feedback made consistent contributions to giving up in both accuracy groups, but previous skills self–efficacy or other main effects or interactions influenced either motivation ratings or giving up in one of the groups at various times. Improved measures of perceptions of feedback may show that previous skills self–efficacy or one of the other variables or interactions has more consistent effects than indicated by the present results.

However, the contribution of other factors which were not measured in the present study also need to be explored. Of particular interest are perceptions of the

task, attributions about the causes of success or failure for prior performance (Weiner, Frieze, Kukla, Reed, Rest & Rosenbaum, 1972) and beliefs about the stability of ability (Bandura & Wood, 1989b; Dweck & Leggett, 1989). People who attribute their success or failure on the previous test to effort, or who believe that the necessary skills and abilities can be learned may find the task interesting and challenging and experience their feedback as motivating while those who attribute previous failure to a lack of ability and believe that ability is a stable characteristic may simply give up and abandon the task. The identification of malleable factors which influence whether dissatisfaction results in feedback being experienced as motivating or debilitating will be important if further research confirms the present findings which suggest that rejecting feedback serves a positive function for poor performers.

Further research is also needed to assess the effect of different types of feedback and different task settings since both could represent boundary conditions which limit any positive functions of rejecting negative feedback. The feedback given in the present study consisted of test marks. Such error detection information contains minimal information to help recipients identify what they did right or wrong, clarify what was required by the task, or to suggest ways in which they could improve their performance. Giving such error correction information in conjunction with summary performance scores could reduce the tendency for poor performers to rate their feedback as inaccurate, and prevent any potentially debilitating effects of accepting negative feedback. However, further research could show that poor performers continue to reject their error detection feedback and ignore suggestions which could help them improve. Such findings would support the current literature which assumes that distorting negative feedback has negative consequences for the individual.

The possible outcomes of rejecting negative feedback also need to be investigated in different task settings to determine whether organisational norms influence the way people respond to feedback. The academic setting used in the present study contrasts with the laboratory experiments used in most of the existing research demonstrating negative outcomes of feedback rejection. This difference suggests that people who reject negative feedback may increase effort when the task has real-life consequences, but simply ignore it if not. However, the consequences which operate in academic settings may differ from those in other natural settings,

such as work organisations. In academic settings, the officially-recognised criterion which defines acceptability of performance level is very clear (usually 50% in New Zealand), and even marginally substandard performance results in failing the course, which usually delays the completion of the desired qualifications by one year. Work organisations are less likely to have such clear-cut standards to judge the appropriateness of performance, and any negative consequences may be less certain and less severe. Consequently, any motivational benefits which may arise from rejecting negative feedback may be restricted to settings where organisational norms support the administration of negative consequences for substandard performance.

In addition to establishing the antecedents, outcomes and boundary conditions relating to accepting or rejecting feedback, additional research is needed to establish the outcomes of self-efficacy. The present findings indicating that the skills dimension of self-efficacy failed to predict goal change and the expectancy dimension had inconsistent effects on effort change contrasts with current theory (Bandura, 1982; 1986) and research. Therefore, replications are needed to establish the usefulness of using two dimensions to measure this complex construct, and the possibility that the effects of self-efficacy on changes in goals and effort depend on the nature of the task needs to be assessed empirically.

Conclusion

Overall, the present study supports the emphasis which the existing literature places on goals as a mechanism which helps individuals regulate their behaviour by providing direction and motivation (Bandura 1991; Latham & Locke, 1991). However, the results revealed flaws in Campion and Lord's (1982) explanation for feedback functioning, limitations to Bandura and Cervone's concepts of self-evaluations and self-efficacy and a tendency for the current literature to under-estimate the importance of recipients' perceptions of their feedback. These findings cast doubt on many of the theoretical assumptions on which the current models are based and suggest that the development of a model which incorporates those concepts and use of path analysis to test the model was premature.

As discussed above, considerably more research is needed to identify factors which influence responses to performance feedback and explain how those factors

function to influence subsequent levels and changes in cognitive and behavioural responses. Such research should adopt a developmental approach by examining factors which are relevant in learning situations, and tracking changes which occur as the task and situation become increasingly familiar. Further research of this nature is needed to provide a more solid theoretical foundation for subsequent model building. Only then will it be possible to develop and test the plausibility of a comprehensive framework which explains and predicts the effect of goals and performance feedback on recipient's motivation and performance in educational, work and leisure settings.

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Appendix 1:

Questionnaires

18.102 SOCIAL PSYCHOLOGY
QUESTIONNAIRE 1.
1990

The purpose of this survey is to give you the chance to participate in questionnaire research, to increase your familiarity with some concepts and measures used in social psychology, to provide data to demonstrate some of the concepts discussed in lectures and to assess the reliability and validity of some scales. Participating in this survey contributes half a percent toward your course grade.

Please answer all questions in both sections. In Section 2 there are no 'right' or 'wrong' answers - just put what you believe. Write your answers on this questionnaire. In most cases you can circle the number which describes you, but in others you will need to write a number in the space provided. When you have completed your questionnaire, transfer your responses to the Answer Sheet. You must hand in your Answer Sheet when it is completed, but you should keep your questionnaire and bring it to each of the first term lectures.

BIOGRAPHICAL SECTION:

1: Which of the following ethnic groups do you identify with most strongly?

1: New Zealand Pakeha	5: Other Polynesian
2: Other European	6: Indian
3: New Zealand Maori	7: Asian
4: Both Maori and Pakeha	8: Other

2: Are you planning to major in psychology?
1: Yes 2: No 3: Undecided

3: Previous educational qualifications
1: Less than School Certificate
2: 1 - 3 School Certificate subjects
3: 4 or more School Certificate subjects
4: Sixth Form Certificate / University Entrance
5: Bursary/Scholarship
6: Tertiary qualification

4: How many university courses have you already passed? ____

5: How many university courses are you enrolled in currently? ____

6: Which of the following grades are you aiming for in this course?

1: A++ (90 - 100%)	5: B+ (70-74%)	9: C (50-54%)
2: A+ (85 - 89%)	6: B (65-69%)	10: D (40-49%)
3: A (80 - 84%)	7: B- (60-64%)	11: E (Less than 40%)
4: A- (75 - 79%)	8: C+ (55-59%)	

7: What do you think your chances are of getting the grade you are aiming for? Please circle one of the following

1: 0-9%	4: 30-39%	7: 60-69%	10: 90-100%
2: 10-19%	5: 40-49%	8: 70-79%	
3: 20-29%	6: 50-59%	9: 80-89%	

8: How important is it to you that you achieve or exceed the goal you are aiming for? Please circle one number on the following scale where 1= not at all important and 10 = more important than anything

1 2 3 4 5 6 7 8 9 10

9: Please assess the following aspects of your academic skills using a scale where

1 = very poor and 6 = excellent.

Please rate your ability to:

a: organize your time effectively	1	2	3	4	5	6
b: work independently without supervision	1	2	3	4	5	6
c: maintain concentration during lectures	1	2	3	4	5	6
d: take lecture notes which cover key points	1	2	3	4	5	6
e: use the library and other resources	1	2	3	4	5	6
f: read quickly and efficiently	1	2	3	4	5	6
g: pick out key points when you are reading	1	2	3	4	5	6
h: organize information in a way which is easy to understand and remember	1	2	3	4	5	6
i: recognize ideas or facts you have learned when you see them again	1	2	3	4	5	6
j: remember what you have learned (regardless of organization)	1	2	3	4	5	6
k: understand complex ideas	1	2	3	4	5	6
l: apply ideas you have learned about to new situations	1	2	3	4	5	6
m: understand and interpret questions accurately	1	2	3	4	5	6
n: use logic and reason to dismiss incorrect alternatives	1	2	3	4	5	6
o: consider new ideas critically	1	2	3	4	5	6
p: debate an issue logically	1	2	3	4	5	6
q: consider both sides of an issue	1	2	3	4	5	6
r: express yourself clearly and concisely	1	2	3	4	5	6
s: generate new ideas	1	2	3	4	5	6

10: Now, please rate your academic ability overall, using the same scale. 1 2 3 4 5 6

ATTITUDES SECTION

Please rate the next set of statements according to how true or false you think they are, using a scale ranging from
1 = Very False to 6 = Very True

	Very False					Very True
1: People should be more involved with their work	1	2	3	4	5	6
2: I am quite independent of the people I know.	1	2	3	4	5	6
.3: I seldom set standards which are difficult for me to reach	1	2	3	4	5	6
4: I choose hobbies that I can share with other people.	1	2	3	4	5	6
5: I enjoy difficult work	1	2	3	4	5	6
.6: I seldom make extra effort to make friends	1	2	3	4	5	6
.7: I have rarely done extra studying in connection with my job	1	2	3	4	5	6
8: I go out of my way to meet people	1	2	3	4	5	6
9: I will not be satisfied until I am the best in my field of work.	1	2	3	4	5	6
.10: I don't really have fun at large parties.	1	2	3	4	5	6
.11: I try to work just hard enough to get by.	1	2	3	4	5	6
12: People consider me to be quite friendly.	1	2	3	4	5	6
13: I would work just as hard whether or not I had to earn a living.	1	2	3	4	5	6
.14: I would not be very good at a job which required me to meet people all day long	1	2	3	4	5	6
.15: I do not let work get in the way of what I really want to do.	1	2	3	4	5	6
16: I truly enjoy myself at social functions.	1	2	3	4	5	6
17: My goal is to do at least a little bit more than anyone else has done before.	1	2	3	4	5	6
.18: When I see someone I know from a distance, I don't go out of my way to say hello.	1	2	3	4	5	6
.19: In my work, I seldom do more than is necessary.	1	2	3	4	5	6
20: I spend a lot of time visiting friends.	1	2	3	4	5	6
21: I often set goals that are very difficult to reach.	1	2	3	4	5	6
.22: Sometimes I have to make a real effort to be sociable.	1	2	3	4	5	6
.23: People seldom think of me as a hard worker.	1	2	3	4	5	6
24: My friendships are many	1	2	3	4	5	6
25: As a child, I worked a long time for for some of the things I earned.	1	2	3	4	5	6
.26: I don't spend much of my time talking to people I see every day.	1	2	3	4	5	6
.27: It doesn't really matter to me whether I become one of the best in my field.	1	2	3	4	5	6
28: I trust my friends completely	1	2	3	4	5	6
29: I don't mind working while other people are having fun.	1	2	3	4	5	6
.30: Often, I would rather be alone than with a group of friends.	1	2	3	4	5	6
.31: I am not really very certain about what I want or how to go about getting it.	1	2	3	4	5	6
32: I try to be in the company of friends as much as possible.	1	2	3	4	5	6

N.ach _____ N.aff _____

For the next set of questions, indicate how characteristic each statement is of you. Options range from '1' (very uncharacteristic) to '5' (very characteristic).

	very uncharacteristic				very characteristic
33: I feel that I am a person of worth, at least on an equal basis with others	1	2	3	4	5

34: I feel that I have a number of good qualities	1	2	3	4	5
.35: All in all, I am inclined to feel that I am a failure	1	2	3	4	5
36: I am able to do things as well as most other people	1	2	3	4	5
.37: I feel I do not have much to be proud of	1	2	3	4	5
38: I take a positive attitude toward myself	1	2	3	4	5
39: On the whole, I am satisfied with myself	1	2	3	4	5
.40: I wish I could have more respect for myself	1	2	3	4	5
.41: I certainly feel useless at times	1	2	3	4	5
.42: At times I think I am no good at all	1	2	3	4	5

R.S.E. _____

43: I'm concerned about my style of doing things	1	2	3	4	5
44: I'm concerned about the way I present myself	1	2	3	4	5
45: I'm self-conscious about the way I look	1	2	3	4	5
46: I usually worry about making a good impression	1	2	3	4	5
47: One of the last things I do before leaving my house is look in the mirror	1	2	3	4	5
48: I'm concerned about what other people think of me	1	2	3	4	5
49: I'm usually aware of my appearance	1	2	3	4	5

Pub S.C. _____

Please indicate how strongly you agree or disagree with the following statements using the scale where

1 = strongly disagree and 6 = strongly agree

50: If I get a poor grade, it will be because I haven't studied hard enough	1	2	3	4	5	6
51: My enjoyment of a social gathering is almost entirely dependent on the personalities of the other people who are there.	1	2	3	4	5	6
52: If I were to receive low marks it would cause me to question my academic ability	1	2	3	4	5	6
53: Making friends is a funny business; I sometimes have to chalk my successes up to luck	1	2	3	4	5	6
54: If I did not get along with others, it would tell me that I hadn't put much effort into the pursuit of social goals	1	2	3	4	5	6
55: Some of the good grades I might get could be due to the teacher's easy grading scheme	1	2	3	4	5	6
56: It seems to me that failure to have people like me would show my ignorance in interpersonal relationships	1	2	3	4	5	6
57: Sometimes, my success in exams depends on some luck	1	2	3	4	5	6
58: In my case, good grades will always be the direct result of my efforts	1	2	3	4	5	6
59: No matter what I do, some people just don't like me	1	2	3	4	5	6
60: The most important ingredient in getting good grades is my academic ability	1	2	3	4	5	6
61: Often, chance events can play a large part in causing rifts between friends	1	2	3	4	5	6
62: Maintaining friendships requires real effort to make them work	1	2	3	4	5	6
63: In my experience, once a teacher gets the idea you are a poor student, your work is much more likely to receive a poor grade than if someone else handed in the same work	1	2	3	4	5	6
64: It seems to be that getting along with people is a skill	1	2	3	4	5	6
65: Some of my lower grades will be partially due to bad breaks	1	2	3	4	5	6
66: If I fail to do well at university, it will be due to lack of effort on my part	1	2	3	4	5	6
67: Some people can make me have a good time even when I don't feel sociable	1	2	3	4	5	6
68: If I were to fail a course it would probably be because I lacked skill in that area	1	2	3	4	5	6
69: In my experience, making friends is largely a matter of having the right breaks	1	2	3	4	5	6

70: When I hear of a divorce, I suspect that the couple probably did not try hard enough to make the marriage work 1 2 3 4 5 6

71: Some of my good grades will reflect that these were easier courses than most 1 2 3 4 5 6

72: I feel that people who are often lonely are lacking in social competence 1 2 3 4 5 6

73: I feel that some of my good grades will depend to a considerable extent on chance factors, such as having the right questions show up in the exams 1 2 3 4 5 6

74: Any good grades I get will always be because I have studied hard for that course 1 2 3 4 5 6

75: Some people just seem predisposed to dislike me 1 2 3 4 5 6

76: I feel that my good grades will reflect directly on my academic ability 1 2 3 4 5 6

77: I find that the absence of friendships is often a matter of not being lucky enough to meet the right people 1 2 3 4 5 6

78: In my case, success at making friends depends on how hard I work at it 1 2 3 4 5 6

79: My poorer grades will be in courses that the lecturer fails to make interesting 1 2 3 4 5 6

80: Having good friends is simply a matter of one's social skills 1 2 3 4 5 6

81: My academic low points would tend to make me feel I was unlucky 1 2 3 4 5 6

82: Poor grades will tell I have not worked hard enough 1 2 3 4 5 6

83: To enjoy myself at a party I have to be surrounded by others who know how to have a good time 1 2 3 4 5 6

84: If I were to get poor grades I would assume that I lacked ability in those courses 1 2 3 4 5 6

85: If my marriage were a long happy one, I'd say that I must just be very lucky 1 2 3 4 5 6

86: In my experience, loneliness comes from not trying to be friendly 1 2 3 4 5 6

87: If I get good grades, it is likely to be because the course material was easy to learn 1 2 3 4 5 6

88: In my experience, there is a direct connection between the absence of friendships and being socially inept 1 2 3 4 5 6

89: Sometimes I feel that I have to consider myself lucky for the good grades I get 1 2 3 4 5 6

90: I can overcome all obstacles in the path of academic success if I work hard enough 1 2 3 4 5 6

91: It is almost impossible to figure out how I have displeased some people 1 2 3 4 5 6

92: If I get good grades it will be because of my academic competence 1 2 3 4 5 6

93: Difficulties with my friends often start with chance remarks 1 2 3 4 5 6

94: If my marriage were to succeed, it would be because I worked hard at it 1 2 3 4 5 6

95: If I get low grades, it will probably be because some teachers are just stingy with marks 1 2 3 4 5 6

96: It is impossible for me to maintain close relations with peple without my tact and patience 1 2 3 4 5 6

97: Some of my bad grades will be a function of bad luck, being in the wrong course at the wrong time 1 2 3 4 5 6

For the next set of questions, indicate how characteristic each statement is of you. Options range from '1' (very uncharacteristic) to '5' (very characteristic).

	very uncharacteristic				very characteristic
98: : I'm always trying to figure myself out	1	2	3	4	5
.99: Generally, I'm not very aware of myself	1	2	3	4	5
100: I reflect about myself a lot	1	2	3	4	5
101: I'm often the subject of my own fantasies	1	2	3	4	5
.102: I never scrutinize myself	1	2	3	4	5
103: I'm generally attentive to my inner feelings	1	2	3	4	5
104: I'm constantly examining my motives	1	2	3	4	5

105: I sometimes have the feeling that I'm off somewhere watching myself 1 2 3 4 5

106: I'm alert to changes in my mood 1 2 3 4 5

107: I'm aware of the way my mind works when I work through a problem 1 2 3 4 5

Priv S.C. ____

108: It takes me time to overcome my shyness in new situations 1 2 3 4 5

109: I have trouble working when someone is watching me 1 2 3 4 5

110: I get embarrassed very easily 1 2 3 4 5

.111: I don't find it hard to talk to strangers 1 2 3 4 5

112: I feel anxious when I speak in front of a group 1 2 3 4 5

113: Large groups make me nervous 1 2 3 4 5

S.A. _____

114: In uncertain times, I usually expect the best 1 2 3 4 5

-115: It's easy for me to relax 1 2 3 4 5

.116: If something can go wrong for me, it will 1 2 3 4 5

117: I always look on the bright side of things 1 2 3 4 5

118: I'm always optimistic about my future 1 2 3 4 5

-119: I enjoy my friends a lot 1 2 3 4 5

-120: It's important for me to keep busy 1 2 3 4 5

.121: I hardly ever expect things to go my way 1 2 3 4 5

.122: Things never work out the way I want them to 1 2 3 4 5

-123: I don't get upset too easily 1 2 3 4 5

124: I'm a believer in the idea that 'every cloud has a silver lining' 1 2 3 4 5

.125: I rarely count on good things happening to me. 1 2 3 4 5

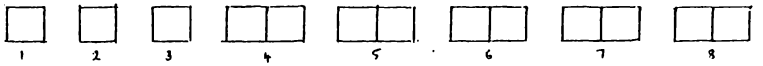
O.Scale _____

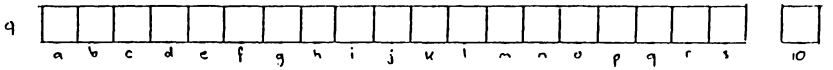
18.102 QUESTIONNAIRE 1 ANSWER SHEET
1990

Name: _____ Student ID: _____

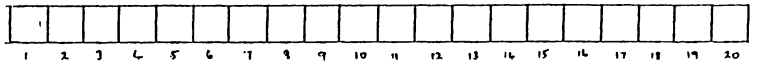
Please enter the numbers you have circled on your questionnaire in the boxes provided for each question.

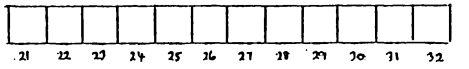
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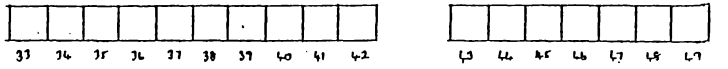


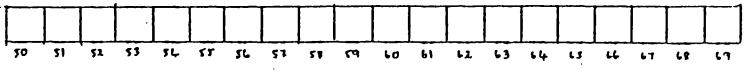


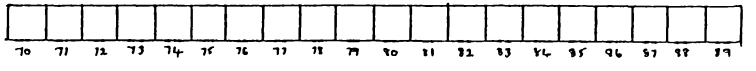
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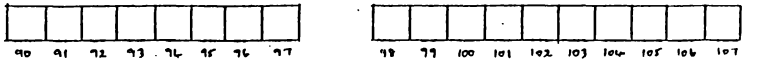


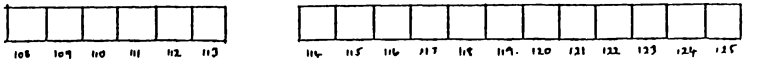












18.102 SOCIAL PSYCHOLOGY
QUESTIONNAIRE 2, 1990

NAME: _____ STUDENT ID: _____

1: Please indicate which of the following you attended.

a) Introductory lecture	1: Yes	2: No
b) Theory lecture	1: Yes	2: No
c) Theory practical - coding	1: Yes	2: No
d) Research lecture	1: Yes	2: No
e) Research practical - test revision	1: Yes	2: No
f) Tutorial in Week 3	1: Yes	2: No

2: Approximately how many hours did you spend reading

a) Deaux & Wrightsman 1 - Theories _____
b) Deaux & Wrightsman 2 - Research _____

3: If you covered the same material using other texts please note the author and number of hours spent

a) Theories _____ _____
_____ _____
b) Research _____ _____
_____ _____

4: Approximately how many hours did you spend revising lecture notes on

a) Introductory lecture _____
b) Theory lecture/practical _____
c) Research lecture/practical _____

5: Did you develop your own notes summarising

a) Chapter 1 - Theories	1: Yes	2: No
b) Chapter 2 - Research	1: Yes	2: No

6: Did you attempt

a) Theory Revisionword	1: Yes	2: No
b) Research Revisionword	1: Yes	2: No

7: Which of the following marks are you aiming for on this test? Please circle ONE of the following

1: A++ (18-20)	5: B+ (14)	9: C (10)
2: A+ (17)	6: B (13)	10: D (8-9)
3: A (16)	7: B- (12)	11: E (Less than 7)
4: A- (15)	8: C+ (11)	

8: What do you think your chances are of getting the mark you are aiming for on this test? Please circle ONE of the following

1: 0-9%	4: 30-39%	7: 60-69%	10: 90-100%
2: 10-19%	5: 40-49%	8: 70-79%	
3: 20-29%	6: 50-59%	9: 80-89%	

9: How important is it to you that you achieve or exceed the goal you are aiming for on this test? Please circle ONE number
1 = not at all important and 10 = more important than anything

1 2 3 4 5 6 7 8 9 10

10: Now that you have some experience of university please assess the following aspects of your academic skills using a scale where 1 = very poor and 6 = excellent.

Please rate your ability to:

a: organize your time effectively	1	2	3	4	5	6
b: work independently without supervision	1	2	3	4	5	6
c: maintain concentration during lectures	1	2	3	4	5	6
d: take lecture notes which cover key points	1	2	3	4	5	6
e: use the library and other resources	1	2	3	4	5	6
f: read quickly and efficiently	1	2	3	4	5	6
g: pick out key points when you are reading	1	2	3	4	5	6
h: organize information in a way which is easy to understand and remember	1	2	3	4	5	6
i: recognize ideas or facts you have learned when you see them again	1	2	3	4	5	6
j: remember what you have learned (regardless of organization)	1	2	3	4	5	6
k: understand complex ideas	1	2	3	4	5	6
l: apply ideas you have learned about to new situations	1	2	3	4	5	6
m: understand and interpret questions accurately	1	2	3	4	5	6
n: use logic and reason to dismiss incorrect alternatives	1	2	3	4	5	6
o: consider new ideas critically	1	2	3	4	5	6
p: debate an issue logically	1	2	3	4	5	6
q: consider both sides of an issue	1	2	3	4	5	6
r: express yourself clearly and concisely	1	2	3	4	5	6
s: generate new ideas	1	2	3	4	5	6

11: Now, please rate your

a: understanding of the theory material	1	2	3	4	5	6
b: understanding of research material	1	2	3	4	5	6
c: academic ability overall	1	2	3	4	5	6
d: effort put into studying for Test 1	1	2	3	4	5	6

18.102 SOCIAL PSYCHOLOGY
QUESTIONNAIRE 3, 1990

NAME: _____ STUDENT ID: _____

Please think back to when the results of the first test came out and recall what you thought about your mark and how it made you feel.

To what extent did your test mark:	RATING			
	not at all	small extent	some extent	great extent
1: make you feel pleased with your performance	|	|	|	|
2: make you feel disappointed with your performance	|	|	|	|
3: make you feel pleased with yourself	|	|	|	|
4: make you feel disappointed with yourself	|	|	|	|
5: make you feel happy with the lecturer	|	|	|	|
6: make you feel annoyed with the lecturer	|	|	|	|
7: make good performance more important to you	|	|	|	|
8: encourage you to work harder or make more effort	|	|	|	|
9: make you feel like giving up	|	|	|	|
10: accurately indicate the quality of your performance	|	|	|	|
11: give adequate information about your performance	|	|	|	|
12: show what you did right	|	|	|	|
13: show what you did wrong	|	|	|	|
14: help clarify what you were required to do	|	|	|	|
15: indicate what you can do to improve	|	|	|	|

1: Please tick all of the following which you attended.

	Lecture	Practical	Tutorial
a) Self Perception	_____	_____	_____
b) Self Presentation	_____	_____	_____
c) Social Cognition	_____	_____	_____
d) Attributions	_____	_____	_____

2: Approximately how many hours did you spend studying
a) Deaux & Wrightsman 3 - The Self _____
b) Deaux & Wrightsman 4 - Social Knowledge _____

3: If you covered the same material using other texts please note the author and number of hours spent
a) Self _____ _____
b) Soc. Cognition _____ _____
_____ _____

4: Approximately how many hours did you spend revising lecture notes on
a) Self Perception lecture/practical _____
b) Self Presentation lecture/practical _____
c) Social Cognition lecture/practical _____
d) Attributions Lecture/practical _____

5: Did you develop your own notes summarising
a) Chapter 3 - The Self 1: Yes 2: No
b) Chapter 4 - Social Knowledge 1: Yes 2: No

6: Did you attempt the
a) Self Revisionword 1: Yes 2: No
b) Social Cognition Revisionword 1: Yes 2: No

7: Which of the following marks are you aiming for on this test? Please circle ONE of the following

1: A++ (18-20)	5: B+ (14)	9: C (10)
2: A+ (17)	6: B (13)	10: D (8-9)
3: A (16)	7: B- (12)	11: E (Less than 7)
4: A- (15)	8: C+ (11)	

8: What do you think your chances are of getting the mark you are aiming for on this test? Please circle ONE of the following

1: 0-9%	4: 30-39%	7: 60-69%	10: 90-100%
2: 10-19%	5: 40-49%	8: 70-79%	
3: 20-29%	6: 50-59%	9: 80-89%	

9: How important is it to you that you achieve or exceed the goal you are aiming for on this test? Please circle ONE number
1 = not at all important and 10 = more important than anything

1 2 3 4 5 6 7 8 9 10

10: Now that you have some experience of university please assess the following aspects of your academic skills using a scale where
1 = very poor and 6 = excellent.

Please rate your ability to:

a: organize your time effectively	1	2	3	4	5	6
b: work independently without supervision	1	2	3	4	5	6
c: maintain concentration during lectures	1	2	3	4	5	6
d: take lecture notes which cover key points	1	2	3	4	5	6
e: use the library and other resources	1	2	3	4	5	6
f: read quickly and efficiently	1	2	3	4	5	6
g: pick out key points when you are reading	1	2	3	4	5	6
h: organize information in a way which is easy to understand and remember	1	2	3	4	5	6
i: recognize ideas or facts you have learned when you see them again	1	2	3	4	5	6
j: remember what you have learned (regardless of organization)	1	2	3	4	5	6
k: understand complex ideas	1	2	3	4	5	6
l: apply ideas you have learned about to new situations	1	2	3	4	5	6
m: understand and interpret questions accurately	1	2	3	4	5	6
n: use logic and reason to dismiss incorrect alternatives	1	2	3	4	5	6
o: consider new ideas critically	1	2	3	4	5	6
p: debate an issue logically	1	2	3	4	5	6
q: consider both sides of an issue	1	2	3	4	5	6
r: express yourself clearly and concisely	1	2	3	4	5	6
s: generate new ideas	1	2	3	4	5	6

11: Now, please rate your

a: understanding of the 'Self' material	1	2	3	4	5	6
b: understanding of Social Cognition	1	2	3	4	5	6
c: academic ability overall	1	2	3	4	5	6
d: effort put into studying for Test 2	1	2	3	4	5	6

18.102 SOCIAL PSYCHOLOGY
QUESTIONNAIRE 4, 1990

NAME: _____ STUDENT ID: _____

Please think back to when the results of the second test came out and recall what you thought about your mark and how it made you feel.

To what extent did your mark for Test 2:	RATING: not at all	small extent	some extent	great extent
1: make you feel pleased with your performance				
2: make you feel disappointed with your performance				
3: make you feel pleased with yourself				
4: make you feel disappointed with yourself				
5: make you feel happy with the lecturer				
6: make you feel annoyed with the lecturer				
7: make good performance more important to you				
8: encourage you to work harder or make more effort				
9: make you feel like giving up				
10: accurately indicate the quality of your performance				
11: give adequate information about your performance				
12: show what you did right				
13: show what you did wrong				
14: help clarify what you were required to do				
15: indicate what you can do to improve				

1: Please tick all of the following which you attended.

	Lecture	Practical	Tutorial
a) Communication			
b) Attitudes and Behaviour, 1			
c) Attitudes and Behaviour, 2			

2: Approximately how many hours did you spend studying
a) Deaux & Wrightsman 5 - Communication _____
b) Deaux & Wrightsman 6 - Attitudes & Behaviour _____

3: If you covered the same material using other texts please note the author and number of hours spent
a) Communication _____ _____
b) Attits & Behav _____ _____
_____ _____

4: Approximately how many hours did you spend revising lecture notes on
a) Communication lecture/practical _____
b) Attits & Behav lecture/practical, 1 _____
c) Attits & Behav lecture/practical, 2 _____

5: Did you develop your own notes summarising
a) Chapter 5 - Communication 1: Yes 2: No
b) Chapter 6 - Attitudes & Behaviour 1: Yes 2: No

6: Did you attempt the
a) Communication Revisionword 1: Yes 2: No

7: Which of the following marks are you aiming for on this test? Please circle ONE of the following

1: A++ (18-20)	5: B+ (14)	9: C (10)
2: A+ (17)	6: B (13)	10: D (8-9)
3: A (16)	7: B- (12)	11: E (Less than 7)
4: A- (15)	8: C+ (11)	

8: What do you think your chances are of getting the mark you are aiming for on this test? Please circle ONE of the following

1: 0-9%	4: 30-39%	7: 60-69%	10: 90-100%
2: 10-19%	5: 40-49%	8: 70-79%	
3: 20-29%	6: 50-59%	9: 80-89%	

9: How important is it to you that you achieve or exceed the goal you are aiming for on this test? Please circle ONE number
1 = not at all important and 10 = more important than anything

1 2 3 4 5 6 7 8 9 10

10: Now that you have some experience of university please assess the following aspects of your academic skills using a scale where 1 = very poor and 6 = excellent.

Please rate your ability to:

a: organize your time effectively	1	2	3	4	5	6
b: work independently without supervision	1	2	3	4	5	6
c: maintain concentration during lectures	1	2	3	4	5	6
d: take lecture notes which cover key points	1	2	3	4	5	6
e: use the library and other resources	1	2	3	4	5	6
f: read quickly and efficiently	1	2	3	4	5	6
g: pick out key points when you are reading	1	2	3	4	5	6
h: organize information in a way which is easy to understand and remember	1	2	3	4	5	6
i: recognize ideas or facts you have learned when you see them again	1	2	3	4	5	6
j: remember what you have learned (regardless of organization)	1	2	3	4	5	6
k: understand complex ideas	1	2	3	4	5	6
l: apply ideas you have learned about to new situations	1	2	3	4	5	6
m: understand and interpret questions accurately	1	2	3	4	5	6
n: use logic and reason to dismiss incorrect alternatives	1	2	3	4	5	6
o: consider new ideas critically	1	2	3	4	5	6
p: debate an issue logically	1	2	3	4	5	6
q: consider both sides of an issue	1	2	3	4	5	6
r: express yourself clearly and concisely	1	2	3	4	5	6
s: generate new ideas	1	2	3	4	5	6

11: Now, please rate your

a: understanding of the Communication material	1	2	3	4	5	6
b: understanding of 'Attitudes & Behaviour'	1	2	3	4	5	6
c: academic ability overall	1	2	3	4	5	6
d: effort put into studying for Test 3	1	2	3	4	5	6

18.102 SOCIAL PSYCHOLOGY
QUESTIONNAIRE 5, 1990

NAME: _____ STUDENT ID: _____

Please think back to when the results of the third test came out and recall what you thought about your mark and how it made you feel.

To what extent did your mark for Test 3:	RATING			
	not at all	small extent	some extent	great extent
1: make you feel pleased with your performance				
2: make you feel disappointed with your performance				
3: make you feel pleased with yourself				
4: make you feel disappointed with yourself				
5: make you feel happy with the lecturer				
6: make you feel annoyed with the lecturer				
7: make good performance more important to you				
8: encourage you to work harder or make more effort				
9: make you feel like giving up				
10: accurately indicate the quality of your performance				
11: give adequate information about your performance				
12: show what you did right				
13: show what you did wrong				
14: help clarify what you were required to do				
15: indicate what you can do to improve				

1: Please tick all of the following which you attended.

	Lecture	Practical	Tutorial
a) Social Influence, 1			
b) Social Influence, 2			
c) Interpersonal Attraction			
d) Attitude Change			
e) Aggression and Violence			

2: Approximately how many hours did you spend studying

a) Deaux & Wrightsman 8 - Social Influence _____
b) Deaux & Wrightsman 9 - Attraction _____
c) Deaux & Wrightsman 7 - Attitude Change _____
d) Deaux & Wrightsman 11 - Aggression and Violence _____

3: Approximately how many hours did you spend revising lecture notes on

a) Social Influence lecture/practicals _____
b) Attraction lecture/practicals _____
c) Attitude Change lecture/practicals _____
d) Aggression & Violence lecture/practical _____

4: Did you develop your own notes summarising

a) Chapter 8 - Social Influence	1: Yes	2: No
b) Chapter 9 - Attraction	1: Yes	2: No
c) Chapter 7 - Attitude Change	1: Yes	2: No
d) Chapter 11 - Aggression & Violence	1: Yes	2: No

5: Which of the following marks are you aiming for on this test? Please circle ONE of the following

1: A++ (18-20)	5: B+ (14)	9: C (10)
2: A+ (17)	6: B (13)	10: D (8-9)
3: A (16)	7: B- (12)	11: E (Less than 7)
4: A- (15)	8: C+ (11)	

6: What do you think your chances are of getting the mark you are aiming for on this test? Please circle ONE of the following

1: 0-9%	4: 30-39%	7: 60-69%	10: 90-100%
2: 10-19%	5: 40-49%	8: 70-79%	
3: 20-29%	6: 50-59%	9: 80-89%	

7: How important is it to you that you achieve or exceed the goal you are aiming for on this test? Please circle ONE number
1 = not at all important and 10 = more important than anything

1 2 3 4 5 6 7 8 9 10

9: Please assess the following aspects of your academic skills using a scale where 1 = very poor and 6 = excellent.

Please rate your ability to:

a: organize your time effectively	1	2	3	4	5	6
b: work independently without supervision	1	2	3	4	5	6
c: maintain concentration during lectures	1	2	3	4	5	6
d: take lecture notes which cover key points	1	2	3	4	5	6
e: use the library and other resources	1	2	3	4	5	6
f: read quickly and efficiently	1	2	3	4	5	6
g: pick out key points when you are reading	1	2	3	4	5	6
h: organize information in a way which is easy to understand and remember	1	2	3	4	5	6
i: recognize ideas or facts you have learned when you see them again	1	2	3	4	5	6
j: remember what you have learned (regardless of organization)	1	2	3	4	5	6
k: understand complex ideas	1	2	3	4	5	6
l: apply ideas you have learned about to new situations	1	2	3	4	5	6
m: understand and interpret questions accurately	1	2	3	4	5	6
n: use logic and reason to dismiss incorrect alternatives	1	2	3	4	5	6
o: consider new ideas critically	1	2	3	4	5	6
p: debate an issue logically	1	2	3	4	5	6
q: consider both sides of an issue	1	2	3	4	5	6
r: express yourself clearly and concisely	1	2	3	4	5	6
s: generate new ideas	1	2	3	4	5	6

11: Now, please rate your

a: understanding of Social Influence material	1	2	3	4	5	6
b: understanding of Attraction material	1	2	3	4	5	6
c: understanding of Attitude Change	1	2	3	4	5	6
d: understanding of Aggession & Violence	1	2	3	4	5	6
e: academic ability overall	1	2	3	4	5	6
f: effort put into studying for Test 4	1	2	3	4	5	6

18.102 SOCIAL PSYCHOLOGY
QUESTIONNAIRE 6, 1990

NAME: _____ STUDENT ID: _____

Please think back to when the results of the fourth test came out and recall what you thought about your mark and how it made you feel.

To what extent did your mark for Test 4:	RATING: not at all	small extent	some extent	great extent
1: make you feel pleased with your performance				
2: make you feel disappointed with your performance				
3: make you feel pleased with yourself				
4: make you feel disappointed with yourself				
5: make you feel happy with the lecturer				
6: make you feel annoyed with the lecturer				
7: make good performance more important to you				
8: encourage you to work harder or make more effort				
9: make you feel like giving up				
10: accurately indicate the quality of your performance				
11: give adequate information about your performance				
12: show what you did right				
13: show what you did wrong				
14: help clarify what you were required to do				
15: indicate what you can do to improve				

please turn over

1: Please tick all of the following which you attended.

	Lecture	Practical	Tutorial
a) Personality Theory	_____	_____	_____
b) Freudian Theorists	_____	_____	_____
c) Humanistic Theorists	_____	_____	_____
d) Behavioural Theorists	_____	_____	_____
e) Issues and Applications	_____	_____	_____

2: Approximately how many hours did you spend studying

a) Personality Text - Personality Theory chapter _____
b) Personality Text - Freud chapter _____
c) Personality Text - Humanistic chapter _____
d) Personality Text - Behavioural chapter _____
e) Personality Text - Issues & Applications material _____

3: Approximately how many hours did you spend revising lecture notes on

a) Personality Theory lecture/practicals _____
b) Freud lecture/practicals _____
c) Humanists lecture/practicals _____
d) Behavioural lecture/practical _____
e) Issues & Applications lecture/practical _____

4: Did you develop your own notes summarising

a) Chapter on Personality Theory	1: Yes	2: No
b) Chapter on Freud	1: Yes	2: No
c) Chapter on Humanists	1: Yes	2: No
d) Chapter on Behaviourists	1: Yes	2: No
e) Material on Issues & Applications	1: Yes	2: No

5: Which of the following marks are you aiming for on this test? Please circle ONE of the following

1: A++ (36-40)	5: B+ (28-29)	9: C (20-21)
2: A+ (34-35)	6: B (26-27)	10: D (16-19)
3: A (32-33)	7: B- (24-25)	11: E (15 or less)
4: A- (30-31)	8: C+ (22-23)	

6: What do you think your chances are of getting the mark you are aiming for on this test? Please circle ONE of the following

1: 0-9%	4: 30-39%	7: 60-69%	10: 90-100%
2: 10-19%	5: 40-49%	8: 70-79%	
3: 20-29%	6: 50-59%	9: 80-89%	

7: How important is it to you that you achieve or exceed the goal you are aiming for on this test? Please circle ONE number
1 = not at all important and 10 = more important than anything

1 2 3 4 5 6 7 8 9 10

8: Please assess the following aspects of your academic skills using a scale where 1 = very poor and 6 = excellent.

Please rate your ability to:

a: organize your time effectively	1	2	3	4	5	6
b: work independently without supervision	1	2	3	4	5	6
c: maintain concentration during lectures	1	2	3	4	5	6
d: take lecture notes which cover key points	1	2	3	4	5	6
e: use the library and other resources	1	2	3	4	5	6
f: read quickly and efficiently	1	2	3	4	5	6
g: pick out key points when you are reading	1	2	3	4	5	6
h: organize information in a way which is easy to understand and remember	1	2	3	4	5	6
i: recognize ideas or facts you have learned when you see them again	1	2	3	4	5	6
j: remember what you have learned (regardless of organization)	1	2	3	4	5	6
k: understand complex ideas	1	2	3	4	5	6
l: apply ideas you have learned about to new situations	1	2	3	4	5	6
m: understand and interpret questions accurately	1	2	3	4	5	6
n: use logic and reason to dismiss incorrect alternatives	1	2	3	4	5	6
o: consider new ideas critically	1	2	3	4	5	6
p: debate an issue logically	1	2	3	4	5	6
q: consider both sides of an issue	1	2	3	4	5	6
r: express yourself clearly and concisely	1	2	3	4	5	6
s: generate new ideas	1	2	3	4	5	6

please turn over

9: Now, please rate your

a: understanding of Personality Theory material	1	2	3	4	5	6
b: understanding of Freudian Theorists	1	2	3	4	5	6
c: understanding of Humanist Theorists	1	2	3	4	5	6
d: understanding of Behavioural Theorists	1	2	3	4	5	6
e: understanding of Issues & Applications	1	2	3	4	5	6
f: academic ability overall	1	2	3	4	5	6
g: effort put into studying for Test 4	1	2	3	4	5	6

10: What grade are you aiming for on the *course overall?*

1: 0-9%	4: 30-39%	7: 60-69%	10: 90-100%
2: 10-19%	5: 40-49%	8: 70-79%	
3: 20-29%	6: 50-59%	9: 80-89%	

11: How much influence did the following factors have on your PERFORMANCE on the *course overall?*
'1' = no effect at all '6' = great deal of effect.

a) amount of effort you put into studying	1	2	3	4	5	6
b) your overall academic ability	1	2	3	4	5	6
c) your level of interest in subject	1	2	3	4	5	6
d) good/bad luck in being able to answer the questions which were set	1	2	3	4	5	6
e) the level of difficulty of the material covered in the course	1	2	3	4	5	6
f) the level of difficulty of multi-choice tests as a means of assessment	1	2	3	4	5	6

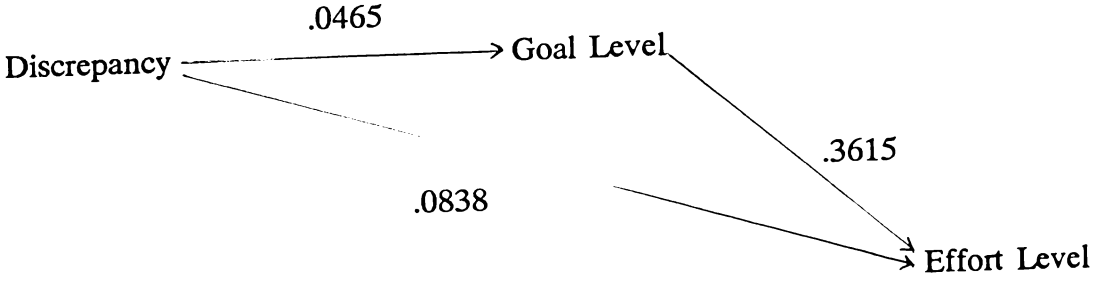
12: To what extent did the following factors influence the amount of EFFORT you put in to this course over the year?
'1' = no effect '6' = great deal of effect

a) demands from other coursework	1	2	3	4	5	6
b) family or personal problems	1	2	3	4	5	6
c) sports, leisure or social activities	1	2	3	4	5	6
d) job pressures	1	2	3	4	5	6

Many thanks for taking part in this research

Chapter 2 Appendix:

Decomposition of Correlations for Change Scores



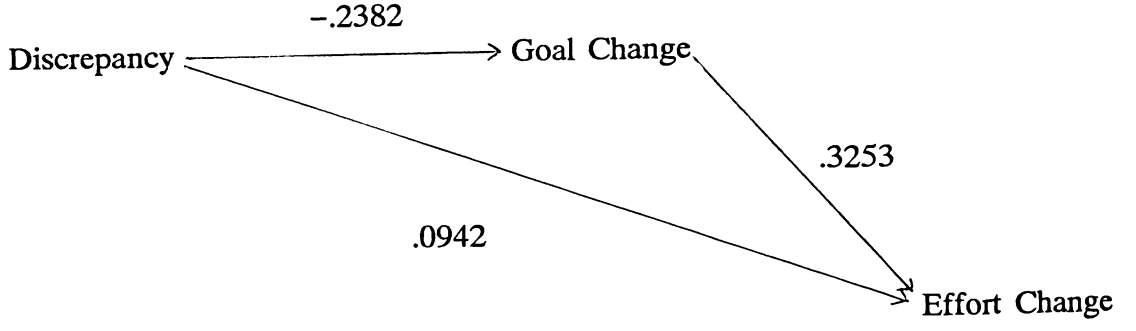


Figure 2A: Path Coefficients for Levels and Change Analyses

Decomposition of Correlations for Change Scores

The argument that correlations between levels score predictors and residualised change scores cannot be decomposed adequately using the change analysis path coefficients for the early sections of indirect paths is illustrated below. The three-variable example which is drawn from Campion and Lord's (1982) model (see Table 4.1) is fully-identified, so the difference between the total effects and correlation should always equal zero (Pedhazur, 1982).

As shown in the levels analysis results in Figure 2A, the direct effect of discrepancy on effort level (.0838) plus the indirect effect via goals (.0465 * .3615) gives a total effect of .1006 which is equal to the correlation between discrepancy and effort level. However, the change analysis results show that the direct effect of discrepancy on effort change (.0942) plus the indirect effect via goal change (-.2382 * .3253) results in a total effect of .0167. This differs from the correlation between discrepancy and the residualised effort change score (.11) by more than .05, even though the model appears to be fully-identified.

The correlations for the change analyses fail to decompose adequately because the change analysis diagram represents the effect of discrepancy on goal change, and of goal level on effort change. Consequently, the discrepancy - effort change correlation contains variance due to previous goals which has been removed from the path coefficient for the first section of the indirect path in the change analysis by using a residualised score to measure goal change. This problem can be overcome by using the early section of the indirect path from the levels diagram to obtain the total effects for the change analyses. In this case, the total effect for the direct discrepancy effort change path (.0942) plus the indirect effects for the performance - goal level path (.0465) and goal level - effort change path (.3253) equal the correlation.

Using residualised scores for both predictor and criterion variables offers an alternative approach to resolving this problem. However, the resulting analyses which examine the effects of changes in predictors on changes in criteria contrast with the purpose of the models tested here which attempted to explain the effects of predictor variable levels on the tendency to maintain, increase or decrease scores on criterion variables.

Chapter 3 Appendix:

Reliability and Validity Assessment
of Validation Variables

Table 3A.1: Descriptive and Reliability Data for Self Attitudes

Variables	Normative		Reliability	
	Mean	sd	Alpha	Mean Inter-Item Corr
Self Esteem	4.28	(.73)	.88	.42
Need for Achievement	3.78	(.62)	.76	.16
Need for Affiliation	4.12	(.62)	.80	.20
Attributions				
Effort–Success	4.61	(.80)	.59	.32
Effort–Failure	4.71	(.96)	.72	.46
Ability–Success	3.78	(.88)	.72	.46
Ability–Failure	3.50	(.94)	.64	.37
Sit.–Success	3.08	(.86)	.59	.32
Sit.–Failure	3.02	(.90)	.50	.25
Luck–Success	2.31	(.95)	.66	.39
Luck–Failure	2.69	(.88)	.61	.34

Note: I–I Corr = Inter–Item Correlation
Sit. = Situation

Table 3A.2: Descriptive Data for Goal Importance and Understanding

		Time 1	Time 2	Time 3	Time 4	Time 5	Time 6
Goal Importance	m	7.88	7.41	7.10	7.06	6.97	7.19
	sd	(1.14)	(1.68)	(1.80)	(1.85)	(1.92)	(2.14)
Understanding	m		3.94	3.55	3.83	3.66	3.43
	sd		(.77)	(.86)	(.84)	(.85)	(.96)

Chapter 3 Appendix A:
Normative and Reliability Data for Validation Variables

Self Attitudes.

Normative data for the self attitude scales suggest that the sample had reasonably high levels of self–esteem and need for affiliation, but levels of need for achievement were slightly lower, and that participants were somewhat more likely to attribute academic success and failure to internal, than to external causes (see Table 3A.1). Alpha coefficients for the 10–item self–esteem, and 16–item need for affiliation scales reached or exceeded the .80 level which is necessary for applied research (Nunnally, 1979), although that for the 16–item need for achievement measure was somewhat lower. Although all alphas for the eight three–item academic attribution subscales fell below .80, their mean inter–item correlations were higher than those for either of needs measures. These results indicate that the self–attitude scales were sufficiently reliable to be used to assess the validity of the self–efficacy measures.

Understanding and Goal Importance

Students' ratings of their understanding of the material covered in each test and the importance they attached to their goals were used to help validate the self–efficacy or effort measures. As shown in Table 3A.2, mean scores for both variables tended to decrease across the measurement periods. Comparing the mean ratings with the scale mid–points of 3.5 for understanding and 5.5 for goal importance indicates that students generally rated their understanding of the material as moderate, and the importance of their course and test goals as relatively high. The significant correlation of r .27 (p <.001) between the importance of initial course goals and Need for Achievement indicates than the single–item measure of goal importance had adequate concurrent validity.

Table 3B.1: Feedback Assessment Means and Standard Deviations

Items	Time 3	Time 4	Time 5	Time 6
Pleased with Performance	2.50 (.98)	1.90 (.96)	2.37 (.95)	2.81 (.90)
Disappointed with Performance	2.25 (1.03)	2.68 (1.04)	2.27 (1.01)	1.92 (.89)
Pleased with Self	2.34 (.98)	1.86 (.93)	2.22 (.93)	2.64 (.89)
Disappointed with Self	2.17 (1.06)	2.51 (1.05)	2.08 (.99)	1.87 (.90)
Pleased with Lecturer	1.95 (.85)	1.74 (.80)	1.84 (.79)	2.02 (.87)
Annoyed with Lecturer	1.63 (.87)	1.86 (1.03)	1.64 (.86)	1.60 (.83)
Importance of Good Performance	2.93 (.87)	2.88 (.86)	2.69 (.85)	2.65 (.89)
Encourage Effort	2.89 (.89)	2.81 (.86)	2.60 (.88)	2.48 (.93)
Feel like Giving up	1.40 (.74)	1.57 (.85)	1.53 (.82)	1.46 (.78)
Accuracy of Feedback	2.64 (.86)	2.47 (.92)	2.54 (.88)	2.64 (.89)
Adequacy of Feedback	2.60 (.82)	2.43 (.90)	2.38 (.89)	2.55 (.87)
Show what was Right	2.35 (1.10)	2.00 (.97)	1.92 (.97)	2.08 (1.00)
Show what was Wrong	2.32 (1.00)	2.05 (1.03)	1.88 (.99)	1.87 (.94)
Clarify what intended	2.39 (.95)	1.99 (.94)	1.87 (.89)	1.99 (.92)
Help Improve	2.36 (1.00)	2.11 (1.00)	1.92 (.94)	1.93 (.92)

Notes. Scale = 1 – 4

Chapter 3 Appendix B:
Feedback Assessment Measure

Table 3B.1 shows mean scores and standard deviations for the 15 items in the feedback assessment measure which was administered at Times 3 through 6 to examine students' reactions to their performance feedback on the first four tests. The mean sores suggest that the performance feedback tended to have most impact in increasing the importance of good performance and encouraging effort, or in making students feel pleased with performance. Feedback had the least effect in making students feel like giving up, and disappointed or pleased with the lecturer. A comparison of the mean scores for the four items which were included to measure satisfaction (pleased and disappointed with self and performance) indicated that students tended to be more pleased than disappointed with themselves and their performance, except at Time 4. The mean scores for the two performance items were consistently higher than those relating to self. Of particular interest are the ratings for feedback accuracy which approximated the scale mid–point of 2.50 even though multi–choice tests marking is reasonably objective, and that answers were marked and verified by computer.

Principal components analyses were conducted on the feedback assessment measure at each of the four periods to determine whether the underlying factor structure was consistent with the four dimensions the instrument was designed to tap. The six items assessing accuracy, adequacy, and the extent to which the feedback showed what was right and wrong, clarified what was expected and helped students improve were intended to tap a cognitive dimension reflecting the informational value of the feedback. The extent to which feedback made good performance more important, encouraged effort or made students feel like giving up were included to represent motivation. The four items assessing the extent to which the feedback made students feel pleased or disappointed with themselves and their performance were expected to tap self–evaluative satisfaction and represent internal attributions for performance. The two items measuring how pleased or disappointed students felt with the lecturer were intended to tap evaluative responses reflecting external attributions for performance.

Use of the Kaiser criterion resulted in the extraction of four factors with eigenvalues of more than 1.00 at Time 3 and five factors at later periods. The results of the varimax rotation in Table 3B.2 show that the six cognitive items loaded on two clearly

Table 3B.2: Feedback Assessment Principal Components Analysis

	Time 3				Time 4					Time 5					Time 6				
	F1	F2	F3	F4	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5
Pleased Perf	.79				.90						.84				.86				
Disapp. Perf	.83				.76						.61	-.61	-.31		.78				-.41
Pleased Self	.73				.91						.87				.85				
Disapp. Self	.81		-.30		.74		-.30		-.35		.53	-.60	-.38		.78				-.39
Pleased Lect.			.53				.52				.58		.32		.35		.60		
Disapp. Lect	-.57		-.32						.75			.76							.85
Importance			.74				.83						.87				.88		
Effort	-.30		.76				.78						.85				.82		
Give up	-.65								.73			.76			-.40				.66
Accuracy				.88				.89						.88				.89	
Adequacy				.88				.88						.86				.85	
Right		.78				.79				.80						.83			
Wrong		.80				.85				.84						.83			
Clarify		.75				.74				.77						.76			
Improve		.70				.75				.74						.76			
Eigenvalues	4.1	2.9	1.5	1.3	3.8	3.1	1.5	1.3	1.0	3.9	3.4	1.4	1.3	1.1	4.2	3.4	1.5	1.1	1.0

distinguishable factors at each period. The positive motivational and external evaluation items all had salient loadings on the same factor at each time while the negative motivational and external evaluation items which loaded with the self–evaluation items at Time 3 formed an additional factor at the later periods. Although disappointment with self and performance tended to have salient loadings on other factors, the four self–evaluation items generally formed a clearly identifiable dimension. Overall, these results suggest that the five dimensions underlying the feedback assessment measure can be characterised as self–evaluative satisfaction, feedback informational value, feedback accuracy and adequacy, motivation, and debilitation.

Table 3C.1: Means and Standard Deviations for Skills Items

		Time 1	Time 2	Time 3	Time 4	Time 5	Time 6
Organise Time	m	3.94	3.75	3.58	3.78	3.65	3.73
	sd	(1.01)	(1.04)	(1.16)	(1.12)	(1.26)	(1.18)
Independence	m	4.85	4.72	4.56	4.49	4.42	4.48
	sd	(.89)	(.91)	(1.10)	(1.07)	(1.14)	(1.03)
Concentrate	m	4.12	4.06	4.00	3.95	3.74	3.78
	sd	(.91)	(1.00)	(1.10)	(1.06)	(1.15)	(1.13)
Lecture Notes	m	4.26	4.43	4.30	4.29	4.14	4.20
	sd	(.93)	(.88)	(1.01)	(.93)	(1.04)	(1.05)
Use library	m	3.96	3.87	3.80	3.85	3.61	3.69
	sd	(1.05)	(1.21)	(1.35)	(1.23)	(1.33)	(1.37)
Read Quickly	m	4.06	3.88	3.74	3.85	3.84	3.87
	sd	(1.15)	(1.10)	(1.16)	(1.14)	(1.11)	(1.12)
Read Key points	m	4.23	4.38	4.19	4.28	4.26	4.27
	sd	(.95)	(.92)	(1.03)	(.94)	(.94)	(.98)
Organise info	m	4.31	4.21	4.00	4.12	4.01	4.09
	sd	(.91)	(.92)	(1.00)	(.99)	(1.00)	(1.02)
Recognise ideas	m	4.56	4.34	4.11	4.18	4.09	4.18
	sd	(.87)	(.88)	(.97)	(.96)	(1.00)	(.98)
Remember	m	3.95	3.79	3.47	3.63	3.58	3.66
	sd	(.87)	(.90)	(.95)	(.91)	(.98)	(.99)
Understand	m	3.83	3.76	3.70	3.77	3.80	3.86
	sd	(.88)	(.90)	(.98)	(.94)	(.98)	(.95)
Apply ideas	m	4.18	4.05	3.86	3.91	3.89	3.95
	sd	(.86)	(.89)	(.98)	(.95)	(.99)	(.94)
Understand Qus	m	4.02	4.03	3.75	3.83	3.77	3.86
	sd	(.87)	(.84)	(.91)	(.90)	(.93)	(.96)
Use Logic	m	4.34	4.27	4.09	4.15	4.05	4.16
	sd	(.89)	(.90)	(.94)	(.98)	(1.01)	(.99)
Be Critical	m	4.35	4.24	4.14	4.11	4.05	4.16
	sd	(.87)	(.83)	(.96)	(.91)	(1.00)	(.96)
Debate	m	4.24	4.21	4.09	4.10	4.07	4.08
	sd	(.99)	(.93)	(.97)	(.97)	(1.02)	(1.00)
Two sides	m	4.70	4.65	4.50	4.45	4.38	4.42
	sd	(.93)	(.87)	(.95)	(.99)	(.99)	(1.00)
Express Clearly	m	4.05	4.08	3.89	3.94	3.82	3.96
	sd	(.92)	(.93)	(.99)	(.97)	(1.01)	(1.02)
Generate Ideas	m	4.03	3.90	3.73	3.80	3.77	3.85
	sd	(.89)	(.85)	(.96)	(.95)	(1.02)	(1.00)

Note. Please see questionnaires in Appendix 1 for full wording of questions.

Chapter 3 Appendix C:

Skills Self–Efficacy Measure.

The mean scores for the 19 items in the skills self–efficacy measure (see Table 3C.1) suggest that the ability to work independently, consider both sides of an issue, recognise ideas, pick out key points when reading or take lecture notes which cover key points tended to be viewed as the easiest skills. The ability to understand complex ideas, organise time effectively, remember what had been learned and use the library and other resources tended to viewed as the most difficult skills.

The dimensions underlying the skills self–efficacy measure were examined using principal components analysis. Use of the Kaiser criterion resulted in the extraction of four factors at the first four time periods and three factors at the later times. However, the four factor solutions produced by the varimax rotations were not clearly interpretable so the number of factors to be extracted was specified as three and the data were reanalysed to determine whether the three dimensions the items were chosen to represent could be identified.

Although the data in Table 3C.2 show that many items had salient loadings of .30 or greater on more than one factor, the general, multi–choice test and advanced skills dimensions are identifiable. The five items which were chosen to represent general 'survival' skills (items 1 to 5) all had salient loadings on Factor 3 at each time period, while items 15 to 19 which were selected to represent advanced skills all had their highest loadings on Factor 2 at Times 1 and 3, and on Factor 1 at the other periods. The nine items which were considered to be important to multi–choice test performance (items 6 to 14) all had salient loadings on Factor 1 at Times 1 and 3, and on Factor 2 at Times 2 and 6. However, Items 11 to 14 had their highest loadings on the advanced skills factor at most of the time periods and only two of this subset of items had salient loadings on the multi–choice skills factor at Times 4 and 5.

Table 3C.2: Principal Components Analysis of Skills Self-Efficacy - 3 Factor Solution

	Time 1			Time 2			Time 3			Time 4			Time 5			Time 6		
Questions	F1	F2	F3	F1	F2	F3	F1	F2	F3	F1	F2	F3	F1	F2	F3	F1	F2	F3
Organise Time			.68			.75			.71			.62			.71			.72
Independence			.58			.71			.74			.77			.76			.72
Concentrate			.52			.56			.64			.65			.74			.66
Lecture Notes	.35		.57		.48	.47	.46		.48			.60	.32		.61		.45	.57
Use Library			.52			.36			.50			.47			.51			.49
Read Quickly	.60		.32		.63		.60				.67	.52		.66			.67	
Read Key Points	.61		.38		.69		.65				.72	.30		.70			.69	
Organise Info	.43		.41		.53	.39	.67				.73			.73			.68	
Recognise	.68				.68		.71			.36	.70		.31	.69			.69	
Remember	.70				.69		.66			.44	.57			.70			.71	
Understand	.71			.45	.55		.50	.48		.65	.35		.60	.45		.59	.44	
Apply	.46	.47		.64	.32		.47	.45		.57			.66	.35		.69	.30	
Understand Qus	.58	.37		.50	.41		.53	.35		.60	.33		.63			.55	.41	
Use Logic	.40	.59		.59	.40		.51	.48		.64			.60			.64	.40	
Be Critical		.72		.71				.75		.78			.80			.79		
Debate		.76		.70				.79		.74			.80			.76		
Two sides		.62		.62				.72		.68			.66			.73		
Express Clearly		.51	.46	.50		.31		.52		.51			.57	.34		.49	.32	.33
Generate Ideas	.59	.33		.62				.64			.55			.68			.65	
Eigenvalues	6.2	1.6	1.3	6.5	1.3	1.3	7.1	1.5	1.2	7.3	1.4	1.3	8.1	1.5	1.2	8.0	1.5	1.1
% Variance	32.4	8.3	7.0	34.0	7.0	6.9	37.3	7.7	6.2	38.6	7.5	6.9	42.4	8.1	6.3	42.1	7.9	5.9

Chapter 4 Appendix

Suppressor Effects

Discrepancy made significant contributions to levels of skills ratings and goals, and increased the betas for the predicted paths from self–evaluations, even though discrepancy was not significantly correlated with skills ratings or goal level initially. This occurs because of a suppressor effect between discrepancy and self–evaluations. Suppressors occur when a strong correlation between two predictors serves to partial out 'irrelevant' variance (variance the predictors share with each other but not with the criterion variable), thereby increasing the betas for both predictors (Pedhazur, 1982). In the present context, the suppressors indicate that, within self–evaluation levels, people who experienced discrepancy rated their skills higher and set higher goals than those who achieved congruence, and, within discrepancy levels, those who were satisfied rated their skills higher and set higher goals than those who were dissatisfied. Thus, the entry of discrepancy increased the significant contribution of self–evaluations to goal and skills level, while the effect of discrepancy, which was hidden by the strong correlation between discrepancy and self–evaluations, became apparent only after satisfaction was controlled.

Appendix 6.1:

Performance–Dissatisfaction Model
High Accuracy Group Regressions

Appendix 6.1a: Performance–Dissatisfaction Model, High Accuracy Group, Time 3 (N=315)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Interaction	Predicted Paths	Omitted Paths	Inter-action
Effort						
Goals	.3538***	.3214***	.3097***	.3438***	.3693***	
Expect	.1959***	.1761**	.1724**	.0911	.0972	
Dissat	.1077*	.1456*	.1434*	.1670**	.0884	
Skills		.0650	.0592		.0243	
Perf		.0536	−.0937		−.1362	
Acc			.0052			
PfxAcc			.1862*			
R	.4262	.4326	.4458	.3741	.3861	
adj R^2	.1739	.1740	.1805	.1399	.1353	
Expect						
Skills	.2599***	.2409***				
Perf	.1803**	.1108		.1403*	.1387*	
Dissat		−.0747		.1095	.0409	
Goals		.0709			−.0998	
					.0096	
R	.3600	.3690		.2034	.2168	
adj R^2	.1240	.1250		.0352	.0347	
Goals						
Skills	.2785***	.2775***	.2698***	.1189*	.1186*	
Perf	.2833***	.3453***	.1916	.2644***	.2874***	
Dissat		.0940	.0901		.0349	
Acc			−.0716			
PfxAcc			.1936*			
R	.4556	.4610	.4747	.3223	.3234	
adj ^{2}	.2024	.2050	.2128	.1039	.0959	
Skills						
Perf	.3154**	.3247***				
Dissat		.0168		.2706***	.2545***	
					−.0245	
R	.3154	.3157		.2706	.2712	
adj R^2	.0966	.0939		.0702	.0676	
Dissatisf						
Perf	−.6570***	−.6570***				
R	.6570	.6570				
adj R^2	.4299	.4299				

Note. Only significant accuracy main effects and interactions shown.

Appendix 6.1b: Performance–Dissatisfaction Model: High Accuracy Group, Time 4 (N=257)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-action
Effort						
Goals	.3340***	.3186***		.2753***	.3214***	.3401***
Expect	.2151***	.2020**		.1863**	.2070**	.2187***
Dissat	.0701	.1017		.0847	.0155	–.0058
Skills		.0310			–.0308	–.0310
Perf		.0590			–.1402	.0075
Acc						–.0255
PfxAcc						–.2749*
R	.4360	.4394		.3594	.3777	.4015
adj R^2	.1805	.1770		.1188	.1256	.1376
Expect						
Skills	.2931***	.2718***	.2060***	.1888**	.1769**	.1637*
Perf	.1847**	.1347	.1184	.1585*	.0865	.0672
Dissat		–.0795	–.0465		–.1441*	–.1050
Goals		.0458	.0412		.0049	.0000
PfxDis			–.1418*			–.1680**
R	.3724	.3797	.4024	.2667	.2938	.3336
adj R^2	.1319	.1306	.1452	.0638	.0718	.0936
Goals						
Skills	.3413***	.3531***	.3360***	.2429***	.2504***	
Perf	.2395***	.3218***	.2985***	.0956	.1478*	
Dissat		.1674**	.4566***		.1063	
Acc			–.0630			
DisxAcc			–.3470**			
R	.4495	.4720	.5015	.2759	.2907	
adj ²	.1957	.2136	.2366	.0689	.0737	
Skills						
Perf	.1724**	.1260		.0689	–.0265	
Dissat		–.0922			–.1894**	
R	.1724	.1899		.0689	.1775	
adj R^2	.0259	.0285		.0008	.0239	
Dissatisf						
Perf	–.5037***	–.5037***				
R	.5037	.5037				
adj R^2	.2508	.2508				

Appendix 6.1.c: Performance–Dissatisfaction Model: High Accuracy Group, Time 5 (N=255)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.3241***	.3061***		.2408***	.2384***	
Expect	.2543***	.2391***		.1569*	.1508*	
Dissat	.0265	.0778		.0377	.0258	
Skills		−.0245			.0450	
Perf		.1120			−.0365	
R	.4224	.4322		.2933	.2975	
adj R^2	.1686	.1705		.0860	.0702	
Expect						
Skills	.2856***	.3056***		.1344*	.1782**	
Perf	.2312***	.2710***		.0912	.1638*	
Dissat		.0447			.0643	
Goals		−.0767			−.1811**	
R	.4028	.4103		.1773	.2483	
adj R^2	.1556	.1550		.0314	.0466	
Goals						
Skills	.2108***	.2206***	.2343***	.0857	.0844	.1054
Perf	.2178***	.2767***	.5427***	.0427	.0350	.4074**
Dissat		.1142	.1121		−.0150	−.0175
Acc			.1197			.2007**
PfxAcc			−.3185**			−.4463***
R	.3328	.3464	.3886	.1033	.1041	.2814
adj ^{2}	.1037	.1095	.1399	.0427	−.0010	.0607
Skills						
Perf	.2061***	.1437*		.0821	−.0048	
Dissat		−.1170			−.1627*	
R	.2061	.2286		.0821	.1602	
adj R^2	.0387	.0448		.0028	.0179	
Dissatisf						
Perf	−.5339***	−.5339***				
R	.5339	.5339				
adj R^2	.2822	.2822				

Appendix 6.1d: Performance–Dissatisfaction Model: High Accuracy Group, Time 6 (N=275)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.3866***	.4415***		.2330***	.3200***	.3202***
Expect	.2402***	.2625***		.1907***	.2245***	.2126***
Dissat	-.0462	-.1185*		.0795	-.0365	-.0416
Skills		-.0476			-.0664	-.0645
Perf		-.1476*			-.2411***	-.2370***
PfxDis					.1168*	
R	.5189	.5351		.3346	.3949	.4117
adj R^2	.2612	.2730		.1021	.1403	.1509
Expect						
Skills	.3084***	.2526***	.2228***	.1760**	.0996	.0687
Perf	.1658**	.0739	.0754	.1163	-.0054	-.0094
Dissat		-.1058	.0678		-.1280	.0746
Goals		.1634**	.1585**		.2342***	.2273***
Acc			-.1561*			-.1294*
DisxAcc			-.2613*			-.2947**
R	.3881	.4208	.4500	.2361	.3262	.3634
adj R^2	.1444	.1649	.1847	.0488	.0932	.1126
Goals						
Skills	.2438***	.2664***		.1180	.1270*	
Perf	.2855***	.3497***		.1464*	.1719*	
Dissat		.1500*			.0595	
R	.4232	.4429		.2117	.2180	
adj ^{2}	.1731	.1873		.0378	.0370	
Skills						
Perf	.2741***	.1902**	.1739	.1648**	.0621	
Dissat		-.1788**	.0579		-.2188**	
Acc			-.1320*			
DisxAcc			-.3337*			
R	.2741	.3163	.3645	.1648	.2539	
adj R^2	.0717	.0935	.1200	.0236	.0576	
Dissatisf						
Perf	-.4692***	-.4692***				
R	.4692	.4692				
adj R^2	.2139	.2137				

Appendix 6.2:

Motivation Model

High Accuracy Group Regressions

Appendix 6.2a: Motivation Model, High Accuracy Group, Time 3 (N=315)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-action
Effort						
Goals	.3261***	.2796***	.2650***	.3185***	.3434***	
Motiv	.2930***	.3224***	.3268***	.2391***	.1991***	
Expect	.1537**	.1268*	.1226*		.0658	
Skills		.0678	.0613		.0243	
Give Up		.0744	.0683		.0316	
Dissat		-.0065	-.0095		-.0024	
Perf		.1042	-.0583		-.1082	
Acc			-.0142			
PfxAcc			.2061*			
R	.5060	.5186	.5309	.4089	.4239	
adj R^2	.2489	.2523	.2606	.1619	.1610	
Expect						
Skills	.2442***	.2216***		.1403*	.1204	
Perf	.2278***	.1074		.1095	.0337	
Motiv	.1509**	.1765**			.1301*	
Dissat		-.1338			-.1357	
Goals		.0446			-.0099	
Give Up		-.0631			-.0776	
R	.3877	.4074		.2034	.2574	
adj R^2	.1421	.1497		.0352	.0481	
Goals						
Skills	.2630***	.2636***	.2553***	.1063	.1041	
Motiv	.1484***	.1391*	.1440**	.1214*	.1252*	
Perf	.3300***	.3503***	.1923	.3027***	.2885***	
Dissat		.0354	.0293		-.0148	
Give Up		.0000	.0000		-.0145	
Acc			-.0779			
PfxAcc			.1993*			
R	.4770	.4777	.4920	.3425	.3430	
adj R^2	.2201	.2157	.2248	.1088	.1034	
Skills						
Give Up	-.1511*	-.1501*				
Perf	.2505***	.2841***		-.2992***	-.2239***	
Dissat		.0092			.1908**	
Motiv		.0960			.0045	
					.0477	
R	.3436	.3564		.2992	.3413	
adj ^{2}	.1124	.1158		.0866	.1051	

Appendix 6.2a cont: Motivation Model, High Accuracy Group, Time 3.

	Levels Analysis βs			Change Analysis βs
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	not relevant
Motivation				
Dissat	.4265***	.4442***		
Perf		−.0302		
Give Up		−.0924		
R	.4265	.4343		
adj R^2	.1793	.1808		
Give Up				
Perf	−.2850***	−.2850***	−.3082***	
Dissat	.2199***	.2199***	.2091***	
PfxDis			−.1301**	
R	.4604	.4604	.4783	
adj R^2	.2069	.2069	.2213	
Dissat				
Perf	−.6570***	−.6570***		
R	.6570	.6570		
adj R^2	.4299	.4299		

Appendix 6.2b: Motivation Model, High Accuracy Group, Time 4

Criteria / *Predictors*	Levels Analysis βs: Predicted Paths	Levels Analysis βs: Omitted Paths	Levels Analysis βs: Interactions	Change Analysis βs: Predicted Paths	Change Analysis βs: Omitted Paths	Change Analysis βs: Interactions
Effort						
Goals	.2732***	.2564***	.2518***	.2710***	.2462***	.2953***
Motiv	.2533***	.2567***	.2848***	.1324*	.1136	.1053
Expect	.2056***	.1916**	.1785**		.1776**	.1980**
Skills		.0204	.0275		−.0261	−.0419
Give Up		.0462	.0454		.0754	.0454
Dissat		−.0057	−.0060		.0189	−.0787
Perf		.0626	.0918		.0591	.1394
PfxMot			−.1229*			
Acc						−.0268
PfxAcc						−.2597***
R	.4946	.4985	.5120	.3325	.3850	.4316
adj R^2	.2356	.2274	.1398	.1036	.1243	.1566
Expect						
Skills	.2909***	.2749***	.2642***	.1888**	.1806**	.1682*
Perf	.1861**	.1433	.1264	.1585*	.0985	.0788
Motiv	.0156	.0327	.0182		.0577	.0408
Dissat		−.1025	−.0633		−.1812*	−.1353
Goals		.0397	.0386		−.0066	−.0079
Give Up		.0435	.0369		.0625	.0547
PfxDis			−.1383*			−.1614*
R	.3727	.3829	.4041	.2667	.3040	.3393
adj R^2	.1287	.1261	.1398	.0638	.0706	.0903
Goals						
Skills	.3068***	.3057***	.2892***	.2058***	.1899**	
Motiv	.2538***	.2339***	.2179***	.2729***	.2794***	
Perf	.2624***	.2811***	.2570***	.1201*	.0929	
Dissat		.0856	.3681***		.0150	
Give Up		−.0602	−.0826		−.0985	
Acc			−.0544			
DisxAcc			−.3250**			
R	.5148	.5207	.5437	.3859	.3957	
adj R^2	.2563	.2567	.2758	.1389	.1398	
Skills						
Give Up	−.1865**	−.1789**				
Perf	.1006	.0557		−.1445*	−.1036	
Dissat		−.1194			−.0678	
Motiv		.1840**			−.2070**	
					.1112	
R	.2437	.3011		.1445	.2252	
adj ^{2}	.0520	.0762		.0170	.0356	

Appendix 6.2b cont: Motivation Revision, High Accuracy Group, Time 4.

	Levels Analysis βs			Change Analyses
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	not relevant
Motivation				
Dissat	.3299***	.3931***	.3827***	
Perf		.1375	.1171	
Give Up		.0160	.0355	
Skillp			.1353*	
R	.3299	.3498	.3739	
adj R^2	.1054	.1119	.1261	
Give Up				
Perf	-.2559***	-.2559***	-.2381***	
Dissat	.2563***	.2563***	.2543***	
Skillsp			-.1494*	
SkpxDis			-.1234*	
R	.4441	.4441	.4747	
adj R^2	.1909	.1909	.2130	
Dissat				
Perf	-.5037***	-.5037***		
R	.5037	.5037		
adj R^2	.2508	.2508		

Appendix 6.2c: Motivation Model, High Accuracy Group, Time 5

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.2147***	.1824**		.1795**	.1599*	
Motiv	.3765***	.4111***		.2367**	.2324***	
Expect	.2165***	.1758**			.1148	
Skills		-.0000			.0517	
Give Up		.0685			-.0198	
Dissat		-.0472			-.0257	
Perf		.1454*			-.0267	
R	.5534	.5725		.3363	.3658	
adj R^2	.2979	.3087		.1061	.1093	
Expect						
Skills	.2796***	.3048***		.1344*	.1759**	
Perf	.2402***	.2736***		.0912	.1652*	
Motiv	.1157*	.1521*			.1725**	
Dissat		.0046			.0222	
Goals		-.1238			-.2361***	
Give Up		.0035			-.0065	
R	.4190	.4334		.1773	.2949	
adj R^2	.1657	.1682		.0237	.0649	
Goals						
Skills	.1951***	.1773**	.1930**	.0752	.0482	.0945
Motiv	.3013***	.2836***	.2854***	.2018**	.2069**	.2006
Perf	.2412***	.2280***	.4705***	.0584	-.0064	.0604
Dissat		.0760	.0683		-.0337	-.0500
Give Up		-.1427*	-.1251		-.1337	-.1575
Acc			.1251*			.2033**
PfxAcc			-.2866**			-.4211***
R	.4483	.4653	.4938	.2188	.2616	.3644
adj R^2	.1914	.2007	.2224	.0403	.0497	.1082
Skills						
Give Up	-.2022**	-.1796**				
Perf	.1264	.0993		-.1798**	-.1215	
Dissat		-.0750			-.0463	
Motiv		.0612			-.1731*	
					.1784**	
R	.2775	.2872		.1798	.2659	
adj ^{2}	.0697	.0678		.0285	.0558	

Appendix 6.2c cont: Motivation Model, High Accuracy Group, Time 5.

	Levels Analysis βs			Change Analyses
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	not relevant
Motivation				
Dissat	.2381***	.3214***		
Perf		.0587		
Give Up		-.1164		
R	.2381	.2685		
adj R^2	.0529	.0610		
Give Up				
Perf	-.2183***	-.2183***		
Dissat	.3299***	.3299**		
R	.4831	.4831		
adj R^2	.2273	.2273		
Dissat				
Perf	-.5339***	-.5339***		
R	.5339	.5339		
adj R^2	.2896	.2896		

Appendix 6.2d: Motivation Model, High Accuracy Group, Time 6

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.3450***	.3881***		.2397***	.2887***	
Motiv	.2499***	.2554***		.1971***	.1514**	
Expect	.2222***	.2234***			.1995**	
Skills		−.0449			−.0781	
Give Up		.0246			−.0798	
Dissat		−.1591*			−.0197	
Perf		−.1141			−.2369***	
R	.5713	.5882		.3397	.4260	
adj R^2	.3264	.3288		.1089	.1600	
Expect						
Skills	.2956***	.2440***		.1760**	.0902	.0579
Perf	.1779**	.0848		.1163	.0086	.0074
Motiv	.1514**	.1365*			.1628**	.1654**
Dissat		.1111			−.1368	.0484
Goals		.1315*			.1962**	.1903**
Give Up		−.0195			−.0176	−.0305
Acc						−.1545*
DisxAcc						−.2694*
R	.4163	.4414		.2361	.3625	.3699
adj R^2	.1642	.1768		.0488	.1120	.1319
Goals						
Skills	.2265***	.2473***		.1021	.1111	
Motiv	.2056***	.1928***		.1893**	.1862**	
Perf	.3020***	.3552***		.1616**	.1801**	
Dissat		.1205			.0235	
Give Up		.0074			.0247	
R	.4701	.4821		.2834	.2856	
adj R^2	.2123	.2182		.0701	.0645	
Skills						
Give Up	−.2342***	.1912**	−.1986**	−.2613***	−.1679*	
Perf	.1778**	.1530*	.1382*		.0295	
Dissat		−.1012	.1310		−.1522*	
Motiv		.0887	.1672		.0916	
Acc			−.1473*			
DisxAcc			−.3246**			
R	.3474	.3652	.4076	.2613	.3043	
adj ^{2}	.1142	.1205	.1475	.0648	.0791	

Appendix 6.2d cont: Motivation Model, High Accuracy Group, Time 6.

	Levels Analysis βs			Change Analyses
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	not relevant
Motivation				
Dissat	.1183*	.1415		
Perf		-.0122		
Give Up		-.0524		
R	.1183	.1258		
adj R^2	.0104	.0049		
Give Up				
Perf	-.1951**	-.1951***	-.1987***	
Dissat	.4605***	.4605**	.4664***	
PfxDis			-.1794***	
R	.5783	.5783	.6054	
adj R^2	.3295	.3295	.3595	
Dissat				
Perf	-.4692***	-.4692***		
R	.4692	.4692		
adj R^2	.2173	.2173		

Appendix 6.3:

Performance–Dissatisfaction Model
Low Accuracy Group Regressions

Appendix 6.3a: Performance–Dissatisfaction Model, Low Accuracy Group, Time 3 (N=215)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.2511***	.2924***	.3158***	.2572***	.3235**	.3445***
Expect	.3205***	.3267***	.3272***	.3185***	.3288***	.3305***
Dissat	.2826***	.1918**	.1865**	.1716**	.0269	.0276
Skills		−.0225	−.0387		−.0378	−.0421
Perf		−.1532*	.2241		−.2441**	.0618
Acc			.0526			.0797
PfxAcc			.4550***			.3479*
R	.5448	.5586	.5922	.4921	.5298	.5508
adj R^2	.2869	.2955	.3287	.2314	.2635	.2798
Expect						
Skills	.2571***	.2152**		.1925**	.1813*	
Perf	.0378	.0248		.0139	−.0040	
Dissat		.0122			−.0222	
Goals		.1344			.0374	
R	.2619	.2919		.1938	.1970	
adj R^2	.0598	.0678		.0285	.0205	
Goals						
Skills	.3101***	.3050***		.2046**	.2015**	
Perf	.1474*	.3097***		.1155	.2135**	
Dissat		.2893***			.1747*	
R	.3508	.4248		.2406	.2807	
adj ²	.1148	.1688		.0490	.0657	
Skills						
Perf	.0564	.0706	.0131	.0026	.0291	−.0534
Dissat		.0255	.0767		.0473	.1207
PfxDis			.1856*			.2657***
R	.0564	.0602	.1698	.0026	.0393	.2307
adj R^2	−.0015	−.0058	.0288	−.0047	−.0079	.0397
Dissatisf						
Perf	−.5599***	−.5599***				
R	.5599	.5599				
adj R^2	.3103	.3103				

Appendix 6.3b: Performance–Dissatisfaction Model, Low Accuracy Group, Time 4 (N=231)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.2801***	.3141***	.3367***	.1540*	.2021**	
Expect	.2575***	.2917***	.2947***	.0909	.1548*	
Dissat	.2645***	.2059***	.1856**	.1435*	.0204	
Skills		−.0249	−.0084		.0246	
Perf		−.1341	−.1268		−.3042***	
PfxDis			−.1334*			
R	.4549	.4697	.4864	.2264	.3476	
adj R^2	.1964	.2033	.2126	.0387	.1013	
Expect						
Skills	.1314*	.1894**		.0100	.0892	
Perf	.2140***	.2781***		.1470*	.1926**	
Dissat		−.1078			.0377	
Goals		−.1519*			−.2306**	
R	.2651	.3100		.1486	.2592	
adj R^2	.0621	.0801		.0135	.0507	
Goals						
Skills	.3325***	.3417***	.3135***	.2668***	.2706***	
Perf	.1306*	.1852**	.1711*	.0773	.0996	
Dissat		.1329*	.1524*		.0543	
PfxDis			.1529*			
R	.3725	.3914	.4180	.2871	.2913	
adj ²	.1312	.1420	.1601	.0744	.0728	
Skills						
Perf	.1280	.0934	.0728	.0743	.0715	
Dissat		−.0826	−.0556		−.0066	
PfxDis			.1891*			
R	.1280	.1484	.2370	.0743	.0745	
adj R^2	.0121	.0134	.0437	.0012	−.0032	
Dissatisf						
Perf	−.4195***	−.4195***				
R	.4195	.4195				
adj R^2	.8240	.8240				

Appendix 6.3c: Performance–Dissatisfaction Model, Low Accuracy Group, Time 5 (N=206)

Criteria / *Predictors*	Levels Analysis βs: Predicted Paths	Levels Analysis βs: Omitted Paths	Levels Analysis βs: Interactions	Change Analysis βs: Predicted Paths	Change Analysis βs: Omitted Paths	Change Analysis βs: Interactions
Effort						
Goals	.4433***	.4226***		.3629***	.3732***	
Expect	.1249*	.1110		.0726	.0770	
Dissat	.2267***	.2260**		.1322*	.0886	
Skills		.0648			.0193	
Perf		−.0021			−.0919	
R	.5053	.5089		.3884	.3967	
adj R^2	.2444	.2406		.1383	.1365	
Expect						
Skills	.2126**	.2461***		.2150**	.2564***	
Perf	.1003	.1343		.1031	.1211	
Dissat		.0312			−.0108	
Goals		−.1065			−.1306	
R	.2398	.2600		.2433	.2724	
adj R^2	.0483	.0492		.0500	.0559	
Goals						
Skills	.3162***	.3159***		.0519	.0521	
Perf	.1789**	.2178**		.0743	.0475	
Dissat		.0824			−.0553	
R	.3710	.3779		.0928	.1047	
adj ^{2}	.1292	.1302		−.0011	−.0036	
Skills						
Perf	.0530	.0558		.0920	.0638	
Dissat		.0057			−.0583	
R	.0530	.0532		.0920	.1052	
adj R^2	−.0020	−.0069		.0037	.0014	
Dissatisf						
Perf	−.4848***	−.4848***				
R	.4848	.4848				
adj R^2	.2312	.2312				

Appendix 6.3d: Performance–Dissatisfaction Model, Low Accuracy Group, Time 6 (N=171)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.3265***	.3307***		.1403	.1668*	
Expect	.1938**	.2163**		.1279	.1596*	
Dissat	.2114**	.1467		.1645*	.1070	
Skills		−.0165			−.1011	
Perf		−.1573*			−.1126	
R	.4490	.4715		.2567	.2919	
adj R^2	.1873	.1987		.0491	.0575	
Expect						
Skills	.2247**	.1825*		.1702*	.1157	
Perf	.1030	.1355		.0793	.0812	
Dissat		.1040			.0260	
Goals		.1736*			.1829*	
R	.2560	.3157		.1945	.2606	
adj R^2	.0544	.0708		.0264	.0454	
Goals						
Skills	.3148***	.3074***		.1412	.1371	
Perf	.0444	.0203		.1086	.0956	
Dissat		−.0623			−.0337	
R	.3221	.3271		.1861	.1886	
adj ²	.0931	.0909		.0232	.0183	
Skills						
Perf	.0957	.0398		.0719	.0310	.1235
Dissat		−.1408			−.1029	−.1278
PfxDis						−.1742*
R	.0957	.1608		.0719	.1187	.2059
adj R^2	.0033	.0143		−.0007	.0023	.0252
Dissatisf						
Perf	−.3976***	−.3976***				
R	.3976	.3976				
adj R^2	.1531	.1531				

Appendix 6.4:

Motivation Model

Low Accuracy Group Regressions

Appendix 6.4a: Motivation Model, Low Accuracy Group, Time 3 (N=215)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.1752**	.2428***	.2676***	.2395***	.2807***	.3027***
Motiv	.3685***	.2743***	.2593***	.3279***	.2370***	.2241**
Expect	.2796***	.3002***	.3018***		.3059***	.3085***
Skills		−.0157	−.0233		−.0320	−.0357
Give Up		.1226	.1225		.1057	.1048
Dissat		.0571	.0561*		−.0895	−.0848
Perf		−.0777	.2838*		−.1788*	.0960
Acc			.0372			.0633
PfxAcc			.4185**			.3163*
R	.5823	.6098	.6365	.4630	.5704	.5864
adj R^2	.3296	.3506	.3790	.2069	.3025	.3150
Expect						
Skills	.2296***	.2036**				
Perf	.0980	.0544		.1925**	.1716*	
Motiv	.1632*	.1400		.0139	.0258	
Dissat		−.0330			.1357	
Goals		.0920			−.0690	
Give Up		−.0088			−.0018	
					.0000	
R	.3017	.3129		.1938	.2252	
adj R^2	.0781	.0719		.0285	.0233	
Goals						
Skills	.2458***	.2041***				
Motiv	.3823***	.3190***		.1486*	.1058	
Perf	.2886***	.3118***		.3328***	.3086***	
Dissat		.2098**		.2385***	.2171**	
Give Up		−.2105**			.0954	
					−.1952**	
R	.4961	.5414		.3888	.4259	
adj R^2	.2354	.2762		.1391	.1618	
Skills						
Give Up	−.2632***	−.2663***				
Perf	−.0360	.0387		−.1538*	−.1823*	−.1648*
Dissat		−.0149			.0077	−.0670
Motiv		.1875*			.0381	.1126
PfxDis					.1328	.1050
						.2395***
R	.2528	.3104		.1538	.2144	.2952
adj ^{2}	.0551	.0791		.0191	.0278	.0653

Appendix 6.4a cont: Motivation Model, Low Accuracy Group, Time 3.

	Levels Analysis βs			Change Analysis βs
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	not relevant
Motivation				
Dissat	.4979***	.4566***		
Perf		-.1374		
Give Up		-.0943		
R	.4979	.5146		
adj R^2	.2443	.2544		
Give Up				
Perf	-.2031**	-.2031**	-.1901*	
Dissat	.2640***	.2640***	.2612*	
Skillsp			-.1746**	
R	.4136	.4136	.4487	
adj R^2	.1632	.1632	.1899	
Dissat				
Perf	-.5599***	-.5599***		
R	.5599	.5599		
adj R^2	.3103	.3103		

Appendix 6.4b: Motivation Model, Low Accuracy, Time 4 (N=231)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.2476***	.2782***	.2998***	.1203	.1613*	
Motiv	.3088***	.2279***	.2191***	.2878***	.2112**	
Expect	.2192***	.2560***	.2600***		.1182	
Skills		-.0071	.0067		.0290	
Give Up		.0289	.0243		-.0735	
Dissat		.1194	.1054		-.0323	
Perf		-.0888	-.0844		-.2754***	
PfxDis			-.1208*			
R	.4799	.5088	.5215	.3242	.4062	
adj R^2	.2202	.2356	.2457	.0972	.1388	
Expect						
Skills	.1331*	.1956**		.0100	.0908	
Perf	.2586***	.3037***		.1470*	.2128**	
Motiv	.1667*	.1843**			.1821**	
Dissat		.0406			-.0191	
Goals		-.1781*			-.2590***	
Give Up		.0017			-.0338	
R	.3099	.3506		.1486	.3108	
adj R^2	.0841	.0994		.0135	.0724	
Goals						
Skills	.3343***	.3335***	.3057***	.2687***	.2600***	
Motiv	.1749**	.1402*	.1468*	.1929**	.1887**	
Perf	.1774**	.1947**	.1822**	.1289**	.1128	
Dissat		.0898	.1052		-.0047	
Give Up		-.0390	-.0321		-.0495	
PfxDis			.1560*			
R	.4088	.4153	.4414	.3420	.3453	
adj R^2	.1561	.1541	.1733	.1053	.0997	
Skills						
Give Up	-.1811**	-.1775*	-.1638*			
Perf	.0766	.0609	.0446	-.0828	-.0536	
Dissat		-.0254	-.0068		.0706	
Motiv		-.0224	-.0140		-.0201	
PfxDis			.1791**		.0745	
R	.2157	.2188	.2799	.0828	.1185	
adj ^{2}	.0382	.0310	.0579	.0025	-.0034	

Appendix 6.4b cont: Motivation Model, Low Accuracy Group, Time 4.

	Levels Analysis βs			Change Analysis βs
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	not relevant
Motivation				
Dissat	.4256***	.4410***		
Perf		-.1474*		
Give Up		-.2239***		
R	.4256	.4837		
adj R^2	.1775	.2238		
Give Up				
Perf	-.1693*	-.1693*	-.1602*	
Dissat	.2742***	.2742***	.2589***	
Skillsp			-.1468*	
R	.3778	.3778	.4048	
adj R^2	.1353	.1353	.1528	
Dissat				
Perf	-.4195***	-.4195***		
R	.4195	.4195		
adj R^2	.1724	.1724		

Appendix 6.4c: Motivation Model, Low Accuracy, Time 5 (N=208)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.3776***	.3763***		.3268***	.3514***	
Motiv	.3336***	.2899***		.1817**	.1477	
Expect	.1383*	.1310*			.0891	
Skills		.0282			-.0067	
Give Up		.0156			-.0373	
Dissat		.0899			.0323	
Perf		.0174			-.0890	
R	.5581	.5640		.4009	.4189	
adj R^2	.3013	.2942		.1526	.1466	
Expect						
Skills	.2265***	.2612***		.2150**	.2621***	
Perf	.0794	.1333		.1031	.1176	
Motiv	-.0809	-.0866			-.0492	
Dissat		.0610			.0115	
Goals		-.0933			-.1225	
Give Up		.0322			-.0000	
R	.2519	.2731		.2433	.2755	
adj R^2	.0497	.0469		.0500	.0483	
Goals						
Skills	.2839***	.2909***				
Motiv	.1883**	.2015**		.0390	.0357	
Perf	.2265***	.2339**		.0749	.1233	
Dissat		-.0306		.0936	.0561	
Give Up		.0657			-.1220	
					.0321	
R	.4121	.4164		.1171	.1488	
adj R^2	.1576	.1529		-.0008	-.0021	
Skills						
Give Up	-.1519*	-.1318				
Perf	.0085	.0403		-.2919***	-.2631***	
Dissat		-.0465			.0284	
Motiv		.1944*			-.0731	
					.1963*	
R	.1546	.2328		.2919	.3385	
adj ^{2}	.0144	.0355		.0808	.0972	

Appendix 6.4c cont: Motivation Model, Low Accuracy Group, Time 5.

Criteria / *Predictors*	Levels Analysis βs: Predicted Paths	Levels Analysis βs: Omitted Paths	Levels Analysis βs: Inter-actions	Change Analysis βs
				not relevant
Motivation				
Dissat	.4773***	.5160***	.5354***	
Perf		−.0491	−.2125	
Give Up		−.1711**	−.1785**	
Acc			.1335*	
PfxAcc			.2997*	
R	.4773	.5031	.5296	
adj R^2	.2241	.2421	.2627	
Give Up				
Perf	−.1518*	−.1518*		
Dissat	.2916***	.2916***		
R	.3886	.3886		
adj R^2	.1427	.1427		
Dissat				
Perf	−.4848***	−.4848***		
R	.4848	.4848		
adj R^2	.2312	.2312		

Appendix 6.4d: Motivation Revision, Low Accuracy, Time 6 (N=171)

	Levels Analysis βs			Change Analysis βs		
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	Predicted Paths	Omitted Paths	Inter-actions
Effort						
Goals	.2471***	.2813***		.1304	.1668*	
Motiv	.2755***	.2133**		.0914	-.0000	
Expect	.1715*	.2005**			.1614*	
Skills		-.0231			-.0944	
Give Up		.0618			.0531	
Dissat		.0309			.0890	
Perf		-.1367			-.1022	
R	.4787	.5106		.1747	.2955	
adj R^2	.2153	.2289		.0190	.0481	
Expect						
Skills	.2085**	.1676*		.1702*	.1027	
Perf	.1324	.1288		.0793	.0782	
Motiv	.1538*	.1056			.1102	
Dissat		.0726			-.0134	
Goals		.1476			.1558	
Give Up		-.0477			-.0304	
R	.2969	.3301		.1945	.2778	
adj R^2	.0718	.0764		.0264	.0434	
Goals						
Skills	.2932***	.2599***				
Motiv	.2056**	.2768***		.1274	.1076	
Perf	.0837	.0208		.1308	.1734*	
Dissat		-.1731		.1336	.0961	
Give Up		-.0291			-.1036	
					-.0168	
R	.3797	.4095				
adj R^2	.1288	.1425		.1861	.2437	
				.0232	.0309	
Skills						
Give Up	-.1948*	-.1795*				
Perf	.0276	.0060		-.1355	-.1053	-.1444
Dissat		-.1578			.0098	.0603
Motiv		.1974*			-.0801	-.0480
PfxDis					.0366	-.1938*
						-.2047*
R	.2061	.2814				
adj ^{2}	.0311	.0570		.1355	.1528	.3025
				.0126	-.0002	.0640

Appendix 6.4d cont: Motivation Model, Low Accuracy Group, Time 6.

	Levels Analysis βs			Change Analyses
Criteria *Predictors*	Predicted Paths	Omitted Paths	Inter-actions	not relevant
Motivation				
Dissat	.4208***	.3911***	.4006***	
Perf		-.0034	-.0033	
Give Up		.0640	.0881	
Skillsp			.1829***	
R	.4208	.4248	.4616	
adj R^2	.1722	.1657	.1941	
Give Up				
Perf	-.2066**	-.2066**	-.1847*	
Dissat	.3605***	.3605***	.0048	
Acc			-.1539*	
DisxAcc			-.3970*	
R	.4815	.4815	.5452	
adj R^2	.2227	.2227	.2803	
Dissat				
Perf	-.3976***	-.3976***		
R	.3976	.3976		
adj R^2	.1531	.1531		

Appendix 6.5:

Correlation Matrices for Accuracy Groups

Appendix 6.5a: Correlation Matrix for High Accuracy Group.

	Effort	Expect	Goals	Skills	Motiv	Give Up	Dissat	Perf
Effort3	***.6031***	.2494	.3756	.2271	.3249	−.0381	.0005	.1439
Expect3	.1301	***.5584***	.2147	.3167	.0876	−.2131	−.2085	.2622
Goals3	.3320	.0945	***.5857***	.3678	.0564	−.1906	−.1877	.3711
Skill3	.1305	.1749	.2023	***.7261***	.0044	−.2587	−.1977	.3154
Motiv3	.2570	.0548	.0364	−.0270		.1014	.4265	−.2824
Give Up3	.0115	−.1634	−.1587	−.2994			.4072	−.4295
Dissat3	.0835	−.1559	−.1774	−.1917				−.6570
Perf2	−.0240	.1537	.3019	.2706				
Effort4	***.6260***	.2682	.3822	.2129	.3358	−.0232	.0125	.1557
Expect4	.2342	***.4604***	.1939	.3249	.0383	−.1164	−.1919	.2353
Goals4	.3072	.1056	***.6691***	.3826	.2733	−.1776	−.0496	.2983
Skills4	.1329	.2162	.2594	***.7626***	.1204	−.2253	−.1556	.1724
Motiv4	.2065	.0184	.2897	.0356	***.4763***	.1144	.3299	−.0666
Give Up4	.0252	−.0781	−.1395	−.1445		***.3735***	.3852	−.3850
Dissat4	.0353	−.2155	−.0072	−.1760			***.2751***	−.5037
Perf3	−.0087	.1911	.1374	.0689				
Effort5	***.6608***	.2726	.3396	.1415	.4629	−.0415	−.0372	.2147
Expect5	.1677	***.6313***	.0688	.3332	.1097	−.1487	−.1535	.2091
Goal5	.2487	−.0977	***.6189***	.2557	.2922	−.2422	−.0763	.2612
Skill5	.1436	.1532	.0945	***.8148***	.0360	−.2521	−.1937	.2061
Motiv5	.2892	.1041	.2006	.1398	***.4782***	.0039	.2381	−.0669
Give Up5	−.0887	−.0482	−.1575	−.1798		***.3824***	.4465	−.3945
Dissat5	−.0047	−.0439	−.0500	−.1602			***.2153***	−.5339
Perf4	.0650	.1189	.0604	.0821				
Effort6	***.6506***	.3586	.4578	.1788	.3552	−.0957	−.1326	.1163
Expect6	.2382	***.4700***	.2798	.3538	.1596	−.2051	−.2221	.2503
Goal6	.2796	.2745	***.6319***	.3221	.2024	−.1422	−.0855	.3523
Skill6	.0598	.2079	.1581	***.7714***	.0621	−.3073	−.2681	.2541
Motiv6	.2456	.1909	.1864	.0667	***.4391***	.0307	.1183	−.0571
Give Up6	−.0466	−.1472	−.0648	−.2613		***.5070***	.5520	−.4112
Dissat6	.0172	−.1722	−.0552	−.2479			***.2795***	−.4692
Perf5	−.0733	.1645	.1788	.1648				

Note. Across-time corrs on diagonal with level corrs above and change below

Appendix 6.5b: Correlation Matrix for Low Accuracy Group.

	Effort	Expect	Goals	Skills	Motiv	Give Up	Disat	Perf
Effort3	***.4541***	.3757	.3494	.1440	.4688	.1200	.3139	−.1966
Expect3	.3739	***.4232***	.2083	.2592	.1617	−.0968	.0103	.0522
Goal3	.3427	.0920	***.4812***	.3184	.3147	−.2515	.1116	.1649
Skill3	.1363	.1933	.2111	***.6478***	.1473	−.2506	−.0141	.0564
Motiv3	.4033	.1169	.2689	.1259		.1264	.4979	−.3599
Give Up3	.0725	−.0599	−.2228	−.1538			.3778	−.3510
Dissat3	.2036	−.0182	.0523	.0310				−.5599
Perf2	−.1907	.0248	.1271	.0026				
Effort4	***.6573***	.2384	.2744	.0889	.3566	.0289	.2596	−.1020
Expect4	.0808	***.7424***	−.0361	.1588	.0913	−.0917	−.0340	.2308
Goal4	.1527	−.1656	***.5870***	.3492	.1124	−.1352	.0137	.1732
Skill4	.0783	.0288	.2767	***.7526***	−.0443	−.2029	−.1217	.1280
Motiv4	.3013	.0846	.1464	.0485	***.4224***	−.0298	.4256	−.2687
Give Up4	−.0511	−.0898	−.1415	−.0828		***.3669***	.3452	−.2843
Dissat4	.1425	−.0572	−.0204	−.0366			***.2439***	−.4195
Perf3	−.2389	.1483	.1114	.0743				
Effort5	***.6505***	.1163	.4364	.2217	.3914	.0254	.2090	−.0136
Expect5	.0674	***.4335***	−.0011	.2179	−.0649	−.0227	−.0360	.1115
Goal5	.3589	−.0232	***.7104***	.3257	.1767	−.0525	−.0299	.1946
Skill5	.1508	.2205	.0558	***.7742***	.1580	−.1544	−.0213	.0530
Motiv5	.2394	−.0532	.0578	.1460	***.4655***	.0317	.4773	−.2490
Give Up5	−.0142	−.0663	−.0305	−.2919		***.3735***	.3652	−.2932
Dissat5	.1188	−.0711	−.0794	−.0892			***.3176***	−.4848
Perf4	−.0526	.1145	.0770	.0920				
Effort6	***.7143***	.2689	.3460	.1017	.3542	.1338	.1729	−.1656
Expect6	.1603	***.4229***	.2296	.2346	.1479	−.0845	.0010	.1245
Goal6	.1501	.2228	***.6878***	.3191	.2159	−.1002	−.1185	.0745
Skill6	−.0379	.1778	.1515	***.8092***	.0871	−.2044	−.1566	.0957
Motiv6	.1196	.1257	.1177	−.0240	***.5163***	.2383	.4208	−.1813
Give Up6	.1170	−.0740	−.0770	−.1355		***.3430***	.4426	−.3499
Dissat6	.1480	−.0461	−.0932	−.1152			***.3801***	−.3976
Perf5	−.1325	.0956	.1221	.0719				

Note. Across time corrs on diagonal, with levels corrs above and change below.

Appendix 6.6:

Descriptive Data for Accuracy Groups

Appendix 6.6a: High Accuracy Group Descriptive Data, Time 3 - 6.

Variables		Time 3 (N=315)	Time 4 (N=257)	Time 5 (N=255)	Time 6 (N=275)
Effort (current)	m	.19	.06	.19	.16
	sd	*2.63*	*2.55*	*2.79*	*1.78*
Effort (previous)	m	.33	.23	.40	.24
	sd	*2.43*	*2.63*	*2.72*	*2.55*
Effort Change	m	-.01	-.10	-.08	-.01
	sd	*2.12*	*2.01*	*2.11*	*1.99*
Expectancy (current)	m	6.41	6.33	6.16	6.23
	sd	*1.62*	*1.60*	*1.76*	*1.78*
Expectancy (previous)	m	6.91	6.15	6.57	6.20
	sd	*1.59*	*1.58*	*1.55*	*1.72*
Expectancy Change	m	2.82	3.43	1.47	3.24
	sd	*1.34*	*1.42*	*1.37*	*1.57*
Goals (current)	m	13.62	13.62	13.37	13.11
	sd	*2.29*	*2.27*	*2.34*	*2.33*
Goals (previous)	m	14.40	13.44	13.65	13.28
	sd	*1.98*	*2.29*	*2.28*	*2.26*
Goal Change	m	4.91	4.62	4.69	4.45
	sd	*1.85*	*1.67*	*1.84*	*1.82*
Skill Ratings (current)	m	4.05	4.01	4.03	4.12
	sd	*.60*	*.61*	*.61*	*.62*
Skill Ratings (previous)	m	4.17	3.94	4.07	4.05
	sd	*.53*	*.63*	*.59*	*.60*
Skill Ratings Change	m	.68	1.14	.60	.89
	sd	*.46*	*.40*	*.36*	*.40*
Motivation	m	2.95	2.85	2.66	2.63
	sd	*.77*	*.79*	*.79*	*.82*
Give Up	m	1.33	1.48	1.48	1.35
	sd	*.71*	*.74*	*.82*	*.68*
Dissatistaction	m	2.04	2.39	1.99	1.73
	sd	*1.00*	*1.00*	*.91*	*.79*
Performance (previous)	m	13.31	11.13	12.98	14.71
	sd	*3.05*	*2.90*	*2.94*	*2.62*
Accuracy Ratings	m	3.23	3.23	3.25	3.25
	sd	*.42*	*.43*	*.43*	*.43*

Appendix 6.6b: Low Accuracy Group Descriptive Data, Time 3 – 6.

Variables		Time 3 (N=215)	Time 4 (N=231)	Time 5 (N=208)	Time 6 (N=171)
Effort (current)	m	–.18	.07	–.10	–.30
	sd	*2.64*	*2.80*	*2.63*	*3.10*
Effort (previous)	m	–.23	.05	–.22	–.29
	sd	*2.50*	*2.54*	*2.60*	*2.85*
Effort Change	m	–.05	.03	.05	–.08
	sd	*2.36*	*2.11*	*2.01*	*2.18*
Expectancy (current)	m	6.11	6.44	6.01	6.03
	sd	*1.46*	*1.64*	*1.67*	*1.64*
Expectancy (previous)	m	6.59	6.52	6.26	5.98
	sd	*1.51*	*1.40*	*1.64*	*1.70*
Expectancy Change	m	2.69	3.44	3.27	3.58
	sd	*1.33*	*1.43*	*1.50*	*1.49*
Goals (current)	m	12.88	13.53	12.95	12.77
	sd	*2.06*	*2.24*	*2.18*	*2.23*
Goals (previous)	m	13.77	13.28	13.49	13.04
	sd	*2.10*	*2.18*	*2.19*	*2.27*
Goal Change	m	4.56	4.62	3.40	3.95
	sd	*1.82*	*1.68*	*1.53*	*1.63*
Skill Ratings (current)	m	3.84	4.01	3.83	3.87
	sd	*.62*	*.61*	*.71*	*.68*
Skill Ratings (previous)	m	4.06	4.00	3.95	3.83
	sd	*.53*	*.61*	*.62*	*.68*
Skill Rating *Change*	m	.56	.99	.47	.79
	sd	*.47*	*.40*	*.43*	*.40*
Motivation Ratings	m	2.86	2.86	2.62	2.47
	sd	*.70*	*.79*	*.79*	*.84*
Give Up	m	1.52	1.68	1.58	1.58
	sd	*.77*	*.92*	*.82*	*.87*
Dissatisfacton	m	2.48	2.37	2.37	2.12
	sd	*.93*	*1.00*	*.98*	*.94*
Performance (previous)	m	11.55	9.81	11.25	13.31
	sd	*2.49*	*2.57*	*2.71*	*2.64*
Accuracy Ratings	m	1.73	1.62	1.71	1.67
	sd	*.45*	*.49*	*.45*	*.47*

ADDENDUM

Residuals Analysis

Potential violations of the multivariate assumptions of normality, linearity and homoscedasticity were assessed by conducting a residuals analysis on the predicted paths for the Motivation Model. Outliers were also examined. Results for the high and low accuracy groups were analysed separately using the data collected at Times 3 and 6, the first and last periods at which all variables were measured.

A graphic analysis in which standardised predicted values were plotted against standardised residuals revealed no apparent non-linear relations for any of the variables. Variability in the residuals scores was reasonably consistent across different levels of predicted values, indicating that homoscedasticity was acceptable. The residuals appeared to be normally distributed for all criteria except the single-item giving up variable which had only four response options. Although there was little difference in the number of scores which fell above or below the mean of the residuals, there was a greater spread of scores on the positive pole for both accuracy groups at both measurement periods. The non-normal distribution of the giving up residuals is likely to reflect the extreme positive skew in the frequency data which was caused by the majority of participants (73% at Time 3 and 68.3% at Time 6) reporting that their feedback did not make them feel at all like giving up. The skew will have been more severe for the high accuracy group because their mean scores for giving up were lower than those of the low accuracy group. Therefore, limitations in the measure and subject loss resulting from the time at which the measure was administered appear to contribute to the non-normal distribution of the giving up residuals.

Outliers were assessed graphically to identify cases where scores for the predicted variable were more than three standard deviations above or below the mean of the residuals. This criterion identified 13 outliers involving nine cases at Time 3 and 16 outliers among eleven cases at Time 6 for the low accuracy group. In the high accuracy group, there were 40 outliers involving 37 cases at Time 3 and 26 outliers among 22 cases at Time 6. The highest number of outliers was found for giving up (17), expectancy change (17) and expectancy level (14) and the smallest numbers were found for motivation ratings (none), goal level (two) and dissatisfaction (three). Outliers fell at both the positive and negative poles of the residuals axis in nine of the 44 analyses, and cases fell close to both the positive and negative cut-off points in most other analyses.

Outliers were also assessed using Mahalanobis Distance which measures the distance of cases from the average values of the independent variables (Norusis, 1993). This criterion identified six outliers involving three cases, and seven outliers among four cases in the low accuracy group at Times 3 and 6 respectively. There were 23 outliers involving 12 cases at Time 3 and 31 outliers among 11 cases at Time 6 in the high accuracy group. The highest number of outliers was found for skills level and change in the high accuracy group; nine cases were identified as outliers in both

the levels and change analyses at Time 3 and seven (skills change) or eight (skills level) were identified at Time 6. There were no outliers in motivation ratings, dissatisfaction, or effort change in either accuracy group at either time.

Together, these results indicate that the outliers were the only notable problem identified by the residuals analyses. Although checks of the data and command files eliminated errors in data entry or in the control language as sources of the outliers, problems with the giving up variable may have contributed to a disproportionate number of the outliers. Outliers can occur in both predictor and predicted variables (Tabachnick & Fidell, 1989) and giving up was one of two predictors of skills level and the only predictor of skills change. Therefore, skew in the frequency data and departures from normality in the distribution of the giving up residuals could account for the 17 outliers identified by the graphic analysis of giving up and the 34 outliers for skills level and change revealed by the Mahalanobis Distance analyses. Transformation of the giving up variable may have reduced the skew, improved the distribution of residuals and decreased the number of outliers. However this was considered inappropriate because the skew appears to be due to weaknesses in the single-item four-category measure and to selective sample loss arising from the times at which the measures were administered. Under such circumstances, transforming the data or altering scores for individual cases would reduce the meaningfulness of responses to the giving up question.

If outliers are caused by sampling cases from outside the intended population, they can be deleted (Tabachnick & Fidell, 1989). However, given the heterogeneous nature of the population of first year students, it is difficult to establish characteristics which could identify those from outside the population in a substantive, rather than statistical sense. If a particular sub-group tended to produce more extreme scores than the rest of the sample, the screening and deleting cycle could eliminate an entire section of the population. This may produce a sample which met the statistical assumptions, but the exclusion of a legitimate group would result in a biassed sample which did not reflect the true nature of the population.

In view of the problems discussed above, no steps were taken to either remove the outlying cases, or reduce their effect by deleting or transforming scores. The number of outlying cases represented a small proportion of the sample and outliers which exceeded four standard deviations of the mean of residuals were rare. Consequently, the inclusion of the outlying cases is unlikely to have distorted the results produced by the relatively large sample sizes used in the present study.