EFFECTS OF TEMPORAL PERSPECTIVE WIDTH ON INTUITIVE PREDICTION OF PLAYER BEHAVIOUR BY ICE-HOCKEY OFFICIALS

by

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This thesis investigates a new model of non-normative prediction that addresses the contribution of width of temporal perspective to intuitive prediction. Intuitive prediction is defined in this thesis as the non-normative prediction of other's behaviour. This new model of intuitive prediction is termed the Temporal Perspective Model (TPM). The notion of temporal perspective expands upon the understanding of intuitive prediction provided by several major social and cognitive theories of the judgement process. TPM asserts that utilisation of the triad of past temporal perspective, present temporal perspective and future temporal perspective increases accuracy of intuitive prediction in judgement contexts. Past and future temporal perspectives are used through the generation and rehearsal of both experience-acquired and novel, possible judgement strategies outside of the actual judgement context (GIOA). Present temporal perspective (PTP) plays a mediating role in the expression of the products of this process within the judgement context. TPM posits that the width of temporal perspective is influenced by perceptions of self-efficacy, which is associated with use of past and future perspectives in the generation of judgement strategies, and also by motivational style, which is associated with engagement of present temporal perspective. Five motivational styles and their associated affects are proposed as influences on present temporal perspective: aggressive motivation, conflict motivation, competitive motivation, cooperative motivation and competence motivation. The context in which TPM has been investigated is the sport environment. The subjects in this study were 118 ice-hockey officials from Vancouver's Lower Mainland. A two by two factorial design was utilised to investigate the major proposition that the temporal perspective model distinguishes individuals in terms of overall achievement in a judgement context. The overall achievement variable was the first principle component derived from an analysis of a set of nine items referring to achieved levels of officiating, number of games assigned and supervisor and peer commendations. This analysis demonstrated significant differences between levels of overall achievement on the following variables: a) engagement of past and future temporal perspectives outside of the judgement context; b) engagement of present temporal perspective within the judgement context; c) the motivational styles of cooperation and competence. Aggressive, conflict and competitive motivations did not significantly distinguish groups in terms of overall achievement. A second two by two design of past-future by present temporal perspective was implemented to investigate the
mediation of past-future temporal perspectives by present temporal perspective on the dependent variable of intuitive prediction. The variable of intuitive prediction was the first principle component of an analysis performed on five items relating to peer reports of implementation of successful, creative or original solutions to game problems. This analysis yielded significant main effects for the first factor of past-future temporal perspective and for the second factor of present temporal perspective. A highly significant interaction was found between past-future temporal perspective and present temporal perspective on the dependent variable intuitive prediction. Correlational analyses revealed significant associations between present temporal perspective and motivational style. The results of this study have largely supported the validity of the constructs proposed in TPM.
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This thesis is concerned with the proposal and exploration of a model that emphasises the importance of temporal perspective to the process of intuitive prediction in a social setting. Intuitive prediction can be defined as the non-normative prediction of other's behaviour (Nisbett & Ross, 1980). This new model, termed the Temporal Perspective Model (TPM), is examined in the context of the sport environment. Three words capture the essence of this thesis: 'prediction', 'temporal' and 'perspective'. The Oxford dictionary defines prediction as the "...cognitive ability to foretell (or) prophesy", 'temporal' is defined as 'denoting time and space', and 'perspective' is drawn from the Latin word _perspectiva_, meaning "to look" or to give attention to (McIntosh, 1974). These three simple definitions can be combined to constitute the primary theoretical proposition of this thesis that underlies TPM:

The ability of an individual to foretell the behaviour of others, or to engage in 'intuitive prediction', is enhanced by increasing the width of temporal perspective or directing mental perspective to knowledge from three points of the temporal event triad: 1) actual past events (past temporal perspective); 2) perceived present events (present temporal perspective); 3)
imagined, possible future events (future temporal perspective). One may visualize the past, present and future of an individual's social experiences as a triadic partitioning of actual and imagined events in time/space based on the degree to which event outcomes are certain. For the purposes of this model, past, present and future are defined in terms of event outcome certainty in the following way: past events are those events whose outcomes are irrevocably determined, present events are those whose outcomes are partially determined by the presence of defining factors or cues, and future events are those events whose outcomes are wholly indeterminate.

Themes Distinguishing TPM from Prevailing Theories of Intuitive Prediction

There are several themes that distinguish TPM from many of the prevailing theories in social and cognitive psychology:

1) TPM outlines the importance of the predictor's consideration of all three points of the temporal triad to the process of intuitive prediction. TPM introduces the notion that previous models of the explanation and prediction process suffer in the emphasis of the perceiver's use of information derived solely from relatively passive processing of present and past events, without consideration of the impact of imagined future events on these processes. TPM asserts that exclusive use of base-rate information in prediction leads to inferior prediction because situational outcomes are multifactorial in origin and continually evolving with
the changing environment. Past-based intuitive prediction is always a step behind the events of the performance situation because it is based on what has been and not what could be. Normative theory would suggest that prediction of the low probability event is of little utility if the average event can be predicted successfully through normative methods (Nisbett & Ross, 1980). It may be stated, however, that the cost of normative prediction, which can be described as the achievement of parsimony in information representation, is accuracy of low probability events. There are two ways in which prediction of the low probability event is important:

a) if the outcome cost of failing to predict the uncommon event is high

b) if the uncommon events in question are low probability events that can be projected to have a higher probability of occurrence in the near future

Two examples drawn from the sport context illustrate the importance of the low probability event in intuitive prediction. An example of the first type of low probability event is when a player physically aggresses against unruly fans in the audience at a game. Failure to intervene successfully on the part of the official can result in personal injury, lawsuits and loss of position for the official. An example of the second type of low probability event may be drawn from the period of the late 1980's during
which it has slowly become apparent that considerations of player popularity have begun to supersede consideration for official's authority, resulting in escalations in the incidence of player-official conflicts. Prediction of the low probability event is a necessity if one adheres to the following notions: a) both situation and disposition interact to affect behaviour; b) the human species is in a continuous state of development, therefore dispositional evolution; c) the environment (situation) is constantly changing and evolving. The concept of inappropriateness of past models has been previously suggested (Abelson, 1976; Frank, 1939).

2) TPM proposes that a preparatory process of resolution of imaginary or possible future event problems outside of the actual event context, termed generation of images-of-achievement (GIOA), contributes to the enhancement of intuitive prediction. GIOA involves the engagement of past temporal perspective and future temporal perspective in the sense that past actual events are utilised by the individual in the construction of novel, possible future events. This process is proposed to enhance the selection of alternative judgements and action strategies concerning the outcome of actual events by reducing the processing and decision-making load within the event context. In effect, judgements are made a priori outside of the event context. This distinction shifts part of the focus of the study of
judgement from the typical in-situation analysis to an investigation of the contribution of engagement of both past and future temporal perspectives outside of the actual situation to the in-situation judgement task. Within the performance situation, TPM posits that the major task of the intuitive predictor is to engage present temporal perspective in the perception of situational cues. These situational cues are then matched to the products of engagement of past and future temporal perspectives (GIOA) in memory. This matching process is posited to direct judgment and, consequently, action. The three temporal perspectives are posited to interact in the process of intuitive prediction.

3) TPM is concerned with a set of individual difference variables that are proposed to influence the ability of the individual to make use of all three points of the temporal triad and which form the basis for a model of the intuitive prediction process. It is essential at this point to make clear that this study is not intended as a validation of the causal pathways of the proposed model, but rather as an initial investigation into the likelihood of particular motivational components being important to the TPM model. These individual difference variables are proposed to have an effect on achievement in judgement contexts through their influence on the triad of perspectives and consist of the following:
a) GIOA: Ability to generate alternative outcomes or generation of images-of-achievement (use of past and future points of temporal triad)
b) Self-efficacy: motivational effects of perceptions of self-efficacy on GIOA activity.
c) Present temporal perspective (PTP): ability to maintain focus on present cues in performance situations (use of present point of temporal triad)
d) Motivation: effects of aggressive, conflicted, competence, cooperative and competitive motivations on PTP.

4) TPM emphasises the importance of differences in judgement styles and related achievement outcomes. Individual differences in the engagement of temporal perspectives and the influence of particular associated variables on temporal perspective are proposed to affect achievement in the judgement context. Achievement considerations are posited to be valuable criteria by which to illuminate differences in judgement style.

This study has been conducted in the context of the sport environment. Specifically, the prediction of player behaviour by ice-hockey officials is the vehicle by which intuitive prediction is studied. For the purposes of this thesis, the 'events' under consideration are defined as ongoing conflicted interactions between two or more players that commence at the first point of aggressive verbal or physical contact and are concluded when
aggressive contact between those players is completed. Of specific interest is the event in which an official must intercede subtly or overtly in order to maintain active involvement in the game for the majority of the participants. Therefore, since it is the role of the official to intervene or perform in these conflicted events, these events are termed 'performance situations'.

Summary of Objectives

In summary, three major objectives are addressed in this thesis:

1) The thesis examines the importance of width of temporal perspective to the process of intuitive prediction.

2) The thesis addresses the question of whether the set of individual difference variables proposed as elements of TPM are associated with the engagement of the three temporal perspectives.

3) The thesis investigates the construct validity of the proposed TPM model. This investigation is framed as the question of whether the model elements distinguish individuals in terms of overall achievement in a sport judgement context.

Fundamental Model Assumption: Judgement Versus Action

A fundamental assumption underlying the investigation of the objectives outlined is that judgement is in some manner associated with action and therefore with achievement in the
domain in which the judgements are being made. 'Action', in the context of this thesis, refers to judgement-prompted intervention on the part of the official designed to prevent further conflict between two or more aggressing players in performance situations. The relationship between judgement and action is somewhat analogous to the controversial relationship between attitude and behaviour in the social psychological literature (Ajzen & Fishbein, 1977). The controversy may be summarized in the following way: does knowing the individual's evaluation (judgement) of an object necessarily enable one to predict if that individual will choose (choice/action) that object when given the chance. Researchers have indicated that the "distinction between judgements and decisions is a tenuous one" and use the terms interchangeably (Slovic & Lichtenstein, 1971). This view is also supported by Wallsten (1980), Hammond et al. (1980) and Jaspars (1978), who indicate that both judgement and action represent the making of a choice among several alternatives. The position that judgement and action are synonymous has had its detractors. Einhorn and Hogarth (1981) maintain that when the individual makes choices, responsibility and regret enter into the decision so can it can be postulated that judgement is neither sufficient nor necessary for choice. The position of this thesis on the judgement-action issue has been to investigate the GIOA process as an entity in itself by means of subjective report methods and also to attempt to locate an objective behavioural achievement correlate that would in some
manner determine that GIOA had occurred. This approach addresses the controversy by assessing both the nature of judgement as an individual process and as the expected behavioural link between this process and achievement outcome.

This presentation begins with a set of construct definitions that are essential to the understanding of how the literature review illuminates the need for a model subsuming these constructs. The literature review concentrates on the understanding of judgement, as it applies to intuitive prediction, that is provided by several major social and cognitive psychological theories. The review concludes with a summary of how the most recent work in the study of temporal perspective demonstrates the mutability of temporal perspective with respect to a number of situational and individual difference variables. The purpose of this endeavour is to illuminate the necessity for a model of intuitive prediction that achieves the following objectives: a) the new model takes into account the importance of utilising all three points of the temporal triad; b) the new model describes the contribution of GIOA activity outside of the performance situation to judgement; c) the new model investigates associations between motivational variables and engagement of the temporal triad. The literature review is followed by an elaboration of TPM and how it expands upon current understanding of the judgement process. A description of the hypotheses, rationales and procedure that underlie the research is then presented. Finally, the results of the study are
discussed in terms of conclusions regarding the implications of the research. An historical review of the evolution of the concept of temporal perspective, new scale validations, and additional analyses of interest are included in the appendix. The following section elaborates construct definitions of TPM terms that will be of use in the review of the literature.

**Construct Definitions in TPM**

**Self-efficacy.** A cognitive motivation derived from internal standards and concerns self-evaluative reactions to one's performances (Bandura, 1977). Self-efficacy is posited by Bandura (1982) to influence thought patterns, actions and emotional arousal. Judgements of self-efficacy are important determinants of how much effort will be expended by an individual and the length of persistence with difficult tasks. Low self-efficacy is associated with heightened perceptions of future task difficulties (Bandura, 1982).

**GIOA.** A cognitive process of mentally reconstructing and developing alternative images of performance situations that is conducted outside of the performance situation. This process utilises both past and future temporal perspectives through the construction of novel or low frequency (future) alternatives from the building materials of remembered experiences (past). The key characteristic of this process is the visualisation of multiple outcomes for similar sets of environmental cues or imagining the same individuals and environmental cues with different possible outcomes. This process encourages the individual to recognise
and address the person x environment interaction that produces behaviour (Heider, 1958; Kelley, 1972b). GIOA can be distinguished from most major judgement model processes by the feature of inclusion of both past and future temporal perspectives in the construction of alternative images. Past-future based alternatives are developed and tested in the performance situation for validity. It is to be noted that lack of encounter with actual experience of possible alternatives does not preclude their retention in memory. The pool of possible alternative images is therefore not restricted to those events through experience as in Kelly's (1955) model of constructive alternativism. The novel alternatives are proposed to be retained in memory until needed. GIOA serves several functions, one of which is the removal of the stress of performance situations from the development of judgement alternatives, thereby improving alternative complexity and quality (Alexander, 1979; Beach and Mitchell, 1978; Ben Zur and Breznitz, 1981; Goldin, 1978; Pitz et al., 1980). GIOA enhances intuitive prediction in performance situations by the provision of ready-made judgements. The information processing task of the individual within the performance situation is then reduced, from developing custom-designed judgements on the spot, to matching situational cues to images-of-achievement already in memory resulting from GIOA. 

Images-of-achievement. Pribram (1971) defined images-of-achievement (IOA) as holistic cognitive plans of movement that precede actual action. Pribram's concept of IOA referred to the
process by which environmental contingencies and past experiences combine to form a blueprint for behaviour. Pribram suggested that the image decays every .5 seconds and is replaced by another containing all the output and outcomes necessary for the next step of the plan. Environmental cues are screened and filtered by the representative record of prior experience. When the course of action looks good, a terminal IOA guides the final phase of action and the entire plan of action is present before it is needed (Fisher, 1984).

Cooperation, competition, aggression, conflict and competence motivational styles. Five social and psychological motivational styles proposed by Butt (1979, 1987) to be important to the sport context. The five motivations and associated affects (in brackets) are as follows: 1) cooperative: other individuals in the sport context are seen as essential and appreciated partners (positive affect); 2) competitive: motivation stems from the desire to defeat others (negative affect); 3) aggressive: this motivation is associated with energy, activity and impulsivity (negative affect); 4) conflicted: this motivation is associated with neuroticism and self-absorption (negative affect); 5) competence: this motivation is concerned with self-insight, skill development and joy in sport participation (positive affect). It is the affective component of the five motivations, and the relationship between affect and attention in the performance situation (Nideffer, 1976, 1979, 1981), that is of interest in this thesis.
Present temporal perspective (PTP). Nideffer (1976, 1979, 1981; Nideffer & Sharp, 1978) defined attentional styles in terms of width and direction of focus and indicated that broad-width and externally directed attention was associated with high levels of social prediction in the sport environment. Present temporal perspective may be defined as a broad-external attentional style. Effective engagement of present temporal perspective means that a multiplicity of present-based cues is available to the individual to provide a better match to an IOA in memory than just a few cues. In TPM it is proposed that the more information the individual has about the cues of the current situation, the more accurately a match can be achieved between that situation and one from the memories storehouse of actual and hypothesized experience.
LITERATURE REVIEW

Part One: A Review of Major Social, Cognitive and Decision Theories of Judgement

Hammond et al. (1980) outlined six approaches to the study of judgement that can be placed in four general categories based upon the degree of psychological to economic or cost-utility based orientation. These are:

1) Social judgement theory, information integration theory and attribution theory: all three models examine judgements on their own terms without reference to probabilities and utilities as fundamental concepts. Attribution theory has been the least integrated into decision-making research (Fischhoff, 1976).

2) Psychological decision theory: psychological decision theory outlines departures from the normative judgement process. A cognitive account of judgement replaces normative emphasis.

3) Behavioural decision theory: behavioural decision theory describes how task and psychological conditions result in departures from normative theory.

4) Decision theory: decision theory concentrates on probabilities and utilities and how an individual should make decisions if following a normative model.

Part One of this literature review follows the logic of the theoretical progression outlined by Hammond, although it does not
encompass every type of judgement theory elaborated by Hammond. The review commences with a discussion of the importance of the concept of temporal perspective to the understanding of human perception, as outlined in Lewin's field theory (1935). The remainder of the literature review is concerned with an exploration of the contributions to the understanding of intuitive prediction provided by attribution theory, cognitive theory and decision-making theory. Each theoretical position is accompanied by two subsections. The first subsection summarises useful contributions of each theory that have application to TPM. The second subsection elaborates the shortcomings of each theoretical orientation described and sets the stage for the need for a new theory of intuitive prediction. Part One of the literature review concentrates on the following deficiencies in existing theories of judgement:

1) The judgement theories described fail to take into account the effects of utilising all three points of the temporal triad in the judgement process.

2) One of the three judgement theories described does not address the notion of contribution of deliberate activity outside of the judgement situation to improvement in judgemental efficiency.

3) One of the three judgement theories discussed fail to account for taxonomies of judgement style or individual differences in the use of judgmental heuristics.
4) The relationships between affective variables and those cognitive variables that are related to judgement are alluded to but not stressed as central components of the judgement process in the three theoretical orientations described.

5) The judgement theories described posit that cognitive changes are negatively motivated by conflict; the importance of schematic change that is positively motivated is not addressed by these theories.

Lewin's Field Theory: Temporal Perspective in Social Psychology

Bleuler (1912) drew the distinction between "logical thinking...which corresponds to reality, is a reproduction in thought of the connections which reality offers...and autistic thinking...(which) is directed by strivings which disregard logic and reality." Frank (1939) was apparently the first to define temporal perspective and to delineate the progressions in time perspective that occur over the course of an individual's life. He tied the notion of temporal perspective into Lewin's field theory (Lewin, 1935) and noted the fact that an individual may have differing time perspectives in different aspects of life such as the economic, political and social spheres. Frank suggested that temporal perspective can effect a retroactive effect on behaviour. Frank stated that perceptions of future outcomes affect present behavior. He described two types of individuals: one with a remote future perspective who exhibited instrumental behaviour and another whose 'consummatory' behaviour...
indicated a relative disregard for consequences. Frank (1939) spoke eloquently of the role of evolution in repudiating the importance of the past in the construction of the future:

...curiously enough, human behaviour does change, despite frequent assertions to the contrary and the professional demonstration of the unchanging mores, the 'residues' and the 'derivations'...in this evolution all manners of A's (past events) have been found to be irrelevant to the future events they were supposed to initiate and new and unsuspected A's were revealed as having critical importance. Only by repudiating the past as a guide to the future, by superseding a future time perspective governed by the dimensions of the past, could this transformation occur. (pp.302)

Lewin (1948) composed a short chapter on the relationship between temporal perspective and morale that was to inspire nearly a half century of theory and research on the topic of temporal perspective. Lewin's conception stressed the importance of distinguishing between the individual's mature, realistic 'level of expectation' and childish, unrealistic 'irreality level of wishes.' Lewin asserted that the concept of temporal perspective could be embedded in his theory of fields or the life-space of an individual to include not only the present but the future and the past. Lewin reinforced Frank's notion of a developmental progression of expansion in temporal perspective that was to later be characterized via Piagetian analogues as the progression from sensorimotor to formal operational thought (Inhelder & Piaget, 1958). Lewin described the relationship between temporal perspective and morale and various processes including persistency, disagreeable situations, productivity,
aspiration, goal distance and uncertainty concerning future events. Lewin (1942) referred again briefly to the topic with a commentary which suggested that the social environment influences the individual's temporal perspective. It is particularly interesting that both Frank and Lewin were absorbed by this theoretical notion at a time when the world was caught up in the prospective uncertainty of a world war. This was a time of great anticipation and dread that focussed the interest of social psychology on the impact of societal forces on the anticipatory process. As Lewin (1948) notes in a poignant postscript to his chapter:

This chapter was written before December 7, 1941; now we are at war. The effect on the morale of the country has been immediate and striking—a circumstance which bears out some of the points we have discussed. Before December 7, what was a realistic outlook for one individual was doubted by a second and ridiculed as impossible by a third. Now the situation has been clarified. Countless conflicts, whether among factions of the population or within each individual himself, have ceased now that the major aspects of the time perspectives are definitely set. (pp.123)

This section of the literature review has elaborated perception of the importance of temporal perspective to the understanding of human thought as early in the history of social psychology as in Lewin's time. In the next section, the contributions of attribution theory to the analysis of intuitive prediction will be examined with respect to how the notion of temporal perspective might enhance these propositions.
Attribution Theory and Judgement

The three attributional theories outlined below, Heider's theory of naive psychology, correspondent inference theory and Kelley's model of attribution, address directly the process of intuitive prediction. The major tenets of each theory are outlined, followed by a subsection of criticisms dealing with general inadequacies in the understanding of intuitive prediction that apply to all three theories. The following criticisms of attribution theory will be discussed:

1) Attribution theory does not examine the contributions of consideration of imaginary events to the evaluation of cause and effect relationships and the implications of such analyses for intuitive prediction.

2) Attribution theory does not investigate the contribution of individual differences in judgement style and the implications for intuitive prediction.

3) Attribution theory research largely neglects the outcomes of various cause and effect analyses in terms of achievement in contexts requiring intuitive prediction.

Heider's Naive Psychology

Heider (1958) published *The Psychology of Interpersonal Relations* in which he attempted to explicate the processes involved in the 'naive psychology' of everyday life. Heider contended that individuals develop theories about events around them and that these theories are either supported or modified by ongoing observations. Heider contends that action is
related to a person's beliefs or theories and that the understanding of behaviour is inextricably linked to the comprehension of an individual's theories about events. Heider indicated that these informal theories about events allow the individual to function adaptively in the social world. Heider proposed a set of axioms that describe the manner in which these theories are developed and operate:

1) Heider proposed that individuals search for causation in the observation of daily events. It is important to note that social prediction, and consequently action or outcome, is inextricably tied to attribution or causal inference in intuitive prediction processes. If a particular event is associated with a particular cause then the individual will tend to predict that event when the associated cause is in evidence (covariation principle). It is important to note that the data sources for such causal analyses are proposed to be actual experience rather than actual plus imagined experiences.

2) Heider theorised that people prefer to attribute causation to stable or enduring dispositional or permanent situational causes rather than to unstable causes, thereby increasing predictability of behaviour. Heider did not address the possibility that individuals may differ in the tendency to engage in this style of attribution. The consideration of individual differences in this style of attribution is important. This importance lies in Heider's contention that
environmental and dispositional forces are hydraulically related in the production of action. If this is the true state of causality then individual differences in the recognition of this relationship would have profound implications for attribution and, therefore, intuitive prediction.

**Correspondent Inference Theory and Judgement**

Jones and Davis (1965) expanded upon Heider's notion of naive psychology by proposing correspondent inference theory. There are several principle concepts that are defined in this theory:

1) Correspondent inference theory proposes that correspondent inference occurs when an observer infers another individual's personality traits (dispositions) and therefore intentions from that individual's behaviour. It is important to note that sources of information for causal analyses are, as in Heider's original proposition, still restricted to actual or past-based data.

2) Correspondent inference theory outlines the importance of consideration of consequences of chosen and non-chosen acts the assessment of dispositional attribution. If the actor has a low amount of choice between activities then the observer cannot easily infer intention from behaviour. An important corollary of this axiom states that a perceiver cannot be sure which effect was intended if actions have many different consequences (Ajzen & Holmes, 1976; Newton,
1974). It may be proposed that the perception of choice between activities is to some degree dependent on the observer's repertoire of alternate choices for action. This is important for intuitive prediction as the less the perceived choice for actor behaviour, the more dispositional the attribution and the less recognition of the interaction between person and environment in the production of action on the part of the observer. This thesis posits that the perception of alternate choices, and subsequent reduction in unidimensional dispositional causal assessment, may be expanded through GIOA.

3) Correspondent inference theory states that correspondent inferences are made from non-normative behaviours (Jones & Harris, 1967). Jones and McGillis (1976) described an expansion upon correspondent inference theory in which it was proposed that correspondence is a measure of the probability of inferring disposition from a behaviour. Jones and McGillis indicated that behaviours that resulted in a disconfirmation of expectancies produced a great amount of correspondence. This was due to the fact that correspondence was proposed to be synonymous with the amount of information gained concerning the probability of a dispositional attribute. It may be posited that the individual tendency to view disconfirmed expectations as person by situation interactions rather than being due to dispositional causes has significant implications for
success in intuitive prediction. The importance of examination of individual differences is not a central concern of attribution theory.

4) Correspondent inference theory proposes that causal assessment can be affected by anything which causes attention to be focused on a potential cause (McArther & Post, 1977; McArthur & Solomon, 1978). Attention appears to exert a significant influence on attribution and subsequent predictions.

Kelley's Attribution Model and Judgement

Kelley (1967) constructed a cube of the normative model of causal analysis for which the principle intent was to ascertain the process by which individuals assess the validity of event impressions. Specifically, Kelley attempted to address the tendency of the observers in general to attribute the event in question to situational or dispositional characteristics. Kelley proposed that such assessments were of assistance to the observer in judging whether information or judgments about the event were valid. Kelley outlined three dimensions of observer assessment:

1) **Distinctiveness**: the degree to which effect occurs primarily in presence of one causal candidate and not in presence of others.

2) **Consistency**: the degree to which the effect is observed reliably when a particular causal candidate is present

3) **Consensus**: the degree to which people other than the target actor show the effect.
Individuals must respond to each of these in assessing causal influence (Kelley, 1967, 1972a, 1972b, 1973; McArthur, 1972; Orvis et al., 1975; Weiner et al., 1972). It is important to note that distinctiveness, consistency and consensus are all based on analyses of actual experience. Kelley does not address the possibility that imaginary experience can be a source of cause and effect analyses of non-experienced events, the products of which may be of utility in novel situations.

Summary: The Utility of Attributional Theory in Terms of Intuitive Prediction

Attributional theory has resulted in two important contributions to the understanding of intuitive prediction:

1) Attribution theory explains intuitive prediction of events that are highly similar to those in the individual's experiential repertoire through experience-based causal assessments. In other words, attribution theory addresses prediction based on the actual, experienced event.

2) Attribution theory addresses the notion that attentional processes can affect causal assessments.

Criticisms of Attributional Theory in Terms of Intuitive Prediction

There are two major criticisms of attribution theory proposed in this thesis:

1) Attribution theory does not address the contribution of imagined, possible events to intuitive prediction. The major shortcoming of the three attribution theories is that
cause and effect relationships are determined solely on the basis of past experience (Kelley, 1967, 1972a, 1972b, 1973; McArthur, 1972; Orvis et al., 1975; Weiner et al., 1972). The individual's ability to make use of imagined, possible events as well as actual past events in the intuitive prediction process is not addressed in attribution theory. In other words, the individual is not posited to reformulate and manipulate event scenarios to predict alternative outcomes for the experienced cause and effect cues. Manipulation of such cues could result in preparatory, possible cause and effect relationships in memory. This activity is described as the GIOA process which in attribution terms could be described as mental experimentation with consistence data from the source of imagination. The consequence of relying exclusively on past experience for causal associations is that if one considers an event as a phenomenon that is related to both invariant person and variant situational causal origin (Heider, 1958; Kelley, 1972b) then even small variations in the presence of situational causes can escalate the number of potential outcomes tremendously. The individual is presumably looking for the best-fit alternative outcome which is not sufficed by applying past-based causal analyses exclusively to new combinations of situational cues.

2) Attribution theory does not examine the outcomes of various judgement strategies in terms of achievement in intuitive
prediction. Attribution theories purposely neglect the assessment of outcomes of various judgement styles in the search for common factors of causal assessment and judgement processes. It may be proposed that the comparison of superior judges with inferior judges, in other words the assessment of comparison by achievement outcome in judgement contexts, may be useful in determining the style of judgement strategies that lead to superior intuitive prediction. If one were to cast this proposition in the terms of attribution theory, superior judges might be employing a style of attribution in which use of future or imagination-based consistency, distinctiveness and consensus information was incorporated into past-based analyses, with implications for judgemental accuracy. Achievement as a criterion is a necessary element of such an investigation. Ross and Anderson (1980) referred to the small interest in judgemental accuracy as a dependent variable in most attribution studies and indicated that the number of outcome studies in a realistic judgement context were very few. Attribution theory posits that an understanding of judgement is gained by delineating common or average judgement processes. The outcome of such processes is of little interest to attribution theorists. Two important ideas can be addressed by examining the achievement outcome of judgement processes: a) superior judges may be utilising qualitatively different judgement processes than inferior
judges; b) judgement processes that are not qualitatively
different between superior and inferior judges may be ranked on a
individual difference process continuum with implications for
judgemental accuracy.

3) Attribution theory does not examine the importance of
individual differences in attributional style. An example
of a possible individual difference variable construed as a
ubiquitous phenomenon by attribution theorists is the
fundamental attribution error. The fundamental attribution
error is a tendency to over-attribute behaviour to the
actor's disposition and to underemphasize powerful
situational determinants of behaviour (Arkin and Duval, 1975; Duval and Wicklund, 1972; Regan & Totten, 1975; Ross, 1977; Ross & Anderson, 1980). Heider (1958) and Kelley
(1972b) both stated that complex patterns of causality
between person and environment forces are possible and,
accordingly, attribution theorists posited that people
engage in dual assessments of person-environment causation
when attributional accuracy is seen as important (Kassin &
Hochreich, 1977). It is suggested in this thesis that the
tendency to recognize the importance of the person-
environment interaction may be conceived as an individual
difference variable. This ability of the observer to
perceive the possibility that actors can behave differently
in very similar contexts may not only be related to
situational characteristics such as importance of
attributions, but also to stylistic differences. This view of the observer as an active construer of possible outcomes, rather than a responder to actual outcomes, distinguishes the observer in attribution theory from the observer in the model presented in this thesis. The important idea to keep in mind is that situational complexities result in constant inappropriateness of past-based models (Abelson, 1976). Overuse of past-based causal analyses of consistency, distinctiveness and consensus information do not assist the observer in ever-changing judgement tasks.

The tendency to utilise consensus, distinctiveness and consistency information may be conceived as an individual difference variable. In lay terms, Kelley's proposition of parameters of event interpretation may be expressed in the following manner: 1) do all individuals act the same way in this event (consensus); 2) does the target actor behave this way in all similar events (distinctiveness); 3) does the target actor always behave this way during this event (consistency). One of the major controversies concerning Kelley's work has centered around the role of consensus information in attribution. The following findings have been made on the use of consensus information: 1) there is little evidence that consensus has a large effect on attribution (McArthur, 1972, 1976; Nisbett & Borgida, 1975); 2) when the sample is representative of the population people use consensus information (Wells & Harvey, 1977); 3)
judgements of stimuli the person has experienced directly are less affected by consensus information (Feldman et al., 1976; Tyler, 1980); 4) people who feel uncertain of their judgements may welcome consensus information (Kulik & Taylor, 1980). It is apparent that much of the research has centered on situational effects on consensus, distinctiveness and consistency. It seems that an investigation into individual differences in the perception that actors can behave differently in the same contexts, with implications for intuitive prediction ability, might be of utility. Indeed, individual differences in the use of consensus information may distinguish high and low achievers in intuitive prediction. Alternatively, it may be posited that the lack of ability to imagine variations in behaviour across individuals in similar events would be a highly non-adaptive and perhaps unusual style of processing experiential information. This lack of adaptability might explain the lack of robust findings on the use of consensus information in causal analyses.

This section of the literature review has concentrated on the contributions of attribution theory to the understanding of intuitive prediction. In the next section, the major contributions of cognitive theories will be discussed and how the notion of temporal perspective might enhance the conceptualisation of intuitive prediction provided by these theories.
Cognitive Theory of Schemas and Judgement

The following section on cognitive schema as it applies to intuitive prediction is presented in an effort to address the following concepts:

1) Schema theory neglects the contributions of future or imagination based data sources to the associative networks of schemas and scripts.

2) Schema theory de-emphasizes the contexts and conditions under which judgemental heuristics can be highly efficient and adaptive modes of processing information.

3) Schema theory does not examine the importance of achievement studies in judgement contexts as guides to fundamental differences between low and high achievers in intuitive prediction.

Cognitive schema theory (Kelley, 1972b) is based on two fundamental concepts:

1) Schemas are mental representations of actual events that assist in the interpretation of information and the guidance of behaviour. Cognitive theory was united with attribution theory when Kelley (1972b) introduced the idea of a causal schema to attribution theory. Neisser (1976) indicated that the schema construct is a cornerstone of psychological theory. Many authors (Berne, 1964; Cantor, 1990; Goffman, 1959) have made the point that events in the phenomenal world are never approached sui generis but are assimilated into pre-existing structures in the mind of the
perceiver. Kelley (1972b) proposed that individuals make use of the concept that schematic sufficiency and necessity are important in the individual's determination of causal relations. Kelley specified two types of schemas: a) 'Single necessary cause schemas' in which the existence of the effect carries with it the certainty that a particular cause was present; b) 'multiple sufficient cause schemas' in which the existence of the effect implies the possibility of several different causes. Note that both types of schematic representation are proposed to be based on actual experience, in fact, a retrospective analysis. Scripts are the type of schema which is referred to in this thesis as IOA or images-of-achievement. A script is a particular type of schema in which the related elements are social objects involving the individual as actor or observer (Abelson, 1976; Schank & Abelson, 1977). Unlike schemas, which are static networks of associations, scripts are event sequences extended over time. Script relationships have a distinctly causal flavour, that is, events early in the script produce or at least enable later events. Tracks are variations on script variables, for example, within the restaurant script, the waiter variable can include the variations of surly or polite. GIOA is posited to increase the number of tracks available to the observer. Scripts can be highly abstract and owe their existence only slightly to personal experience which is an important proposition of the GIOA process.
However, the conception of personal experience in this thesis refers to the contributions of imagined experience rather than vicarious experience (Nisbett & Ross, 1980). Scripts have the important property of rendering new events readily comprehensible and predictable. The cost of this pre-structuring of information is the possibility of erroneous event interpretations, inaccurate expectations and inflexible modes of response (Nisbett & Ross, 1980). Cantor and Mischel (1977), for example, showed the biasing effects of schemas or prototypes on interpretation on ambiguous information. Markus (1977) showed how the speed of processing information about the self is enhanced by the presence of a self-schema. It appears that a process which would guard against predisposing an individual to interpret events based on actual experience rather than imagined possibilities would be of use. This is in fact the process proposed by the GIOA process.

2) Schematic representations of actual events are subject to a series of heuristic biases and errors. Kahneman and Tversky (1972, 1973) have outlined a theory of social judgement in which individuals attempting to make intuitive predictions rely upon information drawn from processes that do not follow the guidelines of normative statistical axioms. Nisbett and Ross (1980) compare this to the
normative process followed in the course of scientific inquiry:

The scientist often needs to observe covariation between events and to measure the magnitude of the covariation in terms of some defined criterion. If possible, principles or theories capable of causally explaining the covariation are formulated. The observed covariation and the postulated causal explanations are then used as the basis for predicting future events. For the formal scientist, all three tasks are governed by fixed statistical and logical principles. (pp.9)

Note that the perception of covariation between events is based on analyses of past behaviours with the attendant implications of deficiency in judgemental accuracy (Abelson, 1976).

Kahneman and Tversky (1972, 1973) refer to a set of errors in the inference process that are proposed to contribute to inaccurate social prediction via the faulty ascription of causation by the intuitive predictor. These are described in the following section.

**Effects of Use of Heuristics on Judgement**

**Knowledge structures.** Inferential errors can be traced back to the tendency to overuse intuitive, inferential strategies, or schemas (Piaget, 1936) about the behaviour of other individuals, and to underuse formal, statistical strategies (Nisbett & Ross, 1980). Nisbett and Ross (1980) suggest that the use of heuristics is generally automatic, non-reflective and notably free of any conscious consideration of appropriateness. Meehl (1955), Slovic and Lichtenstein (1971), and Dawes and
Corrigan (1974) found the actuarial method equal or superior to clinical judgements. In contrast to this point of view, Cohen (1981) has said that normative theory is acceptable only so far as it accords with the evidence of untutored intuition which has set its own standards. Cohen suggests that normative theories should not be taken as definitive models. Lobo and Nair (1990) have found that the combination of statistical and judgemental or non-normative forecasts is superior to either type alone. In summary, the literature reveals that there is some controversy over the utility of individual knowledge structures. It is proposed in this thesis that the type of event being predicted, usual or unusual, determines the appropriateness of the prediction paradigm. In contexts such as social behaviour, which is the context of the current study, normative or past-based paradigms may prove inadequate in the face of complex interactions between person and environment (Heider, 1958; Kelley, 1972b).

Knowledge structures or schemas are influenced by two major judgemental heuristics, availability and representativeness, which affect which schemas will be aroused (Higgens, Roles & Jones, 1977; Hornstein, 1975; Nisbett & Ross, 1980). These heuristics are described in the following section.

Representativeness heuristic. The representativeness heuristic refers to the tendency to assign an event to a certain category due to its similarity to other objects in that category. Nisbett and Ross (1980) state that this heuristic is problematic
because it is invoked without regard to the more normatively appropriate method of assessing relative frequencies of the category in the population under consideration. The layperson appears willing to disregard base-rate information when then is an opportunity to use any other strategy. Kahneman and Tversky (1972, 1973) assert that there is an overcontribution of information derived from considerations of representativeness of the event in question in the formulation of schemas. It is proposed in this thesis that representativeness can be a highly useful tool in intuitive prediction if the GIOA process is used by the observer to increase the diagnosticity of present situational cues through the generation and mental diagnostic testing of novel situational scenarios. In this light, representativeness becomes a highly efficient tool.

**Availability heuristic.** Schema formulation is also subject to the availability heuristic which is used to judge the frequency and likelihood of events and event relations. The availability heuristic is a process by which judgement concerning the probability of an event is positively related to the availability of that event in memory (Tversky & Kahneman, 1973). The error associated with this heuristic is that factors that are not truly valid as evidence influence availability in memory, such as vividness. If a person relies upon the sample generated by personal experience, he will be misled about objective frequencies. Nisbett and Ross (1980) provide the example of subjective assessments of words beginning with the letter 'r'
versus words with 'r' as the third letter. Individuals can more readily generate the first type of word and, although objective frequencies do not correspond with this impression, subjectively evaluate the prior word type as more frequent. In this thesis, it is proposed that GIOA increases the availability of both rare and common events, thereby maximally preparing the observer for as many outcomes as possible in a constantly changing environment (Frank, 1939). The GIOA process alleviates several of the problems with availability proposed by Nisbett and Ross (1980) outlined in the following section.

Factors Affecting Availability

Hindsight knowledge. Research has been conducted on the subjective certainty of hindsight knowledge (Fischhoff, 1975; Fischhoff & Beyth, 1975). Outcomes in retrospect often seem to have been inevitable. This may be because the antecedents and causal scenarios that predicted such outcomes have far greater after the fact availability than do antecedents or scenarios that predicted alternative outcomes that did not in fact occur. It appears that an investigation of a process such as GIOA that enhances the availability of imaginary scenarios could counteract the effects of hindsight knowledge. Nisbett and Ross (1980) suggest that perceptual salience, memorability and imaginability may be relatively unbiased and therefore strongly associated with true frequency. GIOA is posited to decrease salience effects by the consideration and elaboration of non-salient cues. GIOA is
also posited to increase memorability and imaginability of non-occurring alternative outcomes via the rehearsal process.

Concrete or vivid knowledge. Potential events which do not occur have low effect on people's inferences (Nisbett & Ross, 1980). Information that is more concrete and imaginable in images rather than words promotes recognition and recall (Gehring et al., 1976; Paivio, 1971; Shepard, 1967; Standing, Conezio, & Haber, 1970). Information that is more memorable is more available for incorporation into inferences. Hamill et al. (1979) showed that a single vivid instance can influence social attitudes when pallid statistics of far greater evidential value do not. It is posited in this thesis that GIOA functions by increasing the vividness of low-impact events in memory or non-occurring alternatives thereby increasing the availability of best-fit scenarios for individual situations.

Conflicting information. Overconfidence (Einhorn & Hogarth, 1978; Fischhoff et al., 1977; Goldberg, 1959; Oskamp, 1965) leads the lay scientist to stop searching as soon as a plausible explanation is adduced. Snyder and Cantor (1979) found that memory searches favour hypothesis-confirming evidence even when the hypothesis is merely a tentative one. Hastie and Kumar (1979) reported that surprising or incongruent events may be attended to and stored in memory more than expected or hypothesis-confirming events. Many researchers have found that individuals tend to cling to existing hypotheses (Darley & Fazio, 1980; Nisbett & Ross, 1980; Ross et al., 1975; Snyder & Swann,
A process such as GIOA could be visualised as an individual difference in attempts to overcome the tendency to stop improving event explanations, thereby increasing the chances of finding a best-fit rather than just adequate-fit event explanation.

Summary: The Utility of Schema Theory in Terms of Intuitive Prediction

Several axioms of schema theory have direct bearing on the understanding of intuitive prediction provided in this thesis:

1) Schema theory emphasises the contribution of cognitive work completed prior to the judgement situation on information-processing within the situation.

2) Schema theory outlines the effect of perception factors such as on vividness, concreteness and salience of judgement objects on intuitive prediction.

3) Schema theory illuminates the need to take into account systematic cognitive biases in the judgement process.

Criticisms of Schema Theory in Terms of Intuitive Prediction

Schema theory may be criticised for certain reasons:

1) Schema theory fails to closely examine the utility of judgemental heuristics. Kahneman and Tversky (1982) stated that it is often far from clear whether these effects should be treated as errors or biases or whether they should be accepted as valid elements of human experience. Nisbett and Ross (1980) concluded that causal perception is not an
inherently faulty cognitive apparatus but rather, one that manifests certain explicable flaws and that formal training in statistics can improve the process of intuitive prediction. It may be proposed that judgmental heuristics have a far greater utility in particular circumstances than suggested by Kahneman and Tversky and Nisbett and Ross. This thesis investigates the circumstances (use of GIOA) under which heuristics can be highly valuable judgement tools. Judgement via the utilisation of judgemental heuristics may be enhanced if the circumstances described in the following section apply.

Rehearsal of event scenarios. Nisbett and Ross (1980) refer briefly to the concept that use of the availability heuristic may be perceived as a beneficial process. If availability is actually associated with objective frequency, in that perceptual or memorial salience of objects is not distorted by factors irrelevant to the probability of their occurrence, availability can be a useful heuristic. It is suggested in this thesis that GIOA is a process by which many event scenarios are mentally reconsidered and reconstructed. GIOA may affect the availability of both common and uncommon scenarios in memory through the rehearsal process. The rehearsal process should contribute to greater vividness, concreteness and availability of a variety of both experienced and imagined scenarios in memory.
Optimal cue diagnosticity. Nisbett and Ross' (1980) work has been criticized on the grounds that the supporting studies lack ecological validity (Cohen, 1981). It has been suggested that one of the difficulties with laboratory examinations of judgemental heuristics is that the diagnostic value of predictors is assigned for the subjects, devoing the judgement process of the necessary testing phase of a proposed 'hunch-then-test hunch' process (Bowers et al., 1990). Nisbett and Ross state that when target information is highly diagnostic, that is when covariation between target features and outcome categories is virtually perfect, people's overreliance on representativeness criterion may cost them very little. It may be proposed that representativeness can be a highly useful tool if cue diagnosticity is optimal. GIOA is posited to be a process by which optimal diagnosticity can be ascertained by the constant development and testing of alternative judgements in and out of the performance situation.

Collective problem solving. Collective solving of problems should produce inferences better than those of individuals working in isolation through the process that inferential shortcomings should cancel each other out to some degree (Nisbett & Ross, 1980). Schema theory underemphasises the contribution of other's input to the process of developing schemas and scripts. The emphasis in
schema research appears to be on the individual and on the concreteness, vividness and salience of that individual's past experience in the development of schemas (Nisbett & Ross, 1980). GIOA activity is posited to include reflection upon and solidifying in memory of judgement alternatives provided by other individuals.

Importance of achievement studies. As with attribution studies, many of the schema studies described above have centered around analyses of general tendencies without regard for performance outcomes. Kahneman and Tversky's (1972) study concerning the choice of individuating versus base-rate information in judgement tasks is prototypical of this problem. The subject's choice of heuristic is examined without assessing success in prediction as a function of judgement strategy. The fundamental assumption underlying this and many attribution studies is that the normative model is the ultimate prediction model and individual's judgement strategies are assessed using the normative model as a gold standard. Nisbett and Ross (1980) indicate that diagnostic individuating information is an acceptable alternative to base-rate information. It may be suggested that either use of highly diagnostic information or a combination of base-rate and individuating information (Lobo & Nair, 1990) is a more promising judgement model than either normative or heuristic models alone.
Shortcomings of base-rate information. As with attribution models, schema theory asserts that either diagnostic or base-rate information is developed solely from past-based information. The difficulties with using only past-based information sources have been discussed in the preceding section on attribution theory.

This section has elaborated the contributions of cognitive psychology to the understanding of intuitive prediction. In the following section, the contributions of decision theory to the study of intuitive prediction will be described. Enhancement of decision theory via the introduction of the notion of temporal perspective will be discussed.

Decision Theory and Judgement

The following section on decision theory as it applies to intuitive prediction is presented in an effort to address the following concepts:

1) Decision theory does not address the utilisation of the triad of temporal perspectives in judgement.

2) Decision theory discusses the notion that information-processing capacity constrains decision quality, but does not elaborate the contribution of work done outside of the judgement context to a reduction in the information-processing load.

3) Decision theory does not address the contribution of non-conflict motivation to judgemental accuracy.
The decision problem investigated in this thesis is of the ill-defined type. Ill-defined decisions can be described as those decisions for which the individual is unable to assign specific probabilities to outcomes (Howell & Burnett, 1978; Luce & Raiffa, 1957). Ill-defined decisions are common in group and organizational contexts. There are four general phases of the decision process that are common to this category of decision theories: 1) problem recognition; 2) identification of alternatives; 3) evaluation of alternatives; 4) selection of an alternative. Each will be outlined briefly.

Problem recognition. Recognition of a decision problem involves the perception of discrepancies between an existing state and a desired state (Miller & Starr, 1967). Individuals may monitor the environment for diagnostic signs that such discrepancies have occurred (Steinbruner, 1974). Mintzberg et al. (1976) noted that problems must be sorted out from environmental noise or non-relevant or diagnostic cues. The decision maker scans the relevant information to determine if the cues promote an image of himself experiencing personal setbacks, before moving on to the phase of surveying alternatives (Janis & Mann, 1977).

Identification of alternatives. A decision problem can be structured in one of two ways: a) theory-driven: the problem is assigned to a particular category on the basis of problems faced in the past, the category is typically retrieved wholesale from memory and applied with little modification; b) data-driven:
hypotheses are constructed and revised on the basis of incoming information with aspects unique to the situation. Individuals may at times use both processes in succession (Schank & Abelson, 1977). The category-matching process is typical of decision-makers with a great amount of domain-specific knowledge (Goldin, 1978). The use of scripts, or event sequences of actions and outcomes, by politicians to interpret new international events political decision-making has been examined. Decision theory views scripts as a means by which efficiency in structuring decision problems can be increased (Fiske & Kinder, 1980; Walker & Murphy, 1982). Individuals lacking knowledge in a domain will tend to generate hypotheses in an effort to explain decision problems (Getty & Fisher, 1979). Getty and Fisher contend that a recursive memory search is initiated if existing hypotheses do not meet a certain plausibility level. New hypotheses that meet this threshold are added to the current set. It is important to note that decision theory describes these processes as they occur within the judgement context.

The development of alternatives has been proposed to follow a continuum with one end consisting of the search for ready-made alternatives and the other end representing the construction of custom-made alternatives (Alexander, 1979; Mintzberg et al., 1976). Newell and Simon (1972) have described the nature of the custom design process as one in which the decision maker will mentally test various combinations of alternatives against possible attainment of goals. Readings from various research
endeavours on decision theory have provided information concerning the circumstances that elicit either a search or a design approach to problem-solving (Alexander, 1979; Beach & Mitchell, 1978; Ben Zur & Breznitz, 1981; Goldin, 1978; Pitz et al., 1980):

1) Decision makers will follow the least effort principle and will attempt to design novel strategies only as a last resort when search strategies prove inadequate.

2) Decisions that are significant and irreversible are more likely to elicit custom-made alternatives. This idea is important to the study at hand due to the fact that the judgements of officials are highly public, therefore presumably of high importance to the individual. Pilot interviews for this thesis revealed a reluctance on the part of the official to reverse decisions in order to avoid the appearance of indecisiveness. Therefore it may be proposed that custom-designing of alternatives, with the attendant information-processing constraints within the situation is a significant issue for the judgement context examined in this thesis.

3) Different styles of information-gathering and processing will result in a taxonomy of decision styles. Preceptive individuals rely on pre-existing schemas to guide information acquisition and interpret information. Receptive individuals are sensitive to the stimulus itself
and rely more upon design driven alternatives. The importance of judgemental style is examined in decision theory.

4) The number of alternatives generated depends on the number of independent aspects of the decision problem that are perceived. This concept illuminates the need for examination of attentional or information processing constraints on judgement.

5) When the decision maker custom designs alternatives information processing constraints may limit the number of alternatives to a small number.

6) Time pressure constrains the individual to a small number of more cautious alternatives.

7) A decision problem requiring an optimal rather than just an adequate solution will generate a greater number of alternatives.

It is important to note that many of the constraints on decision making is an important part of decision theory and that examination of such constraints is based on the premise that much of decision construction takes place within the judgement context. In this thesis it is proposed that superior judges utilise GIOA outside of the judgement context to reduce this load and that this approach to judgement can be considered as a new taxonomic variation.

Evaluation of alternatives. Evaluation can be considered
as a set of iterative considerations of alternatives designed to reduce uncertainty. The decision maker clarifies the criteria by which to judge alternatives, and estimate the probability of particular outcomes of various decision alternatives (McCall et al., 1982). Decision makers are often unsure of their alternative preferences, alter preferences in the face of actual experience and apply preferences inconsistently (Dyckman, 1981; Fischoff et al., 1980). Note that as with the attribution and cognitive theories presented alternatives modification is prompted by actual experience alone. GIOA posits a similar iterative process, but one which includes imaginary alternatives and which takes place outside of the judgement context.

**Selection of an alternative.** The selection phase of decision-making is posited to be a stressful process in that uncertainty may still remain concerning choice between highly similar alternatives. The post-decisional phase is characterized by regret and decision-bolstering reactions (Soelberg, 1967). Janis and Mann (1977) termed this a period of 'anticipatory regret' in which decision makers mentally project themselves into an uncertain future. The authors also contend that conflict in this phase is related to such factors as decision importance and irreversibility, and also the quality of pre-decisional information-processing. It is important to note that decision theory posits that conflict is the impetus for decision modification without consideration of positive motivations.
Factors Affecting Information Gathering and Integration

Several factors have been proposed as influences on the four stages of ill-defined decision theory:

1) Decision theorists posit that positive instances of a concept are more readily used by the decision-maker than negative instances: confirmatory reasoning is based on an earlier Piagetian stage of reasoning than disconfirmatory reasoning (Smedslund, 1963). This concept is similar to the notion of hindsight knowledge discussed in the section on cognitive theory, with the same implications for intuitive prediction.

2) Decision theory proposes the 'illusion of validity' (Einhorn & Hogarth, 1978) in which it is stated that, because data are not available on the potential success of rejected options, the decision maker will tend to overestimate the success rate of chosen options. Carroll (1978) found that rehearsal of relevant event scenarios resulted in a tendency tended to rate those scenarios as more probable than unrehearsed event scenarios. This is an important function of GIOA but rather than just rehearsal of experienced scenarios, GIOA posits the rehearsal of novel scenarios.

3) Decision theorists state that the process of estimating expected future values from past models is dangerous due to the fact that non-diagnostic features of the present event may trigger a connection between past and present events
(Abelson, 1976). This concept addresses the requirement for updating scenarios but bases updates on ongoing experience rather than imaginary experience.

4) Decision theory asserts that information overload amplifies the use of simplifying informational biases (George, 1974). This concept points out the possible utility of the GIOA process to judgement.

Summary: the Utility of Decision Theory in Terms of Intuitive Prediction

The review of the decision theory literature has resulted in the illumination of several points concerning the judgement process. These points are as follows:

1) Decision theory addresses the notion that a taxonomy of decision styles is possible.

2) Decision theory emphasises the concept of efficiency rather than just guidance in schema use.

3) Decision theory elaborates the notion of custom-designed alternatives and also the circumstances that promote this activity.

4) Decision theory outlines the importance of attentional processes, eg. the perception of positive instances, to the judgment process.

5) Decision theory elaborates the notion of information-processing constraints on decision quality.

6) Decision theory emphasises the importance of evaluation or testing of judgment alternatives.
7) Decision theory addresses the notion of the influence of stress, for example, time constraints, and importance of activity on judgement.

8) Decision theory addresses the concept of the possibility of differences in achievement outcome relative to various individual difference judgement process variables.

Criticisms of Decision Theory in Terms of Intuitive Prediction

Ill-defined decision theory comes closer than the preceding theories outlined in describing the process of judgement outlined in this thesis. There are several criticisms of decision theory that are particularly relevant to the thesis problem.

Importance of consideration of imaginary events. Decision theory asserts that estimating expected future values from past models is dangerous due to the fact that non-diagnostic features of the present event may trigger a connection between past and present events (Abelson, 1976). This proposition presumably relates to the idea that diagnosticity of particular cues alters over time and _a priori_ theories developed with these values of cue diagnosticity become of little utility. The addition of the concept of data-driven processes in decision theory addresses this deficiency. This proposition, however, is made more in the spirit of construing the superior decision-maker as a conscientious attender to situational cues that lend lack of credulity to _a priori_ theories, than to an active reflector upon and designer of possible upcoming event scenarios, as suggested by the GIOA process. In decision theory, the superior decision-
maker is engaging past and present temporal perspectives maximally, the use of future perspective is not addressed. Decision theory posits modification of a priori theories but, as with attribution and cognitive theory, still bases modification on actual experience rather than actual experience plus imagined possible events. As stated previously in criticisms of attribution and cognitive theories, exclusive use of base-rate information in prediction leads to inferior prediction because situational outcomes are multifactorial in origin and continually evolving with the changing environment. However, this thesis proposes that a variation of the data-driven process that can be maximally utilised by engaging this process both in and out of the decision context through GIOA.

Reduction of information-processing load. Decision theory deals with the variable of 'number of alternatives generated' for a given decision problem (Janis & Mann, 1977). The number of alternatives is framed in terms of limits in information-processing capacity and is defined within the parameters of the actual judgement context. The number of alternatives generated is therefore necessarily constrained by the number of independent aspects of the decision problem that are perceived, whether or not alternatives are custom-designed— which requires more cognitive work, whether there are time pressure constraints on the individual, whether the decision problem requiring an optimal rather than just an adequate solution (Alexander, 1979; Beach & Mitchell, 1978; Ben Zur & Breznitz, 1981; Goldin, 1978; Pitz et
al., 1980). Decision theory fails to take into account the effects of doing much of the custom-designing of alternatives (GIOA) outside of the actual judgement context on information-processing load in the decision situation.

**Importance of positive motivational style.** Unlike prior theories described, decision theory does not suggest a present-oriented conflicted state as the source of impetus to engage in decision-making, but rather a recognition that future events may induce conflict if the individual does not engage in the decision process (Janis & Mann, 1977; Miller & Starr, 1967). In this respect, decision theory posits the conflicted nature of the decision process but moves conflict from the present into conflict forecast in the future. As suggested in preceding sections, it is a premise of this thesis that the desire to prove oneself competent in the environment is a superior motivation for decision-making. Competence motivation (White, 1959, 1961) induces the individual to make decision evaluations against an internal standard rather than against the censure of other individuals. It is comparison with internal standards which allows the individual to experiment in the decision context, as failure is weighed only against internal standards and not amplified by external criticism. Reduction in susceptibility to criticism from without is posited to reduce anxiety and therefore to enhance the perception of situational cues which is essential to the matching of situational cues to formulated alternatives (Ingram et al., 1987, 1988; Ingram & Kendall, 1987).
Summary of Literature Review Part One

Part One of the literature review may be summarized with the following points:

1) One of the three judgement theories described fail to take into account the effects of utilising all three points of the temporal triad in the judgement process.

2) One of the three judgement theories do not address the notion of contribution of deliberate activity outside of the judgement situation to improvement in judgemental efficiency.

3) Two of the three theories fail to account for either one of:
   a) taxonomies of judgement style
   b) individual differences in the use of judgmental heuristics.

4) The three theoretical orientations described allude to but do not stress as central components the relationships between affective variables and those cognitive variables that are related to judgement.

5) The three theories discussed posit that cognitive changes are motivated by conflict; the importance of positively motivated schematic change and the implications for attentional processes essential for intuitive prediction is not stressed by these theories.
Literature Review Part Two: Influences on Temporal Perspective

Part Two of the literature review is concerned with the elaboration of the ways in which temporal perspective can be influenced by particular variables. The objective in Part Two is to establish by means of supporting research that temporal perspective is a mutable phenomenon, which is an important proposition of this thesis, and which has implications for achievement in judgement contexts.

Current Concept Definitions and Methodological Problems in the Study of Temporal Perspective

Recent research on temporal perspective has concentrated primarily on the topic of future temporal perspective with a relative disregard for the importance of past and present temporal perspectives. This is rather ironic considering that the major theories of intuitive prediction discussed previously have emphasised past and present perspectives with no consideration of future perspectives. Lack of parity in measurement and a unified definition of the construct(s) involved remain major hurdles to be overcome in empirical veridification of research hypotheses (Gjesme, 1983). This is a longstanding problem in the area. For example, studies using the different techniques for the measurement of future temporal perspective found discrepancies between scores of the same subjects on this construct (Lessing, 1968).

To further confuse matters there has been a splintering of the general concept of future temporal perspective into a myriad
of proposed smaller dimensions and potential influences including temporal extension (length of time over which thought is projected), temporal density (frequency of thoughts in a particular past, present or future temporal zone), realism (reality versus unreality of thought), perceived goal distance (distance of goal from present situation) and pessimism versus optimism (valence of time orientation) (De Volder, 1979; Klineberg, 1968; Trommsdorf, 1983).

The multiple dimension proposition has been countered by a limited interest in pursuing the concept of future temporal perspective as a unidimensional construct (Daltrey & Langer, 1984). Daltrey and Langer developed an 88 item inventory from 120 items which appeared to present a unidimensionality of construct when subjected to factor analysis.

Sanders' (1986) attempt to develop a self-report scale to measure, among other time-related variables, future and past temporal perspective typifies a longstanding problem concerning the validity of temporal perspective scales. Through a combination of rational and factor analytic methods, Sanders developed two 6-item scales referring to temporal perspective. The scales showed promise in terms of discriminable validity but as with many studies in the area, failed to attempt to relate scales with objective criteria of temporal perspective. In fact, one of the most striking deficits in research to date has been a disregard for strenuous attempts at criterion validation of instruments. This deficit provides an opportunity for the
present thesis to address the problem of criterion validity in the construction of temporal perspective measures. Utilised tests include such purportedly objective instruments as the circles test, events listing, story techniques and a variety of pictorial time lines and self-report tests whose valid representation of the construct under investigation is in question (Trommsdorf & Lamb, 1975).

What follows is a review of the most recent literature in order to assess the empirical advances in the study of time orientation. It may be noted that temporal extension and temporal perspective have been addressed in the literature as related but separate entities. Some of the work on temporal extension is included here because of theoretical implications that bear upon the subject of temporal perspective.

The Requirement for a Model of Temporal Perspective

In 1983, an entire volume of The International Journal of Psychology was devoted to the topic of the concept of future temporal perspective. Trommsdorf (1983) commented that social experiences determine the kind of future temporal perspective an individual possesses and suggested that a functional model demonstrating the relationships between cognitive and person variables and future orientation is required. This relationship illuminates the importance of research on temporal perspective to the discipline of social psychology. She discussed the importance of such variables as locus of causality (Trommsdorf &
Lamb, 1975), the perceived affective quality of conceptions of the future, and the motivational aspect of future conceptions.

Temporal Perspective and Motivation

Gjesme (1983), the editor of this special edition of The International Journal of Psychology, referred to the fact that the consideration of situational variables as influences on temporal perspective is a relatively new concept in the area. Gjesme proposed that future temporal perspective must be distinguished with respect to latent abilities and the degree of arousal of such latent abilities in given situations that may possess differential value-orientations for the individual. Specifically, an individual may demonstrate a low future temporal perspective because he/she possesses a low latent ability to engage in future temporal perspective. Conversely, low apparent future temporal perspectives may be manifested in situations for which the individual does not place much value on the future outcome. Gjesme indicated that narrowing the study of future temporal perspective to specific situations can lessen the likelihood of accurately gauging an individual's latent future temporal perspective. Gjesme proposes that the importance of a given activity to the individual will be related to the degree of accentuation of the effects of future-related motives and reinforcement on performance. Gjesme asserted that future Perspective can be envisaged both as a situationally determined phenomenon and a trait. However Gjesme's study concentrated
primarily on the correlation between anxiety and importance of activity as inducements of the manifestation of an unknown capacity for future temporal perspective. Underlying the situational aspect of the manifestation appears to be a traitlike conception of the orientation phenomenon with degree of arousal as the situationally variable aspect. What Gjesme has not addressed is a measurement of the manifestation of the triad of past, present and future temporal perspectives under the stress of situations whose value to the individual is high. This task is undertaken in the present study.

Agarwal and Tiwari (1988) conducted a similar study concerning the relationship between motivation and temporal perspective. They determined that a group who was forewarned about testing on a list discrimination task performed better than a group who was not forewarned. Agarwal and Tiwari concluded that perceptions of future utility affect the amount of temporal coding that is effected in such a task.

**Temporal Perspective and Stress**

Bouffard et al. (1983) examined the decrements in temporal extension that occur in response to goal frustration and found a significant negative correlation between temporal extension and frustration. This study was an attempt to investigate the effects of situational variables on future time extension. Bouffard found that there were no differences between groups before the occurrence of the frustrating situation on future temporal extension measures. Following admission or
rejection to the University of Rwanda, there was a significant difference in length of future temporal perspective between admitted or non-frustrated groups and rejected or frustrated groups. The conclusion to be drawn from this study is that present-based thinking may be a reaction to frustrating circumstances. The main difficulty with this study is that the post-test group was not the same group as that obtained for the pre-test and the original design was modified to become essentially a posttest only design. This difficulty casts in doubt the assumption of equality of groups on the measure preceding the manipulation.

Lomranz (1985) investigated the sensitivity of temporal perspective to social pressures. Lomranz referred to "the human tendency to maintain personal integrity and continuity within a framework of time orientation (temporal perspective) ...(that was)... tested by the most devastating stresses of constant loss and threat to life." Lomranz alluded to the possibility of defining positive rather than traditionally sought after negative aspects of survivor adjustments. He further refined the concept of temporal perspective into 'predominance' or relative weights attached to the past and future by the individual and 'density' defined as a measure of the number of events that subjects are concerned with regarding the past or future. This distinction was drawn in recognition of the fact that a single catastrophic event such as the holocaust can cause an individual to attach a great significance to the
past and to use such an event as a yardstick for all other life events. Lomranz compared a group of Holocaust survivors with a control group and found that Holocaust survivors were more past-oriented, more pessimistic and less future-oriented than the control group. No significant differences were found in present orientation. This finding is consonant with other studies that found a reduction in future temporal perspective under periods of emotional stress. There is an interesting point to consider in this study as in many others using time lines or written linear geometric representations of the life span. These kinds of tests require the individual to form a linear cognitive map of events that may not be linearly conceptualised cognitively and to transfer these possibly artifactual representations into a written format. If it is assumed that cognitive representations are even roughly linear then individual differences in spatial abilities could confound test results. Lomranz commented on this point indirectly by suggesting that an independent weighing of future and past might be more informative in terms of being less restricted to instrumental characteristics. Lomranz made an interesting comment that "if survivors give greater predominance to the past it must be at the expense of the future, as the line (measure) is finite." This point may be argued on the basis that Lomranz is claiming that a finite measuring instrument which may or may not validly represent temporal cognition is synonymous with the complexities of human thought patterns.
Another study on the effects of stress on temporal perspective was conducted by Beiser (1987). Beiser's results indicated that alterations in time perception may serve an adaptive purpose. Beiser investigated a group of Southeast Asian refugees in Vancouver. Individuals who were preoccupied with the past were found to have significantly higher levels of depression. During periods of acute stress, individuals who focussed exclusively on the present were comparably less depressed. A reemergence of thoughts about the past and future during stressful periods resulted in exacerbations of depressive states.

Agarwal (1983) found that experiential rather than physical deprivation during early developmental periods predicted degree of future temporal perspective. Low deprivation groups were found to be significantly higher on measures of future temporal perspective and extension than high deprivation groups.

Temporal Perspective and Ego Strength

Rapaport (1985) conducted an interesting study on the relationship between ego identity and temporal perspective. Rapaport contended that a strong sense of ego identity is consonant with a strong, dynamic future temporal perspective. He agreed with the contention of Platt and Darkes (1969) that the difficulty in obtaining strong indicators of validity for measures of temporal perspective is the "apparent cruciality of specific context to temporal perspective." To this end Rapaport called for more molar measures of temporality with relatively few
contextual cues. Rapaport used the Rapaport Time Line as a measure of temporal perspective. This instrument requires the subject to place significant life events on a strip of paper and gauges varying densities of events placed in the past, present and future as indicators of temporal perspective. Unfortunately Rapaport did not give readily available validity and reliability information on his measurement instruments. Allocation of subjects into groups of increasingly integrated ego-identity was carried out by an experimenter who was aware of the nature of the study, although it is not clear if Rapaport himself did the group assignment task. Interrater reliability for this assignation was computed on the assignations of a much less qualified individual, yielding a 76% interrater reliability rate, all of which leaves actual group membership in some doubt. Despite doubts conferred by the procedures and measures, some interesting results emerged from this data. Rapaport found that there was a significant difference in the amount of experiences that subjects place in each temporal zone on the paper strip. The allocation for distant future experiences was higher for individuals with more highly integrated ego structures than for individuals experiencing identity crises. In addition to this, the more integrated the ego identity the more overall balance was achieved between past, present and future time zones. This study is correlational in nature, therefore a case could be made for exploring the direction of the relationship between ego identity and temporal perspective. Rapaport made reference to ego
identity as a fluid entity whose degree of integration is responsive to the degree of identity crisis. It would be interesting to conduct the same study as a pretest-posttest design to see if temporal perspective changes during identity crises, as the baseline value was not established in this study. **Temporal Perspective and Development**

With respect to developmental issues in relationship to temporal perspective, Kastenbaum (1987) indicated that a wealth of empirical research and clinical experience indicates the importance of integrating past, present and future into the sense of the continuing self. Kastenbaum asserted that a realistic and significant goal in therapy for the elderly is to integrate past experience into the ongoing matrix of present experience. Erikson (1964) has written that "the young person, in order to experience wholeness, must feel a progressive continuity between that which he has come to be during the long years of childhood and that which he promises to be in the anticipated future.

Self-continuity is promoted by shifts in temporal perspective and is represented in psychoanalytic theory as a means of preventing pathologic fragmentation of the personality (Freud, 1953, 1958). More recently Satran (1989) contended that addressing the past is a central theme in psychoanalysis.

Oppenheimer and Van der Lee (1983) investigated the relationship of social perspective-taking and reversibility. Oppenheimer and Van der Lee found that social-perspective taking competence develops after the ability to reconstruct forward and
backward sequences develops in children. In other words, the ability to reconstruct sequences in order other than their original occurrence was significantly correlated with measures of social-perspective taking. The main problem with this work is the same problem that plagues many of the studies on temporal perspective which is the validity of measures used and in this case the validity of the measure of social perspective-taking.

Savickas et al. (1984) investigated the role of maturity of temporal perspective in the career decision-making process. Utilising the Long Term Personal Direction Scale and the Achievability of Future Goals Scale, Savickas determined that future temporal perspective was a component of two factors relating to vocational maturity and decision-making.

Greene (1986) examined the changes in future temporal perspective that evolve with the advent of formal operational reasoning. Greene asserted that Piaget failed to describe the particular dimensions of future temporal perspective that are influenced by cognitive developmental change. An investigation was conducted to ascertain the shifts in extension, density and consistency of future events that occurred over the course of adolescent development. Greene found greater temporal extension in older adolescents but failed to find a greater density of future related perceptions between adolescents of varying ages. Groups studied were 15, 17 and 19 years respectively. One curious aspect of this study is that Greene did not include a younger group than 15 years as this is an age by which many
researchers posit that the formal operational capacity is already in place. This may account for the weakening of results with respect to future temporal density. Greene utilised the density of future Events task in which the number of future events reported is taken as an indicator of future temporal perspective and the oldest reported proposed age attached to each event was a measure of maximum extension. This test violates one of the basic tenets of Lewin's theory with respect to the realism-irrealism dimension of perspective, as it makes no distinction between densities of plausible and fantastical future projection. In addition, Greene measured highest value of future extension and median value of future extension for varying ages and found significant differences between groups only on the highest value measure. This result is in question because this measure is probably subject to unrealistic guessing of values. Interestingly enough, Greene focussed on the Balance Beam measure of formal operations as the probable culprit in the lack of significant findings where this measure appears to be in fact the most valid and reliable of the study.

Tismer (1987) examined the relationship between development and temporal perspective. His results demonstrated a decrease in future temporal perspective and increase in present temporal perspective during adolescence. Tismer used the circles test as a measure of temporal perspective which he indicated is an objective measure. It may be noted that the subjects were given the following test instructions: "draw the circles...that best
show how you feel about the past, present and future." These instructions appear to be more attitudinately-related than density-related and Tismer may have in actuality been investigating the importance of valence of temporal conceptions rather than the density of temporal thoughts. Tismer did however recognize the distinction between realistic-mature versus fanciful-immature notions of the future. Tismer questioned the linear model of cognitive and motivational structure of anticipations and made a case for regarding temporal perspective as a curvilinear phenomenon in which temporal perspective is related to the distance of the goal from the present as opposed to the traditional linear conception. Tismer's results indicated that younger adolescents engage in more unrealistic, wishful thinking while older adolescents engage in more realistic future-oriented thought.

Strumpf (1987) used the Time Reference Inventory to gauge temporal perspectives of the elderly. Contrary to the dictates of "common knowledge", Strumpf found that elderly individuals reported that the present dominated their thoughts. Only 7% of the subjects claimed to think more about the past than the present. However, most of the subjects said that the past was the most important time in their lives and that they derived the most enjoyment from thinking about the past. Strumpf concluded that it is not necessary to be past-oriented to think about and enjoy the past. This finding is consonant with the studies concerning temporal perspective under stress, if one
takes into account that the study was conducted in an institution for the elderly. Institutionalization may be an relatively unhappy and therefore stressful experience for many elderly individuals which may result in a predominance of present temporal perspective, similar to the orientations mentioned earlier in periods of social upheaval such as war. When the elderly individual reflects on the relative autonomy of their life prior to institutionalization perhaps a present-based perspective is adaptive.

Hyman (1988) investigated aspects of what she termed "time competence" in elderly women. Hyman concluded that the self-actualizing individual orients themselves primarily in the present. The present is treated as a means to an end and regrets over events that have occurred in the past are overcome. She utilised the forced choice Personal Perspective Inventory which was validated by comparison of scores to clinical allocation to groups based on degree of self-actualization. Possibly the most disturbing aspect of this study was the fact that the sample consisted of 343 female 'helping professionals' who were probably a relatively homogeneous group in terms of self-actualization. In addition, the reliability values were calculated on college students who presumably fall largely into the same self-actualized category.

Temporal Perspective and Achievement

Mitchell and Cantlon (1987) devised a model for inducing futuristic problem-solving. Mitchell and Cantlon contended that
the future-oriented problem solver must create goals and objectives, analyze forces affecting goal achievement and forecast the consequences of solutions on the problem situation.

Born (1984) found a positive association between realistic organization of elements contained in thoughts about the future and successful integration into society.

Hyman (1988) revealed a positive relationship between future temporal perspective, internal locus of control and high levels of occupational aspiration.

**Temporal Perspective and Reflectivity**

Agarwal (1983) conducted a study of the influence of dispositional factors on time perspective which he proposed is learned through social forces. The effect of future temporal perspective on behaviour was also studied as well as the relationship of reflectivity versus impulsivity to time perspective. This study utilised a checklist of life events and the proportion of chosen future responses to possible future responses divided by total of all past, present and future responses chosen as a measure of future temporal perspective. Agarwal also studied the concept of future extension defined in this study as the number of years that the subject planned and thought over the past and the future. Agarwal studied the relationship between reflective versus impulsive style in decision-making using the story technique in which open-ended present tense statements were presented to subjects who were asked to complete the sentences with stories that were then
analyzed for future temporal perspective and extension. Agarwal found that future temporal perspective and extension were significantly and positively correlated with response time. In addition the study showed that reflective style showed a greater preference for delayed gratification when it was accompanied by a greater future temporal perspective. Agarwal contends that the results demonstrate that reflectivity is related to future temporal perspective in that an individual who is reflective ponders various hypotheses before arriving at a correct solution and is better prepared to delay immediate small rewards for larger delayed rewards.

Temporal Perspective and Affect

Strack (1985) studied the effects of affective associations with recent event memories on ratings of life satisfaction. Strack referred to the work of Tversky and Kahneman (1982) in which the authors stated that recalled events are considered by the individual to be representative of other events that take place in present life. Strack found that, if past events elicit affect at all, then recall of recent events with negative affective associations will have an effect on ratings of life satisfaction. If no affect is elicited then a reverse relationship between negative event recall and life satisfaction ratings may be found.

Darasse (1988) examined differential temporal perspectives that are associated with varying militant political affiliations. She found that communists were more past-oriented than French
consumer union activists. Present temporal perspective did not distinguish the two groups but communists were more positive about the future than the consumer union activists. Darasse used Osgood's Semantic Differential Scale to determine temporal perspective. This study could be criticised in this respect as Darasse appears to confuse temporal perspective with temporal Valence. For example, a choice of 'reassuring versus worrying' with respect to how one feels about the past may be less an indicator of temporal dominance than of optimism-pessimism about the past.

**Temporal Perspective as a Stylistic Variable**

Zuckerman (1988) attempted to investigate the role of future temporal perspective in attributions. He posited that the interpretation of an event by the observer can be seen in terms of an inference that might be drawn from that event or potential knowledge that can be learned from that event. Alternatively, the interpretation of an event can be seen as an explanation leading to the event or a potential cause of the event. In other words, some interpretations are designed only to explain the past and others are designed to be tested in the future. Zuckerman manipulated the temporal orientation variable by assigning subjects to one group with instructions that there would be a follow-up session or to another group with instructions that there would be no follow-up session. Zuckerman found that future-oriented observers focus on what he terms the inference set which reveals information to the observer about how
the interpretation will account for future events. This is a similar concept to that proposed in TPM in which both source of event to be interpreted and purpose of interpreting such events is to be found in future events.

Another study concerning the style of attribution with respect to temporal perspective was conducted by Wolf and Savickas (1985). A positive relationship was found between a sense of continuity between past, present and future, motivation and attributions of success to one's own effort and ability as opposed to attributing success to luck. The Long Term Personal Direction Inventory (Wessman, 1973) was used on a sample of 215 tenth grade students. Wolf and Savickas contended that grade tens are past the age when time concepts have emerged. Some criticism may be levied on this point since there are studies described in the developmental section that are based on the premise that temporal perspective development continues to occur up until 19 years of age.

Summary: Points from the Current Literature on Temporal Perspective

The review of recent literature above is representative of the current trends in theoretical inquiry concerning temporal perspective. From the wealth of information above, several conclusions relevant to the integration of temporal perspective into a model of intuitive prediction can be drawn:

1) Temporal perspective is influenced by both social experiences and personality variables. A functional model
demonstrating the relationships between cognitive and person variables and temporal perspective is required.

2) Temporal perspective must be examined with respect to latent abilities and the degree of arousal of such latent abilities in given situations that may possess differential value-orientations for the individual. Goals are important determinants of temporal perspective engagement.

3) Temporal perspective width can be reduced under periods of emotional stress and overconcentration on one part of the temporal triad results in deficiencies in concentration upon other parts of the triad.

4) Temporal perspective is associated with adjustment. A strong sense of ego identity is consonant with a strong, dynamic future temporal perspective. A wealth of empirical research and clinical experience indicates the importance of integrating past, present and future into the sense of the continuing self.

5) Temporal perspective development progresses from a more unrealistic, wishful thinking approach to considerations of the future to a more realistic conception of the future.

6) Temporal perspective is related to reflectivity in that an individual who is reflective is more future oriented.

7) Temporal perspective width is associated with positive affect.

8) Temporal perspective can be conceptualised as a stylistic individual difference variable.
Summary of the Literature Review: The Need for a New Model of Temporal Perspective

The preceding literature review may be summarized with the following points that tie the notion of temporal perspective into the concept of intuitive prediction:

1) Previous models of the explanation and prediction process suffer in their emphasis on the perceiver’s use of information derived solely from relatively passive processing of present and past events, without consideration of the impact of imagined future events on these processes. A new theory is required that outlines the importance of the predictor’s dynamic integration of past, present and future events to the process of intuitive prediction.

2) The importance of a preparatory process of resolution of imaginary or possible future event problems outside of the actual event context (GIOA) to the process of intuitive prediction requires investigation. This process is proposed to enhance the selection of alternative judgements and action strategies concerning the outcome of actual events by reducing the processing and decision-making load within the event context.

3) The review of current temporal perspective literature points out the necessity of examining the effects of particular
individual difference variables on the individual's ability to make use of all three points of the temporal triad. Several of the important variables discussed have been selected, based on information provided in pilot interviews, to form the basis of a dynamic model of intuitive prediction and consist of the following:

a) GIOA: ability to generate alternative outcomes or generation of images-of-achievement (use of past and future points of the temporal triad)
b) Self-efficacy: effects of perceptions of self-efficacy on GIOA.
c) Present temporal perspective (PTP): ability to maintain focus on present cues in performance situations (use of present point of temporal triad)
d) Motivation: effects of aggressive, conflicted, competence, cooperative and competitive motivations on PTP.

It is important to reemphasize at this point that this study is not intended as a validation of the causal pathways of the proposed model, but rather as an initial investigation into the likelihood of the above-mentioned particular components being important to the model.

The validation of model components is an essential precursor to causal analysis. If the proposed model components
are found to be valid then the next step is to ascertain the causal relationships between the components. This would be an analysis that would be carried out subsequent to this study.
A new model of intuitive prediction termed TPM has been developed with the awareness of criticisms of previous theories discussed in Part One of the literature review. From these criticisms the following criteria have guided theoretical propositions:

1) The literature review points out the need to take into account the effects of utilising all three points of the temporal triad in the judgement process.

2) The literature review illuminates the requirement for investigating the notion that GIOA activity outside of the judgement situation contributes to improvement in judgemental efficiency.

3) The literature review emphasises the need for an investigation of the usefulness of considering individual differences in the use of judgmental strategies.

4) The literature review points out the need to examine relationships between affective variables and cognitive judgement variables as significant components of judgement.

5) The literature review outlines the importance of investigating positive motivations for schematic change.

The TPM proposition incorporates the importance of the predictor's consideration of past, present and future events to the process of intuitive prediction. The model emphasises the importance of a preparatory process of resolution of imaginary
or possible future event problems outside of the actual event context (GIOA) to the process of intuitive prediction. As stated before, this process is proposed to enhance the selection of alternative judgements and action strategies concerning the outcome of actual events by reducing the processing and decision-making load within the event context. The model examines the effects of particular individual difference variables on the individual's ability to make use of all three points of the temporal triad and consist of the following:

a) GIOA: ability to generate alternative outcomes or generation of images-of-achievement (use of past and future points of temporal triad)

b) Self-efficacy: effects of perceptions of self-efficacy on GIOA.

c) Present temporal perspective (PTP): ability to maintain focus on present cues in performance situations (use of present point of temporal triad)

d) Motivation: effects of aggressive, conflicted, competence, cooperative and competitive motivations on PTP.

This model of temporal perspective can be viewed as a bipartate division between the importance to the process of intuitive prediction of:

1) Past and future perspective outside of the performance situation (GIOA)
2) Present temporal perspective within the performance situation (PTP). Present temporal perspective is posited to mediate the expression of past and future temporal perspectives within the performance situation. Specifically, PTP is posited to interfere with the accessing of the products of GIOA. It is proposed that the primary function of PTP engagement is situational cue perception. If cue perception is inadequate then the matching image in memory will not be a best-fit solution to the judgement problem.
The Temporal Perspective Model: A Model of Intuitive Prediction

The following schematic outlines the intuitive prediction process an individual goes through in the selection of a best-fit or most likely outcome of a performance situation.

Figure 1: The Temporal Perspective Model: A Model of Intuitive Prediction
Elaboration of Schematic Model Parts

Part A: Outside of the Performance Situation
motivation through self-efficacy→
engagement of past and future temporal perspective (GIOA)
or
engagement of past temporal perspective (memory)
→

Part B: Within the Performance Situation
aggressive-competitive or conflicted-competitive motivation
(negative affect)
or
competence-cooperative motivation
(positive affect)→
engagement of present temporal perspective (PTP) (pick up cues to match ongoing current situation to image-of-achievement in memory)
or
failure to engage present temporal perspective)→
accuracy of intuitive social prediction
or
inaccuracy of intuitive prediction)→
perceptions of efficacy→
...cycled back into GIOA...
TPM states that the ability of an individual to foretell the behaviour of others or to engage in intuitive prediction is enhanced by the looking at, or directing mental perspective to, knowledge from three points of the temporal event triad: 1) actual past events (past temporal perspective); 2) perceived present events (present temporal perspective); 3) imagined, possible future events or images-of-achievement (future temporal perspective). Actuarial prediction may be conceptualised as a process by which prediction is confined to the examination of past event frequencies or the past temporal perspective. Lobo and Nair (1990) found that a combination of statistical and judgemental forecasts yielded more accurate earning forecasts than either method alone. TPM asserts that a combination of actuarial (past-based) and imaginative, speculative processes (future-based) contribute to superior intuitive prediction.

TPM is also concerned with how motivational styles are related to the degree of manifestation of temporal perspective in performance situations. The effects of these variables on temporal perspective is proposed to influence the intuitive prediction process. The review of current temporal perspective literature indicates that temporal perspective is a phenomenon that is mutable, but only when subjected to great social forces. In this thesis it is suggested that an individual's temporal perspective suffers an effect under stress that may be compared to a regression of the developmental process in which, the cited research has revealed, perspective gradually expands to encompass
not only present experience, but past and future experience as well. Temporal perspective is conceptualized in this thesis as a more elastic phenomenon that demonstrates expansion and contractions in the width of the temporal span in situations that are only moderately stressful. The particular emphasis in this thesis is that the future and past temporal perspective are of maximum importance outside of the performance context in the development of ready-made judgement strategies (GIOA) and that the present temporal perspective becomes of significant importance within the performance situation. The importance of present temporal perspective is in the individual's in-performance situation perception of cues that is necessary to select the best-fit ready made IOA from the GIOA process. It is a basic proposition of this thesis that the width of temporal perspective can be reduced in two ways.

Outside of the performance situation. The individual fails to make use of imagined, possible events in the development of ready-made, best-fit judgement solutions or images-of-achievement (IOA). Temporal perspective is reduced to actual experienced or past-derived IOA. The alternative to this style of processing experiences is the elicitation of future temporal perspective. Note that future temporal perspective is intimately tied to past temporal perspective in the development of possible, imagined IOA. This is due to the fact that the past provides the materials for generating new, possible scenarios. Perceptions of self-efficacy are proposed to encourage the individual to
continue engagement in GIOA. In addition, cooperation-competence motivation is posited to result in a more reflective GIOA process than the externally oriented competitive-aggressive motivation.

Within the performance situation. The width of temporal perspective can also be reduced by failure to effectively engage present temporal perspective within the performance situation. An essential part of the judgement process is the matching of IOA in memory to performance situation cues. If an individual is unable to successfully pick up situational cues it is unlikely that best-fit strategies developed from past and future temporal perspectives (GIOA) will be aroused. If cue pick-up is inadequate then inappropriate strategies will be aroused.

Motivational type is proposed as influences on the engagement of present temporal perspective.

Model Part A: Processes Outside of the Performance Situation

Future and Past Temporal Perspectives: GIOA

The importance of past temporal perspective and future temporal perspective to intuitive prediction in the generation of multiple-images-of-achievement is outlined in this section. Pribram (1971) defined images-of-achievement (IOA) as holistic plans of movement that precede actual action. Pribram's concept of IOA referred to the process by which environmental contingencies and past experiences combine to form a blueprint for behaviour. Pribram suggested that the image decays every .5 seconds and is replaced by another containing all the output and outcomes necessary for the next step of the plan. Environmental
cues are screened and filtered by the representative record of prior experience. When the course of action looks good, a terminal IOA guides the final phase of action and the entire plan of action is present before it is needed (Fisher, 1984).

In interviews for the purposes of this thesis, athletes and officials reported the generation of several pre-action IOA for any particular performance situation, based upon a set of environmental cues that indicate possibilities for the behaviour of others. From this set of possible options is selected a terminal IOA that guides the individual's behaviour. Provided the individual is able to take in maximal amounts of information from the environment, an IOA can be selected from experience that best matches the cues. The choice of IOA should be as wide as possible in order to provide the best fit to the particular performance situation. Much of the expansion of the IOA repertoire by superior officials was apparently achieved outside of the actual performance situation. Clearly, many IOA can be drawn from actual experience but it appears that superior achievement in intuitive prediction is related to possession of a repertoire of IOA that goes beyond actual experience to considerations of possible, imagined or future IOA. This makes sense as it would seem logical that the more substantial the repertoire the more likely it is that a 'best-fit' prediction will be available that will in fact fit the situation at hand. It is at this point that width of temporal perspective plays an important role in the expansion of the repertoire. The process
of introducing imaginary experience to reflections on performance situations is considered in this thesis to be the introduction of future temporal perspective to the more passive past temporal perspective-oriented reflective process.

Temporal perspective is posited to determine the quantity and quality of IOA pertaining to a performance situation that are in the individual's memory. By quantity is meant the number of possible alternative predictions generated; by quality is meant the accuracy of intuitive predictions generated. It is to be noted that IOA that prove useful in performance situations are posited to be derived from a combination of practical and projective modes of thought. This stipulation is in keeping with Lewin's (1948) distinction between reality and irreality in future oriented thought as it seems reasonable to suggest that wishful thinking in the light of irreality does not yield useful products. Future temporal perspective, as an adaptive phenomenon, is not simply a general tendency to 'look to the future' as is suggested in the recent literature on time perspective. Instead, this thesis suggests, as did Erikson's formulation with regard to ego identity, that a fully developed and adaptive future time perspective incorporates and derives its substance from concerns of the present experience, interwoven with thoughts of past experience as subject matter for the reconstruction and prediction of future events. In this manner, future temporal perspective is a combination of temporal attention to the past, present and future and not simply a
tendency to 'look ahead' without regard to the past or present. In this thesis, outside of the stressful situation, the notion of temporal perspective is conceptualized more similarly to the stable conception represented in the literature to date. Temporal perspective is considered in this thesis much in the same manner as the conceptualization by Gjesme (1983), where it was posited that there is a distinction between ability and manifestation of that ability as a function of the importance of the situation to the individual.

Within the sport context there has been a body of research that specifically addresses the relevance of non-stressed reflection to performance in the stressful situation. A primary source of expansion of the repertoire of IOA appears to be directed daydreams or 'what if' daydreams. Directed daydreams must be distinguished from non-active daydreams and the eidetic which responds poorly to active imaginal handling (Ahsen, 1977). Daydreams are considered to be an important aspect of mental life that can contribute to health (Singer & Switzer, 1980). Some authorities have suggested that divergent thinking is an important function of daydreams (Straub & Williams, 1984). Individuals differ in the ability to imagine visually or verbally (Sheehan, 1972). The quantity and vividness of reported daydreams differs between individuals (Singer & Antrobus, 1963; Singer & Switzer, 1980). Some individuals use daydreams in a constructive manner to solve problems (Huba et al., 1977; Singer & Antrobus, 1963).
Influences on GIOA: Self-efficacy

Self-efficacy has been conceptualised by Bandura (1984, 1986; Bandura et al., 1963) as an cognitive variable that moves the individual toward performance of an activity. Bandura (1983) has referred to self-efficacy perceptions as determinants of anticipated fears. Self-efficacy perceptions have been found to influence performance on cognitive tasks (Bouffard-Bouchard, 1990) in terms of number of problem tasks completed, efficiency of selected strategies and accuracy of self-evaluation of responses. With respect to self-evaluation, Conway (1990) found that retrospective adjustments in autobiographical recall were more frequently significant for lower achievement individuals than higher achievement individuals. Self-efficacy in TPM is proposed to serve three important functions. These are:

1) Self-efficacy perceptions orient the individual to future goals and achievements and are associated with the engagement of future temporal perspective in the service of goal achievement.

2) Self-efficacy perceptions are associated with realistic self and situational assessments which are necessary 'realism dimensions' (Lewin, 1948) of the GIOA process.

3) Self-efficacy perceptions are associated with reductions in the frequency of images of anticipated fears of performance situations and allow the development of realistic problem solutions. This function is related to the limited information-processing capacity described in the section on
decision theory. TPM postulates that anticipated fears are low utility images that occupy information-processing space and which, when perceptions of self-efficacy are high, are replaced by images of solving problems realistically and successfully. The low utility of anticipated fears is posited in this thesis to be due to the associated arousal and effects on attentional processes.

Model Part B: Processes within the Performance Situation

Present Temporal Perspective

Present temporal perspective has been defined in this study as the ability to focus on or perceive meaningful cues in the judgement context. There are five motivational styles proposed by Butt (1979, 1987) that TPM posits exert an influence on the individual’s ability to engage present temporal perspective (PTP). These motivations are proposed to exert influence on PTP primarily through the effects of associated arousal.

Motivational Influences on PTP

From the TPM schematic, it can be seen that changes in the accessibility of present temporal perspective under performance stress are proposed to mediate the availability of multiple-images-of-achievement that have been generated outside the stressful situation. This section is concerned with these motivational influences on the accessibility of present temporal perspective. The motivational styles outlined in the in-performance-situation part of the TPM proposition are important for the affects associated with each motivation. It is the
affective component that distinguishes this motivational part of the model from the cognitive, future-orienting self-efficacy motivation proposed in the first part of the model. In this thesis, self-efficacy motivation is a cognitive variable and the other five motivations are considered for their importance as affective variables. Nideffer (1976, 1979, 1981; Nideffer & Sharp, 1978) defined attentional styles in terms of width and direction of focus and indicated that broad-width and externally directed attention was associated with high levels of social prediction in the sport environment. Present temporal perspective may be defined as a broad-external attentional style. Effective engagement of present temporal perspective means that a multiplicity of present-based cues is available to the individual to provide a better match to an IOA in memory than just a few cues. In TPM it is proposed that the more information the individual has about the cues of the current situation, the more accurately a match can be achieved between that situation and one from the memories storehouse of actual and hypothesized experience.

White's (1959, 1961) theory of effectance postulates that individuals are motivated by the drive to have an effect on the environment which he terms "effectance motivation". White maintains that competence derives from effective interaction with the environment through the enactions of learned behaviour. Acquisitions in competence are made independently of other drives such as hunger and sex. Effectance motivation is expressed in
social settings as influence by competition and aggression or influence by cooperation and competence. Butt (1979, 1987) drew upon White's theory and the extensive literature concerning cooperative and competitive motivations and achievement to develop and research a model of sport motivation in which positive relationships between: 1) cooperative and competence motivations and 2) competitive and aggressive or conflicted motivations were proposed and found. Butt developed a quintet of self-report scales designed to measure the five motivations of cooperation, competition, aggression, competence and conflict in the sport environment via assessments of associated affect. In competence and cooperative motivations attention is focussed on the improvement of self and others. Competence and cooperative motivations are associated with positive affect such as pleasure associated with self-improvement. Competitive motivation is associated with negative affect and attention is focussed either on the defeat of opponents or on inner turmoil. Competitive motivation is associated with: a) aggressive motivation where anger is the primary associated affect; b) conflicted motivation where guilt and anxiety constitute the primary associated affect. It is the nature of the affect associated with each of the motivational styles that are of primary interest in the TPM proposition. As discussed in the following section, negative affect has profound effect on present temporal perspective.
Negative Affect and PTP

Negative affect has been described as arousal that has been cognitively labelled as negative. Schacter (1964; Schacter & Singer, 1962, 1979; Schacter & Wheeler, 1962) postulated two conditions necessary for the experience of emotion: physiological arousal and the cognitive process that defines a particular emotional state. TPM asserts that negative affect has a detrimental effect in temporal perspective in the performance situation. As proposed by Butt (1979, 1987) negative affect can be expressed outwardly as aggression or inwardly as conflict. The following sections elaborate two ways in which negative affect influences present temporal perspective.

Effects of Aggressive Motivation on PTP

The temporal perspective literature supports the notion that stress negatively affects the width of temporal perspective (Beiser, 1987; Bettleheim, 1958; Bouffard, 1983; Lomranz, 1985; Stouffer, 1959). TPM asserts that negative affect is more stressful to the individual than positive affect. It is proposed in this study that the width of temporal perspective is affected differentially by the valence that is attached to the arousal that occurs under stressful performance situations, much in the same way that arousal affects field width and salience of objects in the present attentional field. The relationship between present attentional width and arousal has been well-documented in the attentional literature (Bacon, 1974; Burkham, 1964; Landers, 1980). TPM posits that negatively-valenced arousal of
aggression. that Butt (1979, 1987) proposed stems from competitive motivation, is associated with the inability to engage present temporal perspective. Negatively-labelled arousal or negative affect affects the engagement of present temporal perspective (cue pick-up) by reducing the individual's ability to perceive a multiplicity of environmental cues to match to IOA in memory.

Effects of Conflicted Motivation on PTP

Conflicted motivation (Butt, 1979, 1987) is associated with guilt and anxiety in the performance situation. Arousal with associated negative affect have been studied in terms of the tendency of negative affect to lead to inward focus (Bower, 1981; Isen et al., 1978; Wicklund, 1975). This inward focus contributes to the likelihood that individuals will focus on negative memories about themselves. In this process, IOA developed outside of the stressful situation are displaced in working memory by regressions in temporal perspective that dominate the individual's thoughts with past or future failures. There are two implications of this process:

1) Only certain IOA will be available to the individual. If working memory has a finite capacity (Huttenlocher & Burke, 1976; Pascual-Leone, 1970) and is filled' with negative images from past situations or unrealistic images of upcoming events, the number of available working memory units with which to reflect upon more realistic, better situationally matched images-of-achievement is reduced.
2) Negative affect will influence the ability to engage PTP by affecting cue perception. The negative relationship between state anxiety and performance has been documented in the sport environment (Cooley, 1977; Martens, 1977). A negative relationship between anxiety and temporal perspective has been found (Kraus & Ruiz, 1967; Ruiz & Kraus, 1968). TPM posits that negative affect such as anxiety affect the individual's ability to engage present temporal perspective through the interference of self-focussed thoughts.

Summary of TPM Propositions

Gjesme (1983) conceptualised temporal perspective as a latent ability whose manifestation is subject to the effects of particular aspects of the performance situation. In accordance with this proposition, TPM proposes that:

1) The use of both past and future temporal perspectives in GIOA outside of the performance context enhances intuitive prediction. The notion of the contribution of effort exacted outside of the performance situation expands upon the understanding of intuitive prediction provided by attribution, cognitive and decision theories.

2) Lack of ability to engage in present temporal perspective results in an actual regression to a primitive, narrow temporal perspective under stress.

3) Self-efficacy perceptions and motivational style affect the width of temporal perspective. Self-efficacy is positively associated with increased use of past and future
temporal perspectives. Positive motivational styles are associated with increased use of present temporal perspective.
OBJECTIVES

The three major objectives of the proposed research are as follows:

1) This thesis examines the construct validity of the TPM proposition.
2) This thesis undertakes an inquiry into the importance of width of temporal perspective to the process of intuitive prediction.
3) This thesis investigates the association between the TPM proposition and achievement in a judgement context.
Hypothesis 1

It is predicted that there will be a significant difference between high and low achievement groups in performance contexts requiring intuitive prediction, regardless of length of experience, on the following variables:

Model Part A

i) (GIOA):

The high achievement group will yield higher scores than the low achievement group on the tendency to derive problem solutions from considerations of both past-actual and future-possible event scenarios outside of the performance context.

ii) Perceptions of self-efficacy:

The high achievement group will yield higher scores on measures of perceived self-efficacy than low achievement group

Model Part B

i) Motivation:

The high achievement group will yield higher means on measures of competence and cooperation motivation and lower scores on measures of competition, conflict and aggression motivation than low achievement groups.

ii) Present temporal perspective (PTP):

The high achievement group will yield higher scores than the low achievement group on a measure of the ability to engage PTP under stressful conditions,
Hypothesis 2

Individuals who are high in GIOA and high in PTP will be distinguishable in terms of achievement in intuitive prediction from individuals who are high in GIOA and low in PTP. PTP is posited to mediate the expression of GIOA in stressful performance situations. This effect is posited to be due to the importance of PTP cue pickup and matching to GIOA best-fit alternatives in memory.

Hypothesis 3

It is hypothesized that the following associations will be found:

Model Part A

i) GIOA will be positively associated with perceptions of self-efficacy.

Model Part B

ii) PTP and competitive, conflicted and aggressive motivation will be negatively associated.

iii) PTP and cooperative and competence motivations will be positively associated.
The subjects used in this study were 118 ice-hockey officials from the lower mainland of Vancouver. The sample consisted of 116 male and 2 female officials ranging in age from 14 to 51 years of age. The TPM proposition was developed from a series of interviews with, and on-ice observations of, a cross-section of officials in which it became apparent that the proposed set of TPM variables were likely candidates for critical determinants of competency in officiating. The role of the official in ice-hockey is to maintain boundaries for the behaviour of participants in the game with as little obvious intervention as possible. The official who is high in the ability to make accurate intuitive predictions should be able to maintain these boundaries without resorting to more obvious intervention tactics, by predicting and subtly influencing the behavioural choices that are made by players.

Ice-hockey officials are recertified each fall in clinics held throughout the province. The clinics consist of 30 to 100 officials and are divided by Level, that is, each clinic is designed for a particular Level from Level One (minor hockey) to Level Six (college and junior hockey). Individuals are assigned to Level One or Two if they pass a written examination. Assignment to the other four Levels is by invitation based on evaluations and recommendation by experienced officials. Once
the official is qualified he/she may be assigned to increasingly more demanding calibres of hockey within a given player age category such as Bantam, Midget or Junior. Individuals under the age of 14 were deleted from the analyses as it was desirable to retain only those individuals who had achieved an age where the achievement of formal operational capabilities were probable (Case and Griffin, 1989; Case, 1988; Fischer and Pipp, 1984; Keating and Clark, 1980). Additional analyses for the purposes of validating the GIOA and PTP scales were conducted on 110 third year undergraduate psychology students on a parallel form questionnaire dealing with examination and study judgements and strategies.

It is important to establish that the performance situation of the officials under study is in fact a judgement context. This matter was addressed by acquiring a copy of the official evaluation form which is utilised by official evaluators to assess the competence of officials. The rating scale includes an item "rating of judgment ability" that must be assessed by the evaluator. This item supports the contention of this thesis that judgement is an important component of the performance situation under study.

Procedure

The instruments used in this study were administered in the controlled setting of the summer clinics in time periods of approximately one hour. Student surveys were administered in the spring of 1988 in the undergraduate psychology classes.
Instruments and Measures

The measurement strategy taken in this study was to use a number of original scales designed for the purpose of the study and which were specific to the sport environment. These new scales were backed up by several widely used measures of reported reliability and validity and several objective and performance measures. In keeping with the philosophy of Gjesme (1983), whose results indicated that temporal perspective may not be aroused in every situation, it was preferable to construct scales that referred specifically to the situation of interest which was the sport context. A manipulation of the degree of situational importance of the officiating activity was the overwhelmingly positive response to an item that questioned officials as to whether they would participate in the activity of officiating without payment. A second reason for utilising sport specific scales was to increase the face validity of the questionnaire for the respondents in order to enhance the degree of conscientious responding. A third reason was that the scales are intended to be used subsequently as practical, sport specific tools.

Model Part A

GIOA: An experimental scale was constructed consisting of 11 items that were balance keyed and intended to indicate the degree of non-stressed thoughts about the performance context that were concerned with the development of future-oriented novel solutions to problems. The content of these items was based on descriptions provided by high achievement officials in pilot
interviews. Items were investigated for reliabilities and validities and all 11 items proved satisfactory for scale inclusion. A sample item is: "After games I like to think about problems that came up and how I might have handled them differently". (alpha reliability=.5143. See appendix for test items).

**Self-efficacy.** Perceptions of self-efficacy were measured using the self-confidence factor from Quinlan and Janis' Self-Esteem Scale (1982). High scores on the self-efficacy scale are indicative of strong perceptions of self-efficacy. A sample item is: "I expect to do well in the future as an official". (Cronbach's alpha=.91).

**Model Part B**

**PTP.** An experimental 20 item scale balance keyed in the direction of focusing on present cues was developed from a pool of 30 items. Item content was based on descriptions of cue perception behaviour provided by high achievement officials. The statistical properties of the 30 items were analyzed and item statistics, reliabilities and validities were considered in the final choice of 20 items. High scores on the PTP scale are indicative of ability to maintain focus on the present and to perceive relevant situational cues. A sample item is: "I rarely miss much of what is going on around me in a game". (alpha reliability=.7435. See appendix for test items).

**Motivational style.** Motivational style was assessed using
Butt's Sport Motivation Scales (Butt, 1979:1987). The five 5-item scales are keyed in the direction of cooperation, competition, competence, aggression and conflict. Scale items refer to expressions of affect associated with each motivational type. A sample item is: "When I am officiating I often feel happier than I am than doing anything else (competence item)." (split half reliability=.5-.8)

Other Measures Used in this Study

Cattell's Factor M Scale. Cattell's Factor M scale is a measure of "autism: a trait of general tendency to be autistic, i.e. to perceive reality falsely as in accord with one's wishes, also wrapped up in inner imaginative developments, bohemian, careless of practicalities" (Cattell, 1965).

Cattell's Factor C Scale. Cattell's Factor C scale is a measure of "ego strength: a source trait showing itself in good emotional stability and capacity to cope with emotional difficulties...(the opposite pole of which)...manifests itself in emotional instability and being easily upset and moody." (Cattell, 1965).

Physical symptoms checklist. This was a 10 item checklist of physical symptoms perceived by the individual around game time and intended as an objective somatic correlate of negative affect.

GIOA and PTP criterion variables.

A set of items intended as objective validations of experimental scales including preferred types of books, leisure
activities, school grade over previous year, team captaincy, number of lottery ticket purchases per month, number of fistfights over lifetime, chess ability, tardiness, number of traffic accidents and tickets relative to age, political preference and frequency of participation in vicarious learning opportunities. These items were utilised in two principle component analyses to produce two first principle components which served as criterion variables for the validation of GIOA and PTP (see appendix). Sample items are: "What kind of books/movies do you prefer? (GIOA)"; "How many traffic accidents have you been involved in for which you were the driver? (PTP)".

Overall achievement criterion variable. Overall achievement as an official was measured by taking scores on the first principle component of a set of items referring to achieved Level, calibre of hockey officiated the previous year, number of games assigned per month over the last year, number of playoff games assigned in the past year, number of letters of complaint from coaches and parents divided by years of experience, frequency of comments from peers on the implementation of novel solutions and frequency of comments from peers on the implementation of unsuitable solutions. A sample item is: "What calibre of hockey did you primarily officiate last year (specify B, A, AA or AAA calibre)?".

Intuitive prediction criterion variable. A measure of the suitability and originality of performance situation solutions and ability to plan ahead and deal effectively with odd
situations was generated by means of a principle component analysis on 5 items related to peer reports on these abilities. This variable was developed with the intention of conducting a more specific analysis of intuitive prediction than that used in the main model analysis. The main model analysis was conducted using the more robust Overall Achievement variable. A sample item is: "I have been complimented by official performance evaluators on my use of original solutions to game problems". Scores on the first principle component of this analysis formed the criterion variable. The rationale underlying the use of this variable is that use of successful and original problem-solving strategies in the performance situation is presumed to be an index of intuitive prediction. According to information provided in the pilot interviews and observations, the task of an official is to perceive, interpret and predict behaviour and to intervene on a subtle level before it becomes necessary to call penalties. The correlation between Intuitive Prediction and Overall Achievement as an official criterion variables was .4860 (p < .000). This association between Overall Achievement and Intuitive Prediction has two implications:

1) Intuitive prediction is an important part of the composite of abilities that are required of a competent official.

2) Analyses in this study based on overall achievement imply a significant intuitive prediction component.
DESIGN AND ANALYSES

Analysis 1

A two by two MANOVA design of achievement by years of experience was utilised, followed by univariate ANOVAS on dependent variables. Officials were divided into the four groups based on the Overall Achievement variable yielding two groups of high and low Overall Achievement, and a division of groups into low and high Years of Experience. Group divisions were based on median splits on Overall Achievement and Years of Experience. The following values were utilised for the median splits: a) Low years of experience were from 0 to 6 (mean=3.15) and high years of experience were from 7 to 30 (mean=12.63). Low Overall Achievement ranged from -1.57 to -.999 (mean=-.863) and high Overall Achievement ranged from 0 to 1.758 (mean=.863).

The dependent variables in this analysis were:
1) GIOA
2) Self-efficacy
3) PTP
4) Aggressive motivation
5) Conflicted motivation
6) Competence motivation
7) Cooperative motivation
8) Competitive motivation
Analysis 2

A two by two ANOVA design of GIOA by PTP on the dependent variable of Intuitive Prediction was used.

Analysis 3

Pearson correlations were computed for the following variables:

i) GIOA and Self-Efficacy

ii) a) PTP and Competitive, Conflicted and Aggressive Motivations.

b) PTP and Cooperative and Competence Motivations.
RESULTS

In order to test the experimental hypotheses, a series of descriptive and inferential tests were performed. These included analyses of variance, post-hoc tests and correlational indexes. The results of each of these tests will be reviewed in the following sections. A number of experimental scales designed for the purpose of this study were developed. As some of the results of the major analyses were achieved utilising these experimental scales, investigation of the validity and reliability of these scales was of critical importance to the results. The psychometric properties of these scales are explored more fully in the appendix.

Analysis 1: Investigation of Group Differences in Terms of Overall Achievement and Years of Experience on TPM Variables

As predicted, a significant difference was found between groups in terms of Overall Achievement, regardless of Years of Experience (Table 1 and Table 2). The main effect for Overall Achievement was significant, \( F(1, 95) = 5.8730, p < .001 \). The main effect for Years of Experience was not significant, \( F(1, 95) = .3010, p > .05 \). No significant interaction was found between the independent variables of Years of Experience and Overall Achievement, \( F(1, 95) = .2498, p > .05 \).

Univariate ANOVA's following the significant main effect of Overall Achievement were conducted (Table 3 and Table 4). High Overall Achievement group means were significantly higher
than low Overall Achievement groups on GIOA, Self-efficacy, PTP, Competence Motivation, and Cooperative Motivation (See Table 4 for group means). Competitive Motivation, Aggressive Motivation and Conflict Motivation did not distinguish groups in terms of Overall Achievement.

Table 1
MANOVA on Overall Achievement by Years of Experience

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Approx. F</th>
<th>Sig. F</th>
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<tr>
<td>Overall Achiev</td>
<td>1</td>
<td>5.8730</td>
<td>p &lt; .001</td>
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<tr>
<td>Years of Exper.</td>
<td>1</td>
<td>.3010</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Over.Ach x Yrs.Exp.</td>
<td>1</td>
<td>.2498</td>
<td>p &gt; .05</td>
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Table 2
Cell Frequencies for MANOVA on Overall Achievement by Years of Experience

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<tr>
<td>Low O.A High Yrsex</td>
<td>21</td>
</tr>
<tr>
<td>High O.A Low Yrsex</td>
<td>24</td>
</tr>
<tr>
<td>High O.A High Yrsex</td>
<td>26</td>
</tr>
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</table>
Table 3
Univariate ANOVAS Following Significant MANOVA on Overall Achievement

<table>
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<td>Sig. F</td>
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<tr>
<td>GIOA</td>
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<td>p &lt; .001</td>
<td>PTP</td>
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<td>6.1947</td>
<td>p &lt; .01</td>
<td>AGGRESSION</td>
<td>.1314</td>
</tr>
<tr>
<td>SELF-EFFIC.</td>
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<td>23.8819</td>
<td>p &lt; .001</td>
<td>CONFLICT</td>
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<td>.0700</td>
<td>p &gt; .05</td>
<td>COMPETITION</td>
<td>.0002</td>
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<tr>
<td>PTP</td>
<td>1</td>
<td>23.8819</td>
<td>p &lt; .001</td>
<td>COMPETITION</td>
<td>1</td>
<td>.0002</td>
<td>p &gt; .05</td>
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<td>4.2144</td>
</tr>
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<td>6.1947</td>
<td>p &lt; .01</td>
<td>COMPETENCE</td>
<td>1</td>
<td>7.9430</td>
<td>p &lt; .01</td>
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<td></td>
</tr>
<tr>
<td>CONFLICT</td>
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<td>p &gt; .05</td>
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<td></td>
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<td></td>
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<tr>
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<td>2.900</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td>11.255</td>
<td>p &gt; .05</td>
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<tr>
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Note. Officials: N=99

Table 4
Comparison of Group Means on Univariate ANOVAS Following Significant MANOVA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Low Overall Achievement</th>
<th>High Overall Achievement</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
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<tr>
<td>GIOA</td>
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</tr>
<tr>
<td>SELF-EFFIC.</td>
<td>34.490</td>
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</tr>
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<td>PTP</td>
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<td>AGGRESSION</td>
<td>13.569</td>
<td>2.900</td>
</tr>
<tr>
<td>CONFLICT</td>
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<td>3.346</td>
</tr>
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<td>COMPETITION</td>
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<tr>
<td>COOPERATION</td>
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Note. N of Groups: Low Overall Achievement =52
High Overall Achievement=47
Analysis 2: The Mediating Effects of PTP on GIOA

Significant main effects were found for both GIOA, \( F(1, 108) = 19.325, \ p < .001 \), and PTP, \( F(1, 108) = 4.526, \ p < .05 \) on the dependent variable of Intuitive Prediction. Significant interaction effects between the two independent variables were also found, \( F(1, 108) = 6.993, \ p < .001 \) (see Table 5 and 6). Simple effects analysis on the interaction resulted in a finding of significant differences between means for groups high on GIOA on PTP, \( F(1, 54) = 9.232, \ p < .001 \).

---

Table 5
Two-Factor ANOVA of GIOA by PTP on Intuitive Prediction

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>DF</th>
<th>Approx. F</th>
<th>Sig.</th>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>GIOA PTP</td>
<td>1</td>
<td>6.9931</td>
<td>( p &lt; .001 )</td>
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</table>

Note. Officials: N of cases=112
Table 6
Means and N's for Two-Way ANOVA on Intuitive Prediction

<table>
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<tr>
<th>Group</th>
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<th>N</th>
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<tr>
<td>Low GIOA -Low PTP</td>
<td>34.61</td>
<td>33</td>
</tr>
<tr>
<td>Low GIOA High PTP</td>
<td>32.78</td>
<td>27</td>
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<td>High GIOA -Low PTP</td>
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<td>27</td>
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Analysis 3: Associations Between Model Variables

**Model Part A.** GIOA was found to be positively associated with Self-Efficacy in the official's analysis \((r = .25, p < .01)\). Student analyses showed a non-significant trend in the same direction \((r = .13, p > .05)\).

**Model Part B.** It was posited that Aggressive Motivation, Conflict Motivation, Competitive Motivation would be positively associated. Low engagement of PTP and Competitive Motivation were posited to be positively associated. The results demonstrated the posited associations between Aggression Motivation, Conflict Motivation, Competitive Motivation and PTP in the official's analyses (Table 7). Student analyses demonstrated comparable results except for the association between Aggressive Motivation and PTP.
### Table 7
Correlations between Aggression, Conflict and Competition Motivations and PTP

<table>
<thead>
<tr>
<th></th>
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<td>-0.2000*</td>
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<td>0.0809</td>
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<td>0.2251*</td>
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<td>-0.2657*</td>
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<tr>
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<td></td>
<td>-0.3483**</td>
<td>-0.1509</td>
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<tr>
<td>PTP</td>
<td></td>
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</table>

**Note:** Upper Value: N of cases: Officials 118
Lower Value: N of cases: Students 110

1-tailed Signif: * p < .01 ** p < .001

b) Cooperative and Competence Motivations, and engagement of PTP were posited to be positively associated. Proposed positive associations between Competence and Cooperative Motivations were found (Table 8). The predicted positive association between PTP and Competence Motivation was found. The proposed positive association between PTP and Cooperative Motivation was not supported in the official's analyses but was supported in the student analyses.
Table 8
Correlations between Cooperation and Competence Motivations and PTP

<table>
<thead>
<tr>
<th></th>
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<th>Competence</th>
<th>PTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperation</td>
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<td>0.3734**</td>
<td>-0.0083</td>
</tr>
<tr>
<td>Competence</td>
<td>0.2101</td>
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<td>0.3195**</td>
</tr>
<tr>
<td>PTP</td>
<td></td>
<td></td>
<td></td>
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</table>

Note. Upper Value: N of cases: Officials 118
Lower Value: N of cases: Students 110

1-tailed Signif: * p < .01 ** P < .001
DISCUSSION

The TPM Model

One of the most important objectives in this study was achieved. The hypothesis was largely confirmed that the set of variables pertinent to the proposed model of intuitive prediction are important distinguishing variables in terms of overall achievement as an official. The findings of the overall achievement analysis support previous findings that achievement is positively associated with span of temporal perspective, particularly with the extension of perspective into the future (Born, 1984; Hyman, 1988). The findings of this thesis are encouraging for the prospect of continuing research in the development of the proposed model with methodology and analyses appropriate to the investigation of causal model pathways.

GIOA: Contributions of Activity Outside the Performance Situation to Intuitive Prediction

It appears that GIOA is a highly significant contributor to the distinction between achievement groups. This is a result which runs counter to intuitive notions that, ultimately, it is actual experience that provides solutions to all intuitive prediction problems. In fact, in this study, years of experience was not a significant main effect nor did years of experience contribute to an interaction effect with achievement. Years of experience showed only a mild, nonsignificant positive correlation with overall achievement. The conclusion to be
drawn from this result is that it is not experience that contributes to achievement as much as it is what one does with the memories from one's experience. The restructuring and multiplication of solutions in out-of-performance-situation contexts has an important relationship with achievement. This result is, in fact, consonant with the findings of many sport researchers that daydreams are considered to be an important aspect of mental life that can contribute to health (Singer & Switzer, 1980), that divergent thinking is an important function of daydreams (Straub & Williams, 1984), that individuals differ in the ability to imagine visually (Sheehan, 1972; Singer & Antrobus, 1963; Singer & Switzer, 1980) and that some individuals use daydreams in a constructive manner to solve problems (Huba et al., 1977; Singer & Antrobus, 1963).

The GIOA concept is similar to the 'constructive alternativism' proposed by Kelly (1955). Kelly posited that individuals engage in alternative interpretations of similar events either by conceptualising different individuals in the same event or the same individual in repeated involvements in the same event. Kelly theorised that this interpretive process was at the center of individual differences and channelled behavioural responses. Kelly stipulated, however, that any personal theory was subject to alteration based on conflicting facts from ongoing experience. The conception of personal theory generation from imaginative sources was not a theme of Kelly's proposition. GIOA would be conceptualised as the same individual
involved in different events or different outcomes for the same event. It is apparent from the results of this thesis that the individual's use of imagination can contribute substantially to the development of alternatives. GIOA is a highly significant distinguishing variable in terms of behaviour and achievement in judgement contexts.

The importance of out-of-judgement-context intuitive analyses can not be overemphasised. The results of this study have supported the notion that IOA modification can occur outside of the judgement context. In terms of decision theory with respect to information-processing capacity, GIOA relieves the individual of the task of constructing data-driven theories within the performance situation. Utilisation of GIOA solves the following information processing problems outlined by decision theory (Alexander, 1979; Beach and Mitchell, 1978; Ben Zur and Breznitz, 1981; Goldin 1978; Pitz et al., 1980):

1) Custom designing solutions consumes much of the information-processing capacity of the individual in the performance situation.

2) Time pressure in performance situations limits the number of alternatives developed to a small number.

3) Performance situation information overload contributes to the use of simplifying heuristics, which may interfere with decision or judgement quality.

4) Information overload in the performance situation limits the number of cues perceived and consequently the number of
alternatives generated.

The functional aspect of preparedness has been noted (Fiske & Kinder, 1980; Walker & Murphy, 1982). Preparatory rehearsal of scripts elevates the individual's estimations of the probability of occurrence of rehearsed events (Carroll, 1978). This aspect of rehearsal is related to the 'illusion of validity' in which positive instances are used more readily than negative instances (Smedslund, 1963). From the results of this thesis, it appears that rehearsal of imaginary scripts allows the individual to entertain new possibilities for situational outcomes by making the 'illusion of validity' serve a useful purpose. In other words, rehearsal of imaginary scripts allows those scripts to become part of the individual's stored script resource. Schemas have been described as readily available, sometimes automatic, plans of action (Showers & Cantor, 1985) developed spontaneously with experience. In periods of stress the individual is posited to fall back on these schemas or 'well-worn social routines' (Cantor, 1990). This thesis has posited and supported a more dynamic, deliberate, out-of-performance-situation process of schema development in which the 'well-worn routines' are under constant reconstruction, reappraisal and revision. This GIOA process is analogous to an out-of-performance-situation ill-defined decision-making process. The deliberateness proposed in TPM may be compared to the notion of 'defensive pessimism' proposed by Cantor (1989). Defensive pessimism refers to an a priori approach to tasks in which expectations for outcome are
lowered prior to the task and confrontive coping is utilised to deal with anxiety. The effectiveness of defensive pessimism lies in the preparatory aspect (Brehm et al., 1983). TPM concurs with the notion of preparatory, confrontive coping but not with the aspect of lowering expectations prior to an event. Individual differences in the realistic nature of expectations is at the very heart of TPM and it is that factor which distinguishes individuals in terms of achievement. This thesis has proposed and supported the notion that the nature of an expectation sets the level of intuitive prediction that can result in performance situations as intuitive prediction must by necessity be linked to real possibilities and not ego-protecting expectations. This study has found that GIOA or schema adaptation itself functions as a coping mechanism both preceding and following negative outcomes by ensuring the individual that future occurrences of similar situations will be more accurately predicted and provided for. In addition, schema 'readiness' through GIOA enhances performance and therefore perceptions of self-efficacy. Cantor (Cantor, 1990) reveals that defensive pessimism results in high costs in anxiety for the individual and likens the process to a cost-benefit tradeoff. In TPM, the process of confronting potentially anxiety-producing failures or expected difficulties is eased by the prospect of being better prepared. This notion has been supported by Showers (1988) who has contended that focussing strictly on concrete 'how to's' of tasks prevents anxious ruminations. Cantor (1990) and Wright and Mischel (1987)
have pointed out the necessity for low environmental demands and repeated script rehearsal in interventions to modify existing schemas. These non-stressed rehearsals are exactly the conditions defined for GIOA. It is interesting that Cantor states that defensive pessimism is non-adaptive because it focuses the individual on low-probability outcomes. It is precisely the rehearsal of low-probability outcomes in addition to high probability outcomes that distinguishes superior intuitive predictors in this thesis.

Motivation to engage in GIOA: The Influence of Self-efficacy on Schema Adaptations

Building on Kelley's (1973) work, researchers have delineated schemas, scripts and episodes as fundamental cognitive units of personality (Cantor, 1990). These schemas that shape the way in which individuals perceive and interpret events are conceptualised as personal styles for seeing the world (Cantor, 1990). The approach taken in this thesis, which is supported by the results, is that schemas are reflected in personal style and are also influenced by individual differences in the willingness and ability to adapt personal styles to changing environments in the service of predicting events in those environments. This view of schemas is a more dynamic one than that posited previously (Baumeister and Scher, 1988; Cantor, 1990; Epstein, 1973; Nisbett & Ross, 1980) in which the individual is pictured as relatively resistant to schema modification.
Several theorists have posited that schema modification occurs primarily as a response to conflict or overwhelming life events (Stewart, 1989; Versoff, 1983). Other researchers posit that perceptions of future utility affect the degree to which temporal perspective will be engaged (Agarwal and Tiwari, 1988; Gjesme, 1983). The view of the individual in TPM is more consonant with the latter profile. This conception has also been proposed by Markus and Nurius (1986) who suggest that the individual invokes multiple temporal perspectives on past, present and future selves with the idea of attaining an ideal self (Higgins et al., 1985). Decision theorists have posited that the expectation of personal setbacks, goal attainment, the contributions of perceived discrepancies between existing cues and desired states drives the individual to engage in the decision-making process (Dyckman, 1981; Janis & Mann, 1977; Newell & Simon, 1972; Soelberg, 1967). It is this pursuit of the ideal self, in which schematic change is referenced to internal standards, that has promoted the study via TPM of the role of self-efficacy (Bandura, 1977, 1978, 1983, 1984, 1986; Bandura et al., 1963; Bandura & Cervone, 1983) in the elicitation of IOA or schematic evolution. The existence of individual differences in perceptions of self-efficacy has been shown in this thesis to be related to differential proclivities for the triadic temporal engagement that is associated with schema or IOA adaptation. Markus and Nurius (1987) alluded to this connection when they reported that absence of positive images of future selves lead to
difficulties in mobilising for specific action in the present.

TPM asserts that the individual needs to be conceived of as falling on a continuum of being willing to repetitively address particular problems in order to reach self-goals (Steele, 1988).

**The Role of PTP in Intuitive Prediction**

The results of this study indicate that PTP is an essential component of intuitive prediction. These results support Nideffer's (1976, 1979, 1981; Nideffer & Sharp, 1978) contention that broad-external attention or PTP is an important part of intuitive prediction. The performance situation is the point in time at which all three points of the temporal triad come together in the service of intuitive prediction. The importance of PTP as a mediator of judgements derived through GIOA lies in the fact that if the situational cues are not accurately perceived then the IOA selected from memory will be inadequate. TPM proposed the notion that the picking up of situational cues to match to IOA in memory was interfered with by the filling of short term memory with negative images stemming from aggressive motivation or conflict motivation. This lack of ability to engage PTP stemmed from the fact that the number of available working memory units with which to reflect upon more realistic, better situationally matched images-of-achievement is reduced (Huttenlocher & Burke, 1976; Pascual-Leone, 1970). Decision theory refers to this point in the decision process as that time when the individual must monitor the performance
situation environment to pick up cues indicating a discrepancy between existing and desired states (Janis & Mann, 1977; Miller & Starr, 1967; Mintzberg et al., 1976; Steinbruner, 1974). This thesis has posited that the existing state is present temporal perspective; the desired states stem not only from past, but from both past and future temporal perspectives. This is the point at which all three temporal perspectives intersect in the pursuit of accuracy in intuitive prediction.

It is also at this point that the temporal span that may have achieved optimal width outside of the performance situation, in the engagement of both future and past temporal perspectives, can suffer decrements in manifestation that resemble earlier developmental periods (Inhelder & Piaget, 1958; Lens & Gaily, 1980; Verstraaten, 1980). Kastenbaum (1987) pointed out the necessity of integrating past, present and future into a sense of continuing self. Erikson (1964) theorised that the whole person was developed from a sense of the importance of what had been and what could be. Freud (1953, 1958) posited the importance in shifts in temporal perspective as a means of avoiding pathologic fragmentation of the personality. Other authors have pointed out the importance of future temporal perspective and freedom from the events of the past that can come with maturity (Greene, 1986; Hyman, 1988; Savickas, 1984; Strumpf, 1987; Tismer, 1987). The cruciality of present temporal perspective to the integration of the past, present and future has been demonstrated in the work of this thesis. The results show that an individual with a strong
past and future temporal perspective is not maximally effective in engaging in intuitive prediction without a strong present temporal perspective. It is curious that current studies of temporal perspective have concentrated on the contribution of future temporal perspective to achievement with a relative disregard for PTP (Gjesme, 1983; Greene, 1986; Savickas, 1984; Tismer, 1987). According to the results of the TPM study, PTP can significantly affect the ability of the individual to utilise past and future temporal perspectives in the process of intuitive prediction.

Gjesme (1983) alluded to the possibility that temporal perspective might not manifest itself in every situation. It can be concluded from the results of this thesis that context specificity, particularly with respect to the effects of stress on PTP, is a crucial determinant of expression of the true width of an individual's temporal perspective. It might be proposed that the decrements in temporal perspective noted by Lomranz (1985) and Beiser (1987) might be an instance of a similar phenomenon where true temporal perspective was masked by situational effects on one of the three perspectives.

Influences on PTP: Motivational Variables

The model of sport motivation proposed by Butt (Butt, 1987) was supported by the correlational analyses in this study. Many of the proposed associations between PTP and Butt's (1987) model of aggressive motivation, conflict motivation, competence motivation, cooperative motivation and competitive motivation
were found. Specifically, it was found that positive motivations are associated with increased engagement of PTP, while negative motivations are associated with decreased engagement of PTP. It may be concluded from these results that the five motivational styles and associated affects are a valid component of the TPM proposition. With respect to motivations associated with negative affect, the findings of this study reveal a stronger relationship between conflict motivation and PTP, than between aggressive motivation and PTP. This finding may be attributed to the distinction between internality and externality of attentional direction described by Nideffer (1976, 1979, 1981; Nideffer & Sharp, 1978). Butt's model addressed the notion of the primarily external orientation of aggression, conflicted and competitive motivations, versus the internal orientation of competence and cooperative orientations (Butt, 1976). Butt's model allows for crossovers in external-internal orientations but stresses the relationship between conflict and externality. The findings of this thesis suggest that conflict motivation may be more internally oriented in terms of attentional focus being on feelings of guilt and anxiety. Competitive motivation yields an attentional focus that is narrowed on the opponent, which indicates that at least some environmental cues are being picked up.

The overall achievement analysis supported the notion that cooperative and competence motivations are important to achievement in a judgement context. Competitive, aggressive and
conflict motivations did not distinguish groups in terms of achievement. The lack of distinction between groups on overall achievement on the competition and aggression motivation variable is not unexpected. There may be a link between the motivational style of officials and the type of authority they hold over players. Raven (1974) described six types of leader power, including the following that are relevant to officiating:

1) **Legitimate Power**: by which role relations between a leader and a target who are defined as obligations on the part of the target to comply with the leader's requests.

2) **Coercive Power**: by which the leader has the ability to mediate target punishment.

Due to the fact that officials and players have a set of rules by which to play and the official's task is to enforce those rules, it may be proposed that officials have legitimate and/or coercive power over players. The existence of this type of power may alleviate the necessity for the official to be highly competitive or aggressive, as conflict between player and official can ultimately be resolved by referring to standardised rules. In fact, unruly players may be ejected from the game at the discretion of the official.

It is important to note that the expected associations between PTP and the five motivational styles were supported in correlational analyses, but three of the five styles failed to distinguish individuals in terms of overall achievement. It is also interesting to observe that the motivational styles that
were most strongly associated with PTP, the competitive, aggressive and conflict motivations, were less effective in distinguishing high achievers than the cooperative and competence motivations— which were less strongly associated with PTP. This phenomenon can possibly be explained by noting that PTP does not distinguish groups in terms of achievement as profoundly as GIOA, therefore influences on PTP may be more weakly or indirectly related to overall achievement than PTP.

Another possibility for the lack of findings on the competitive, aggressive and conflicted motivations may be the fact that intuitive prediction is only one component of the overall achievement criterion. PTP is a part of intuitive prediction and motivational styles are posited to influence PTP, not directly to influence overall achievement. Since the correlational analyses demonstrated the posited associations between motivational style and PTP, it may be suggested that the indirect nature of the motivational influence on overall achievement is not sufficient enough to be evidenced in an investigation where overall achievement is a criterion.

The examination of the TPM proposition and subsequent findings in this thesis suggests that in order to predict the behaviour of others in social situations, an individual must be possessed of: 1) a large repertoire of possible situational outcomes based on the engagement of past and future temporal perspectives; 2) the ability engage present temporal perspective in the performance situation. Either of these abilities in
significant in its own right, but the combination of the two appears to be associated with superior prediction.
REFERENCES


### Table 1
**Discriminant Validity of TPM Scales**

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<tr>
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<td>-.4544**</td>
</tr>
<tr>
<td></td>
<td>-.3010**</td>
<td>.2251*</td>
<td>-.1626</td>
<td>.1624</td>
<td>.0699</td>
<td>-.2657**</td>
</tr>
</tbody>
</table>

**Note.** Upper value=Officials: Based on N of cases: 118
Lower value=Students: Based on N of cases: 110

1-tailed Signif: * p < .01 ** p < .001
Scale Validations: Criterion Validity: Officials

1) Motivation scales

Sample Item: "When I am on the ice I feel that I am performing my best yet."

---

Table 2
Correlations Between Motivation scales and Objective Criteria

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>FIGHTS</th>
<th>PAYMENT</th>
<th>ROLE</th>
<th>NHL ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGGRESSION</td>
<td>.4822**</td>
<td>-.1730</td>
<td>-.2143*</td>
<td>-.3123**</td>
</tr>
<tr>
<td>CONFLICT</td>
<td>.2584*</td>
<td>-.1716</td>
<td>-.2543*</td>
<td>-.1595</td>
</tr>
<tr>
<td>COMPETITION</td>
<td>.1571</td>
<td>-.2281*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COOPERATION</td>
<td></td>
<td>.1975</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPETENCE</td>
<td></td>
<td></td>
<td></td>
<td>.3187**</td>
</tr>
</tbody>
</table>

1-tailed Signif: * p < .01 ** p < .001

Items Utilised in Criterion Validation of motivational scales (with rationales in brackets):

1) SYMPTOMS: "Check of the number of symptoms you experience in or around game time: feel sick, feel weak, feel dizzy, headache, muscle aches." (somatic correlates of negative affect).

2) FIGHTS: "How many fights did you have last year playing hockey?" (correlate of aggressive impulse control)

3) PAYMENT: "Would you officiate for no payment?" (intrinsic motivational style)

4) ROLE: "Do you prefer to Referee rather than to be a Linesman?" (preference for responsibility and control associated with Referee task)

5) NHL ROLE: "Would you prefer to be a player or and official in the NHL?" (preference for extrinsically rewarded role).
2) GIOA Scale

Alpha Reliability = .5143

Scale Items:

1. I like to think about unusual incidents that could happen in games and how I might handle them.
2. I like to consult other officials for ways to handle new situations that come up in games.
3. On the way to games I think of unusual situations that might come up and how I might handle them.
4. My thoughts after the game are concerned with finding different solutions to new game problems.
5. I like to plan how I will deal with odd situations on the ice.
6. I prefer to think about possible incidents that might come up in games rather than those that did happen.
7. I do not think you learn much except from actual experience.
8. My thoughts about my games off the ice are best described as emotional.
9. I direct a lot of thought to actual experiences in games I have been in.
10. I do not like to think about how games might have turned out if people had acted differently.
11. I do not think about unusual game problems that might come up.

Table 3
Validations of GIOA Scale

<table>
<thead>
<tr>
<th>GIOA</th>
<th>PTP</th>
<th>Factor M Scale</th>
<th>Principle Component 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.1437</td>
<td>-.0250</td>
<td>.3130**</td>
</tr>
</tbody>
</table>

1-tailed Signif: * p < .01 ** p < .001
Principle Component 1: was derived from a Principle Component Analysis of the following criterion variables proposed to be related to tendencies and abilities corresponding to GIOA (rationale in brackets):

1. "Do you usually win at chess (strategic success)?"
2. "Have you been trained in the use of mental imagery (visualization skills)?"
3. "What were/are your preferences in school subjects (subject preference was organized on a continuum of increasing requirement for novel abstraction)?"
4. "What type of articles have you, if ever, written (same organization as in c)"
5. "What types of books/movies do you prefer (organized on continuum of preference for realistic to fantastical)?"
6. "How many times per month do you buy lottery tickets (low probability projective thinking)?"
7. "When you go to games, what percentage of your attention is focussed on the official (search for alternative strategies)"
8. "How many articles on Officiating did you read last year (same as in g)"
9. "How many times per month do you go to watch peers Officiate (same as in g)?"

3) PTP Scale

Alpha Reliability = .7435

Scale items:
1. I rarely miss what is going on around me in a game.
2. I react blindly in games.
3. I am able to pick up details of game situations.
4. I find it difficult to forget mistakes and go on.
5. I find myself thinking of past mistakes during games.
6. I find myself thinking of past successes during games.
7. I tend to jump the gun instead of watching the situation develop.
8. I daydream on the ice when I should be watching the action.
10. I find it difficult to keep track of the action.
11. I know what all the players are doing at any time.
12. I notice when it is time for a player to come out of the penalty box.
13. I often have to consult linesmen about penalties I didn't see.
14. I find that coaches comments during the game can distract me from the action.
15. I am good at picking up on all the game action.
16. Most of my attention is focussed on the present situation.
17. It is easy for me to stay mentally into the game.
18. I can keep track of action behind the play.
19. I tend to dwell on my feelings and miss game action.
20. My thoughts do not get in the way of picking up game action.

Table 4
Validations of PTP Scale

<table>
<thead>
<tr>
<th>Principle Component 2</th>
<th>Factor C (Egostrength)</th>
<th>Factor M (Realism)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTP</td>
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</tr>
<tr>
<td></td>
<td>-.1243</td>
<td></td>
</tr>
</tbody>
</table>

1-tailed Signif: * p < .01 ** p < .001

Principle Component 2: was derived from a Principle Component Analysis of the following criterion variables proposed to be related to tendencies and abilities corresponding to PTP (rationale in brackets):

a) "Check of the number of symptoms you experience in or around game time: feel sick, feel weak, feel dizzy, headache, muscle aches (somatic anxiety correlates)."

b) "How many auto accidents were you in which you were the driver (divided by age in years; attentional measure)?"

c) "How many speeding tickets have you had last year (attentional measure)?"

d) "I often have to consult linesmen for information on plays I did not see (attentional control)."
e) "I find it difficult to catch all the infractions when a player fight breaks out (attentional control)."

4) **Self-efficacy scale**

Sample item: "When I think of what I have accomplished as an official I feel very satisfied with myself."

<table>
<thead>
<tr>
<th>Preference for Referee Role over Subordinate Linesman Role</th>
<th>.3556**</th>
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</thead>
<tbody>
<tr>
<td>Factor C (Egostrength)</td>
<td>.3401**</td>
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</tbody>
</table>

1-tailed Signif: * p < .01 ** p < .001

This scale has also been validated in prior studies (see instruments section).

<table>
<thead>
<tr>
<th>Overall Achievement</th>
<th>Intuitive Prediction</th>
<th>Years of Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Achievement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intuitive Prediction</td>
<td>.4860**</td>
<td></td>
</tr>
<tr>
<td>Years of Experience</td>
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<td>.2370*</td>
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1-tailed Signif: * p < .01 ** p < .001
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
<th>Median</th>
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<td>GIOA</td>
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<td>4.32</td>
<td>23 to 43</td>
<td>35.00</td>
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<tr>
<td></td>
<td>34.60</td>
<td>5.25</td>
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<td>--</td>
</tr>
<tr>
<td>SELFEFFI</td>
<td>37.05</td>
<td>4.89</td>
<td>24 to 30</td>
<td>38.00</td>
</tr>
<tr>
<td></td>
<td>32.56</td>
<td>6.63</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>PTP</td>
<td>67.04</td>
<td>7.59</td>
<td>41 to 72</td>
<td>54.00</td>
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<tr>
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<td>64.04</td>
<td>5.34</td>
<td>--</td>
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</tr>
<tr>
<td>AGGRESSION</td>
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<td>2.99</td>
<td>7 to 22</td>
<td>14.00</td>
</tr>
<tr>
<td></td>
<td>12.36</td>
<td>2.85</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>CONFLICT</td>
<td>11.14</td>
<td>3.01</td>
<td>5 to 18</td>
<td>11.00</td>
</tr>
<tr>
<td></td>
<td>14.72</td>
<td>3.64</td>
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</tr>
<tr>
<td>COMPETITION</td>
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<td>7 to 23</td>
<td>15.00</td>
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<tr>
<td></td>
<td>13.01</td>
<td>3.80</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>COOPERATION</td>
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<td>3.08</td>
<td>13 to 25</td>
<td>19.00</td>
</tr>
<tr>
<td></td>
<td>17.46</td>
<td>3.07</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>COMPETENCE</td>
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<td>2.89</td>
<td>9 to 25</td>
<td>16.00</td>
</tr>
<tr>
<td></td>
<td>14.05</td>
<td>3.42</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>INTUITIVE PRE</td>
<td>0.00</td>
<td>1.00</td>
<td>-4.2 to 3.1</td>
<td>-.02</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>OVERALL ACH</td>
<td>0.00</td>
<td>1.00</td>
<td>-1.6 to 1.8</td>
<td>.03</td>
</tr>
<tr>
<td></td>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>YEARS EXPER</td>
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<td>0 to 30</td>
<td>6.00</td>
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<td>--</td>
</tr>
</tbody>
</table>

Note: Officials: Upper Value based on N=118.
      Students: Lower Value based on N=110.
Table 8
Correlations between Overall Achievement, Intuitive Prediction, Years of Experience and TPM Variables

<table>
<thead>
<tr>
<th></th>
<th>Overall Achievement</th>
<th>Intuitive Prediction</th>
<th>Years of Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIOA</td>
<td>.4023**</td>
<td>.4311**</td>
<td>.0703</td>
</tr>
<tr>
<td>PTP</td>
<td>.2246*</td>
<td>.2891*</td>
<td>.0338</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>.4756**</td>
<td>.4188**</td>
<td>.1420</td>
</tr>
<tr>
<td>Competence</td>
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<td>.2947*</td>
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</tr>
<tr>
<td>Competition</td>
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<td>.0442</td>
<td>0.0315</td>
</tr>
<tr>
<td>Cooperation</td>
<td>0.1992*</td>
<td>.1620</td>
<td>-0.0323</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.0216</td>
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</tr>
<tr>
<td>Conflict</td>
<td>-0.0100</td>
<td>-0.1481</td>
<td>-0.0188</td>
</tr>
</tbody>
</table>

1-tailed Signif: * p < .01 ** p < .001
Historical Research on Temporal Perspective

The notion of temporal perspective has been apparent in the psychological literature from as early as 1939 when Frank (1939) presented an elaboration of the concept in terms of the effects of an individual's conceptions of the past and the future on the perceptions of the present. The idea that maladaptive temporal perspective is a significant component of psychopathology has been a central concept in psychiatric theory (Huibert & Lens, 1988). In the years following Frank's work, the concept of temporal perspective has undergone many modifications and progress in research of the construct has suffered from disagreements in definition and appropriateness of measurement. The few consistencies in the formulations to present are that temporal orientation is a product of the social environment, is a relatively stable influence on behaviour and is endurably modified by extreme social forces (Lomranz, 1985). Stern (1924) indicated that the future is near to the person only when it is experienced in its personal significance for the present.

Stress and Temporal Perspective

In the discussion of Lewin's field theory it was suggested that the Second World War was the inspiration for the notion of temporal perspective. The effects of the war was to become a repeating theme in the decades to come in the development of theory and research on temporal perspective.
Bettleheim (1958) used the following words to describe the temporal perspective of concentration camp inmates in Nazi Germany:

The prisoners lived, like children, only in the immediate present; they lost the feeling for the sequence of time; they became unable to plan for the future or to give up immediate pleasure satisfactions to gain greater ones in the near future. (pp. 201)

Stouffer (1959) observed a similar phenomenon occurring with American soldiers sent into battle in World War Two. Stouffer wrote that:

(the troops experienced)...a shortening of time perspective, living in the short run and focusing attention on means rather than ends. The hedonism of combat troops on leave is traditional. By banishing the long run to a status of limited reality, the combat man could to some extent escape facing the unpleasant probabilities and avoid a disorganizing level of anxiety. (pp. 189-190)

The term "antepression" was coined to describe this phenomenon. Eson and Greenfield (1962) concluded that antepression occurs frequently in nonneurotic individuals. In their study it was found that subjects tended to rate thoughts about future events as pleasant. In his 1948 chapter, Lewin discussed the effects of unemployment on future time perspective. Eisenberg and Lazarfield (1938) found that workers facing long periods of unemployment tended to reduce the frequency of thoughts about the future. Lipman and Havens (1965) found that families who had been victims of violence in Columbia showed a lesser sense of optimism, security and preference toward
thoughts of their future. Coser and Coser (1963) referred to a "mutilation or destruction of time perspective" that occurs in periods of social instability. This was conceived of as the "subjective counterpart of a stable social order and of stable social institutions, which not only permit but sanction an orderly progression of expectations with reference to others and oneself" (Finestone, 1957).

There were a number of studies on the relationship between temporal perspective and a variety of person and situational variables. Temporal perspective was studied in relationship to socioeconomic status, achievement, sex, ethnic group and psychopathology (Barndt & Johnson, 1955; Cottle, 1974; Davids, 1969; Farnham-Diggory, 1966; Khoury & Thurmond, 1978; LeShan, 1952; Lessing, 1968; Mehta et al., 1972. Shannon, 1975). Findings indicated a positive relationship between SES and future orientation, achievement and future orientation, depression and past orientation, and a negative relationship between future extension and pathologies such as schizophrenia.

**Anxiety and Temporal Perspective**

Interest in the relationship between temporal perspective and anxiety was vigorous and a variety of studies provided conflicting results. Krauss and Reiz (1967) found a significant negative correlation between a measure of manifest anxiety and the use of present or future verbs in a test of sentence completion. High levels of manifest anxiety were positively correlated with a greater proportion of present and past verbs
and a lesser proportion of future tenses. Eply and Ricks (1963) found a significant negative correlation between anxiety and the length of future time spans in TAT stories. Contrary to these findings, Rokeach (1960) suggested that "attempts to cope with anxiety should involve a deemphasis on the present and a preoccupation with the future." Maslow (1962) stated that "...threat and anxiety point to the future (no future=no neurosis)."

Ruiz and Krauss (1968) continued their studies with a larger population of sixty-four subjects and found that with a greater range in measured levels of anxiety a significant curvilinear relationship between anxiety and future orientation emerged. The findings demonstrated that the patients lowest in anxiety completed slightly less future tense sentence completions than did the patients high in manifest anxiety and both groups completed significantly less future tense items than did the group who were found to be moderately anxious. It appears from this study that anxiety may have initially beneficial effects on future orientation that are detrimentally influenced by high levels of anxiety.

Developmental Aspects of Temporal Perspective

The developmental aspects of temporal perspective were also studied thoroughly. The work of Inhelder and Piaget (1958) demonstrated the shift in dependence upon concrete realities to the manipulation of abstractions. In their classic paper Inhelder and Piaget made the following observation:
The connection indicated by the words 'if...then' (inferential implication) links a required logical consequence to an assertion whose truth is merely a possibility. This synthesis of deductive necessity and possibility characterizes the use of possibility in formal thought, as opposed to possibility-as-an-extension-of-the-actual situation in concrete thought and to unregulated possibilities in imaginative fictions. (pp. 257-258)

As previously mentioned, both Frank and Lewin had recognized the developmental progression of an individual's time perspective from a narrow present-oriented perspective to a more mature present, past and future based perspective. A great deal of change in perspective was posited to occur in the adolescent years (Eson & Greenfield, 1962; Neugarten, 1968; Wallace, 1956). Specifically, the findings indicated that, in comparison to younger children, adolescents displayed a deeper and more extended temporal perspective (Kastenbaum, 1961, 1966; Verstraaten, 1980; Wallace, 1956), were able to project a more complex set of future events (Bortner & Hultsch, 1972; Douvan & Adelson, 1966; Moerk & Backer, 1971) and were able to project future events with greater organization and realism (Lens & Gaily, 1980; Moerk, 1974; Verstraaten, 1980). With regard to the end of the lifespan some researchers suggested that future orientation decreased in the elderly as an adaptation to impending death (Cummings & Henry, 1961: Dooley, 1941). Other theorists posited and demonstrated a positive relationship between future orientation and life satisfaction (Fink, 1957; Spence, 1968). Erikson (1964) has written that "the young
person. in order to experience wholeness. must feel a progressive continuity between that which he has come to be during the long years of childhood and that which he promises to be in the anticipated future. Self-continuity is promoted by shifts in temporal perspective and is represented in psychoanalytic theory as a means of preventing pathologic fragmentation of the personality (Freud, 1953, 1958).

Motivation and Temporal Perspective

Heckhausen (1967, 1977) indicated that in terms of achievement motivation theory, the future is the primary "motivational space" that stimulates and directs perception and performance. Specifically, when a discrepancy exists between the present and anticipations of future situations the individual is motivated to enact either approach or avoidance behaviour on the basis of those anticipated situations.