IMPULSIVITY AND TEMPORAL EXPERIENCE IN PRISONERS

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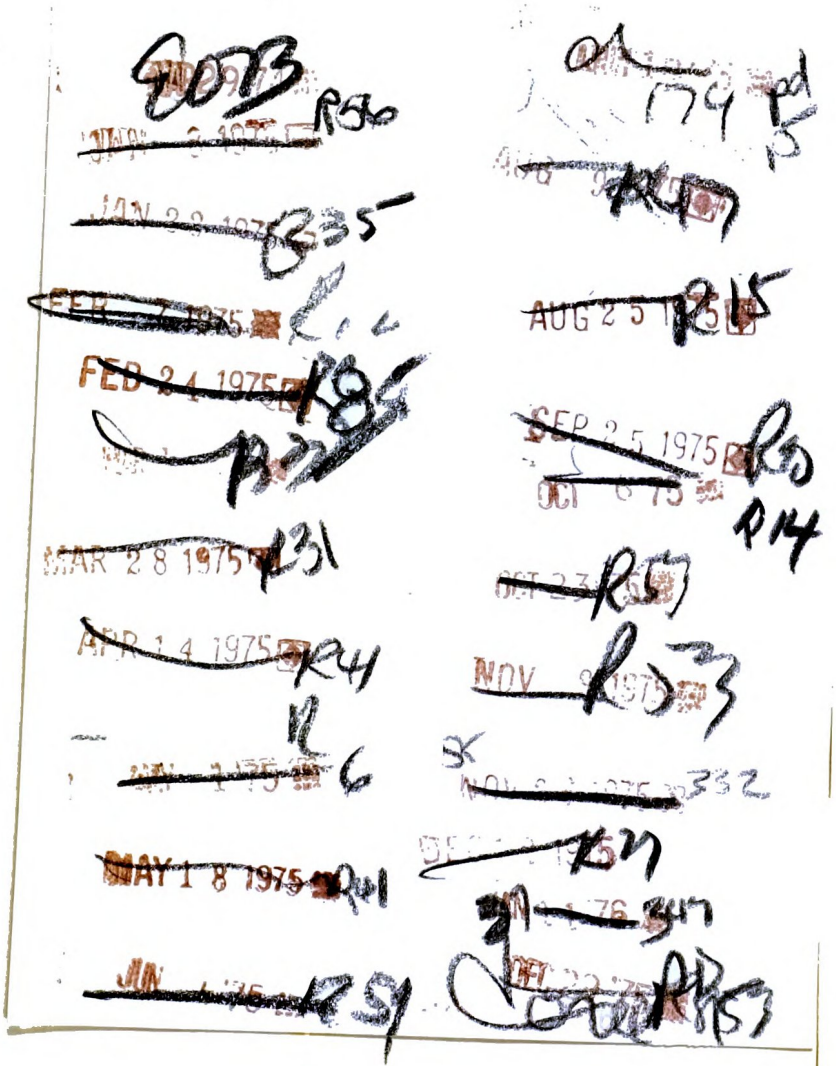

ABSTRACT

IMPULSIVITY AND TEMPORAL EXPERIENCE
IN PRISONERS

by John J. Laffey

The development of a concept of time and of regard for the future is theoretically bound up with the ego function of delay of impulse expression. This study sought to examine the theoretical relationship between impulsivity in overt behavior and those aspects of temporal experience termed time estimation, time perspective, and time orientation. Thirty prison inmates whose behavior indicated a relatively low degree of impulse control were compared with a group of thirty inmates with greater impulse control. As hypothesised, the impulsive group overestimated time, via the production method, to a significantly greater extent, although both groups tended to overestimate brief intervals. This outcome is consistent with prior research indicating time estimation to be a good index of impulsivity. A story-completion test was employed to measure the extension, or span, of the future time perspective. For "action-oriented" story stems both groups were rather constricted. "Thought-oriented" story stems yielded significantly greater scores on future time extension for both groups, although the low impulsive group had significantly higher scores than had the impulsive group, as hypothesized. A measure of the coherence of the future time perspective failed to discriminate between groups, but the correlation with IQ suggested the possibility of intelligence or possibly memory influencing this measure. Both the concept of the coherence of the

of the future time perspective, as well as the methodology employed here, require further empirical examination. Neither group showed much evidence of future time orientation in Thematic Apperception Test stories. The mean proportion of future tense verbs was quite low for both groups due to the few number of subjects who used any such verbs. Perhaps because of this, the measure of future time orientation (future tense of verbs) showed little relationship to other temporal variables. On the other hand, the impulsive subjects were, as predicted, more present-oriented, as judged by their greater tendency to phrase TAT stories in the present tense only. The question of whether grammatical convention or time orientation is reflected in verb tense usage was raised. While it was felt that the factors of time spent in prison and time remaining to serve could have influenced the temporal variables examined, the unreliability of figures available for prior and remaining prison time resulted in very low correlations. Some comments and suggestions regarding methodology were made. In general, the relationships between impulsivity and time estimation, time orientation, and future time perspective, and between IQ and both time estimation and future time extension were consistent with earlier research findings.

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John J. Laffey

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CHAPTER I

THEORETICAL INTRODUCTION

Interest in the phenomenon of time has a lengthy history from a philosophical point of view. With the advent of the separate discipline of psychology, time later received attention in the area of psychophysics (Boring, 1950). In more recent years, since the growth of personality psychology, attempts have been made to relate temporal experience to personality variables. Temporal phenomena have come to be considered among the many factors involved in personality development and functioning. Even the perceptual aspects of temporal experience (time estimation) have been increasingly investigated with regard to motivational factors.

Much of the theorizing in regard to the development of a "time sense" in relation to personality formation has been from a psychoanalytic orientation. Such considerations have generally referred to various childhood experiences as leading in one way or another to the child's first notions of time. There seems to be considerable agreement that the sense of time and notions of the future are intimately related to problems of the regulation and control of drives in particular, and to ego development in general.

In his writings, Freud appears not to have dealt with the concept of time at any great length. In "A Note on the Mystic Writing-Pad" Freud did indicate what he considered the possible origin of the sense of time. In brief, this notion was that the discontinuous action of the perceptual-conscious system, with its periodic withdrawals of cathexes from the outside world, could gradually lead to a sense of time. This view, however, has not been fruitful in terms of research.

Rapaport (1951) had indicated that a more cogent theory of the development of a time sense could be made by reference to the psychoanalytic theory of the development of the thought-processes and that clinical evidence could offer some degree of confirmation of it. Although the psychoanalytic theory of the development of thinking is complex and difficult to conceptualize, in essence it involves the transition from "ideation" to "thinking." Ideation is the "hallucinatory" experience or memory-trace of a need-satisfying object, stimulated by a current need for impulse gratification. Ideation, therefore, is equivalent to drive-representation, and is accompanied by an affective discharge. Thinking, however, brings reality considerations into the picture, but is possible only by virtue of delaying the discharge of need-tensions. As the vivid hallucinatory experience and affective discharge are prevented by this delaying action, the conserved energy is employed in seeking the need-satisfying object in reality. Eventually, ideation gives way more and more to thought-processes which organize all ideas related to the need-satisfying object and plan the search for the object in reality.

As Rapaport (1950) has stated, "Thinking explores the possible pathways of action to find the one of least resistance, least danger, and greatest directness, while preserving almost intact the energy necessary for motor action."

Another psychoanalytic writer has discussed this theory with reference to the ego and growth of the reality principle. Hartmen (1955) has stated, "The reality principle includes postponement of gratification and temporary tolerance of unpleasure...The reality principle in the narrower sense imposes restrictions on the pleasure principle, if only to secure a future pleasure gain." With further development the pleasure

principle works in reconciling contradictions within the psychic systems (i.e., id, ego, supergo) by producing an unpleasant feeling as a danger signal. "At this point, objectivation and anticipation begin to play a decisive role. What one could call the pleasure-unpleasure balance... will now include, beyond the consideration of the present, also the consideration of the future."

Ego psychology is based on the foundation of tolerance of delay of gratification. This concept of delay or control of impulse expression as a basic ego function offers a significant meeting ground between psychoanalytic theory and general psychology (Rapaport, 1951).

Approaching the topic of reasoning and planning from a learning theory framework, Dollard and Miller as well rely on the notion of delay. They state, "...the direct instrumental responses to the internal drives and external cues must be inhibited in order to give the cue-producing responses time to occur; the subject must stop and think before rushing precipitately into action" (1950, p.115). As Dollard and Miller put it, in order to reason and to plan goal-directed activity, one must "stop and think." Here again, the notion of delay of immediate impulse gratification appears crucial to the growth of concerns for reality, for anticipatory thinking, and for considerations of the future.

Both from a psychoanalytic framework and from a learning theory position, delay or inhibition of gratification are prerequisites for the development of anticipatory, or future-oriented thinking. From the standpoint of formal logic, this delaying ability may be considered a "necessary condition" (although perhaps not a "sufficient condition") for the development of an elaborated time sense, and especially for the development of the concept of future time.

The topic of the present research is the question of what differences in temporal experiencing may be expected from subjects who differ markedly in the extent to which they manifest this delaying activity. An individual whose overt behavior reveals a relatively diminished ability to delay direct impulse expression or to postpone more immediate gratification would seem preoccupied with situations offering immediate rewards. He would therefore not have learned to reward himself adequately with the knowledge of anticipated, perhaps greater gain, in short, his concerns (thoughts and fantasies) would tend to lie predominantly in the present or immediate future, rather than in the more distant future. This concern with more immediate time has been referred to in the literature as reflecting a predominantly "present time orientation."

If this hypothetical person were concerned primarily with more immediate time, then when offered the opportunity to fantasy about the future he might be expected to utilize a rather brief, or abbreviated time span. His "extension of future time" in fantasy would, by virtue of the greater significance of the present and less significance of the future, be foreshortened. Again, with less practice in long-range planning and anticipating, potential future events would be less frequently a part of an individual's current thoughts and fantasies, and notions of future events would be less capable of arousing anticipatory need-reducing responses. Future events would be less meaningful than immediate happenings, and being less meaningful, future events would be less well sequentially organized. To use a term introduced by Wallace (1956) the "coherence of the future time perspective" would be reduced.

Finally, the perception of time may also be affected by the lack of impulse delaying ability. In the common state of boredom, time seems to

pass slowly, and we tend to overestimate its passage, thinking that more time has gone by than actually has. One interpretation of this phenomenon holds that boredom is due to the lack of satisfaction in a situation, with discomfort occurring because of there being no possibility of gratification of pressing urges. Whether the state of mild discomfort itself or an attendant desire for time to pass more quickly (thus hastening the end of the frustrating situation) may be operative, the effect on our subjective experience of duration is well known. Returning to the instance of an individual with little ability to delay impulse expression, in a situation in which there is no particularly inherent satisfaction, no opportunity for direct impulse gratification, we would expect such a person to experience the passage of time as of longer duration than it is in reality. A phenomenon analagous to boredom should arise, resulting in the overestimation of the actual, elapsed time.

The above speculations are offered as hypotheses to be tested in this study. Two groups of prison inmates, dichotomized on the basis of degree of impulse control in overt behavior while in prison, were tested to determine differences in time estimation, future time coherence, future time extension, and time orientation in fantasy. A review of the literature will offer some background as to empirical findings which bear upon the problems investigated here as well as suggesting techniques of measurement.

CHAPTER II

REVIEW OF THE LITERATURE

For a more comprehensive discussion of studies in the area of temporal experience, the reader is referred to the most recent review by Wallace and Rabin (1960), or to the earlier one by Gilliland, Hofeld and Eckstrand (1946). Research under the heading "time orientation" or "time perspective" may be considered a "molar" approach to the study of temporal behavior, involving the total personality, anticipations and expectations of the future as well as memory of the past. It is well at the outset to call upon distinction suggested by Wallace (1956) between time orientation and time perspective. These terms have often been used interchangeably in the literature, although they are not synonymous.

According to Wallace, time orientation refers to the direction, in time, of an individual's thoughts, concerns, and fantasies. Time orientation answers the question of what time dimension - past, present, or future - is stressed in one's thoughts. Time perspective refers to the span of time, either forward, into the future, or backward, into the past, which is covered by an individual's thoughts and fantasies. Thus time perspective reflects a quantity of time, for which the term "extension" has been suggested. Wallace also pointed out another aspect of time perspective, which he called "coherence." Coherence refers to the orderly arrangement of events in a logical sequence. Temporal coherence, or the logical relatedness of events in sequence, and time extension, or the amount of time spanned, may therefore apply either to the past or future time dimension.

According to this distinction in terminology, some studies reportedly of "time orientation" (Barndt and Johnson /1955/; Davids and Parenti /1958/;

Davids, Kidder and Reich /1962/) would be measuring future time extension. Levine and Spivack (1959) used the term "time conception" for future time extension. Ricks and Epley (1959) referred to "prospective span" and "retrospective span," which correspond to future and past time extension. This lack of consistency in terminology creates difficulty in interpreting the research findings reported. For purposes of clarity, the distinction in terms drawn by Wallace (1956) and mentioned above will be maintained in the discussion which follows.

Apparently the earliest detailed theoretical discussion of the concept of time perspective was published by Frank (1939). Frank was concerned with culturally determined attitudes in regard to temporal experience, the transmission of these attitudes through the child-rearing process, and the effect of notions of the past and future on the present. This "field-theoretical" approach was subsequently discussed by Lewin (1942) in relation to the social atmosphere of the surrounding group (authoritarian vs. democratic) and its influence on the individual's time perspective. Criticism has been leveled at the looseness of Lewin's definition of time perspective, given as "the totality of an individual's views of his psychological past and psychological future existing at a given time" (Wallace and Rabin, 1960). Some research, notably that of Eson (1951) and of Fink (1953) can be considered as based on this theoretical orientation of Lewin.

Discussing his observations of the Massachusetts Penal System, Field, in 1931, commented on the monotony of life, limited incentives, and slow work tempo, and his impression that "prisoners commonly fail to develop well-conceived plans for the future." As did Field, Farber (1953) found that length of sentence and time already served did not seem to bear on

degree of current suffering. Farber employed extensive questionnaire and interview data, and found that the degree of pain experienced in the prison situation was not related to any aspect of the past nor to any particular feature of the present, but rather to "an uncertainty in the future time perspective." In another study, this time of college students, Farber (1953) concluded that "...man's feeling-tone or mood is determined less by his present activities than by his future time perspective."

The studies by Farber illustrate both direct interview and questionnaire methods in examining future time perspective. Another direct method, employed by Israeli (1936) involves the use of future autobiography. A number of studies have been reported which have employed less structured, projective methods. As is the case with projective devices in general, these techniques reduce emphasis on the stimulus and maximize the expression of the individuality of the subject. A story-completion method has been employed by Barndt and Johnson (1955), by Wallace (1956), by Davids and Parenti (1958), and by Davids, Kidder and Reich (1962). Pictures from the Thematic Apperception Test series have been used in several ways, by Bonier and Rokeach (1957), by Fink (1953), and by Teahan (1958). This variety in methodology alone, as well as the lack of or ambiguity in theoretical specification and definition of terms, poses limits to the generality of the findings reported. However, as Wallace and Rabin (1960) have pointed out, the number of significant results obtained by both direct and indirect methods "have been quite fruitful."

Several of these studies may be mentioned as background to the present investigation. Eson (1944) studied the relative degree of temporal

orientation of five groups of subjects of different age levels -- 10, 16, 25, and 65-year olds -- and all showed a tendency toward greater reference for the future than the past or present. Eson also reported that the child of eight seems primarily concerned with the present and projects into the future only when stimulated to anticipate a future event. At the other end of the age range, Fink (1953) employing Eson's method of analyzing accounts of recent thoughts and conversations for temporal dimension stressed, also similarly rated TAT stories of two groups of elderly subjects. The group consisting of elderly, institutionalized people revealed greater emphasis on the past than did the group of people, matched in age, living in the community. Fink concluded that "...the results of institutionalization and increasing age bring about increased concern with the past."

Bonier and Rokeach (1957) used the same TAT cards as did Fink in their study of time orientation of college students rated as high or low in dogmatism. They found that subjects who scored high in dogmatism tended to give more TAT responses in the future tense, and that both future orientation and degree of anxiety were positively associated with degree of dogmatism. In another study of college students, Lipman (1957) first determined the Manifest Anxiety scores of subjects. Lipman found that a high degree of anxiety seemed positively related to future time orientation and that a factor analysis suggested the components of this future orientation to be "dismal unclarity" and "exaggerated goal-frustration fears." This finding of Lipman sounds similar to the earlier statement of Farber (1953) that current distress among prisoners was related to an "uncertainty" in regard to the future.

LeShan (1952) was interested in the effects of social class differences in child-rearing practices on time perspective. His story technique revealed that, among 8-10 year olds, middle class children tended to use longer time spans in their stories than did lower-class children. While he also postulated that upper-class children would reveal greater orientation to the past, he did not test this hypothesis. A recent criticism tends to cast doubt on LeShan's findings. Greene and Roberts (1961) computed LeShan's Chi-square and found it to be non-significant. Moreover, there was no rationale for combining scores into meaningful categories for analysis, so that no conclusions can properly be drawn from this study about the relationship between social class and time perspective.

Children rated as high achievers academically were found by Teahan (1958) to have a greater degree of future orientation and a greater extension of future time, compared to low achievers. Teahan used both accounts of recent thoughts and conversations, the method of Eson (1951) as well as the story-telling technique of LeShan. He also included three TAT cards, which were rated for degree of optimism reflected in the story's ending. A high degree of optimism was positively related to a high degree of future time extension.

A group of studies using a common technique may well be examined together. This technique requires that the subject create a story, after being offered a beginning, following which the subject is asked to indicate how much time expired in the action of the story. This story-completion method was introduced by Barndt and Johnson (1955) together with a scoring system which rates length of time spanned by the story. Barndt and Johnson, comparing delinquent and non-delinquent 17-year-olds,

found that the delinquents were more constricted in the length of time involved in their stories. While the authors referred to their study as measuring "time orientation," we would prefer to term it "future time extension." Problems of terminology aside, the constriction in future time perspective found by Barndt and Johnson may reflect the observations of Greenacre (1945) on the "psychopath." "He seems to live only in a series of present moments, without real consideration for past or future... Indeed, the lack of practical appreciation of time and inability to learn from experience, stand out as cardinal symptoms." While we have no intention here of becoming involved in definitions of "psychopath," these remarks appear relevant, not only because they are typical of those called psychopaths, but also because they could in part be considered interpretations of some of the empirical results being reported.

Wallace (1956) in examining future time perspective in schizophrenics, used a slightly modified version of the same story completions used by Barndt and Johnson. Compared to normals, Wallace found the schizophrenics to be highly constricted in extension of future time in fantasy. In addition, utilizing a correlational technique comparing the age at which subjects anticipated the occurrence of certain events with the ranking of these events in order of expected occurrence, he found the schizophrenics showed far less coherence of the future time perspective, i.e., events were not well organized sequentially. Thus, the schizophrenic process seems to hinder severely an individual's consideration of the future, both in the extent of future time thought about, and in the organization of events anticipated. Wallace cautioned that his results could not be considered conclusive, and advocated longitudinal studies of future time perspective during childhood and adolescence.

Normal and disturbed 11-year old boys were subjects of an investigation by Davids and Parenti (1958) utilizing the Barndt and Johnson (1955) story completions and scoring technique. Contrary to prediction, no significant difference was found between normal and disturbed groups on extension of future time. In fact, future time extension was positively correlated with the personality traits of pessimism and resentment. In the disturbed group only, the more constricted was the time span in a child's stories (referred to by the authors as "present-oriented"), the more stable did his friendship patterns appear. This relationship did not hold among the normal children. Davids and Parenti compared their findings with the results of Barndt and Johnson, noting that both normal and disturbed children were significantly more constricted in future time perspective than the normal 17-year olds. However, both groups of children showed no significant difference in time extension when compared with the delinquent adolescents. Davids and Parenti pointed out that what may be a sign of good adjustment at one age level may be abnormal at another, adding, "Understandably, it may not be until early adolescence that a person is normally concerned with the future more than with the present."

More recently, Davids, Kidder and Reich (1962) replicated the original Barndt and Johnson study, with institutionalized adolescent male and female delinquents. While there were no sex differences, their over-all results were nearly identical to the earlier study with regard to the delinquent group, and significantly different from Barndt and Johnson's normal adolescent group. A comparison with normal and disturbed 11-year olds (Davids and Parenti, 1958) again revealed the disturbed and normal younger children to be similar in time perspective to the delinquent adolescents.

While there is no data on measures such as the above for the children who are the subjects of Redl and Wineman's book (1957) these authors have made pertinent comments. "But one thing we would like to make clear is that there are certain partial functions of the ego related to the phenomenon of time, which, if disturbed, have a disastrous effect on a child's life and on the chances for education and therapy to take hold of him" (p. 119). They go on to describe the great difficulty these children have in making a distinction between "subjective experience" and the "objective measurement of time," resulting in an overreliance on subjective time as the only "real" thing. These children are considered as having a severe disturbance in relation to the future, without much of a concept of "themselves in the future," since they have little by way of ego-ideals, even delinquent ego-ideals. This disturbance in time relations seemed to Redl and Wineman a paramount factor in the therapeutic management of these children. "We hasten to add that this seemingly minor part of their pathology constituted one of our major technical hazards as becomes clear when we remember that promise as well as threat, punishment as well as reward, encouragement as well as criticism, have a rather healthy relationship to time as a sine qua non, as a prerequisite without which they make no sense at all or are even doomed to make things worse" (p.121).

In light of these comments and apparently in accord with the original hypothesis of Davids and Parenti (1958) in regard to time perspective, the failure to find differences between normal and disturbed 11-year olds is curious. Perhaps the composition of the disturbed group did not contain sufficient children of the type described by Redl and Wineman. Another possibility is that the measuring technique, the story completion,

is inappropriately interpreted. Granted that both Barndt and Johnson as well as Davids and Parenti used the term "present-oriented" to refer to what Wallace called a constriction of future time extension, the question arises as to whether the terms are misleading when interchanged. In other words, does a reduction in extension of future time (time span) imply a corresponding stress on the present (orientation predominantly in the present time dimension)? If the distinction made by Wallace (1956) is a real one, that is, if there is on the one hand a dimension, past, present, or future, which may be emphasized more or less, and on the other hand an extension in the future or past dimension which can vary, then it seems we are faced with the question of whether the two factors are independent. The story completion technique is scored only in terms of the extension of time into the future, and does not lend itself without alteration to tapping of other than the future time dimension, i.e., does not measure past or present. Strictly speaking then, one cannot conclude that 11-year olds are present-oriented, but rather that neither the normal nor the disturbed group revealed fantasies that extended far into the future. This is not meant to detract from this original finding, but the possibility exists that whereas neither group revealed fantasies far into the future, nevertheless normal children may more frequently think about the future (thus, be more future-oriented). The matter of time orientation, then, would have to be determined by means of an appropriate technique. It is interesting to note in this regard that the earlier study by Eson (1951) using a technique aimed at eliciting temporal orientation, did find an emphasis on the future even at the 10-year old level. Teahan (1958) found a significant positive correlation between his two measures of future time extension, but non-significant results when these measures were correlated with a measure of future time orientation. Teahan

interpreted these results as supporting Wallace's (1956) original distinction between time orientation and time perspective. It seems clear that this question must remain unresolved until further research sheds light on the relationship between time orientation and time perspective. Aside from this issue, it appears from the preceding studies that the story completion technique offers a reliable measure of future time extension.

Those studies which have investigated time orientation as defined in this discussion, are the only ones reported which have dealt at all with past time. Thus, Eson's (1951) and Bonier and Rokeach's (1957) work, while not focused specifically on past time, have allowed for some measure of the stress on the past found in current fantasy. Fink (1953) seems to be the only investigator specifically concerned with the past, in his research with the aged. Mischel (1961) utilized the accuracy with which a specific past event was dated, in his study of delayed reinforcement and social responsibility, which begins to approach the examination of the coherence of past events. However, aside from the original work by Wallace (1956) who introduced the term "coherence," there has been no other reported study of this aspect of time perspective.

Other investigators, such as Levine and Spivack (1959) have adapted some of Wallace's time coherence items for use in the analysis of "time conception." They asked subjects to state the ages they might be when certain events would occur. The mean of all ages listed was then compared to the subject's actual age, with the greater discrepancy interpreted as reflecting greater extension of thoughts into the future. This kind of task was also presented to children by Mischel and Metzner (1962). They included such items as how old the child would be when he gets married,

or when the first man will reach the moon, etc. There may be some difficulty inherent in this method. The age and intelligence of subjects may affect their general knowledge of reasonable expectancies, such as awareness of newspaper accounts of dates anticipated for a "moon shot." Perhaps the problem of the intrusion of reality may be more clearly seen in the question, "What year will someone hit 60 home runs again"? The summer of the year this study was received for publication (1961) the feat in question was accomplished. Obviously subjects who gave the earliest dates were the more accurate predictors, although they would have been judged the more constricted in time perspective. It would not be unexpected that the adoption of a technique devised for measuring one variable (time coherence) may raise new problems when applied to another variable (time extension).

A number of recent studies have shown interesting relationships between measures of impulse delaying ability and other so-called ego functions. These studies have for the most part been based on the formulation that delay or inhibition of immediate gratification is a prerequisite for the development of cognitive processes such as thought, fantasy and imagination. A discussion of the notion of delay as related to ego development, including comments on empirical findings from varied sources, has been published by Singer (1955). As an illustration of the relationship between perceptual variability and degree of physical motility, Singer cited the experiment of Goldman (1953). Goldman found that with increasing degrees of motor inhibition there was increasing perception of apparent motion (the autokinetic phenomenon). This study was based on Werner's (1945) and Werner and Wapner's (1949) sensory-tonic field theory of perception, according to which available energy which is not released

in bodily movement will express itself in perceptual displacement, e.g., illusory motion. This has been referred to as the equivalence in functioning of sensory and tonic events, with each capable of serving vicariously for the other.

A similar but independently derived theoretical position is explicit in the analysis of the Rorschach Human Movement response (M). Results comparable to those of Goldman (1953) above have been reported by Singer, Meltzoff and Goldman (1952). A period of motor inhibition (a slow-writing task) was found to increase the perception of movement (M) on the Rorschach ink blot test. Meltzoff, Singer and Korchin (1953) were also able to demonstrate the relationship between Rorschach M responses and motor inhibition, as predicted by the sensory-tonic theory mentioned above. Rorschach M response has subsequently been shown to be related to the ability to inhibit the expression of an affect (Meltzoff and Litwin, 1956).

Thus, empirical research has shown a relationship between physical inhibition and the perception (or projection) of apparent movement, while the attribution of movement to an ambiguous stimulus (ink blot) has been found related to the ability to forego immediate affective expression (Meltzoff and Litwin, 1956).

The ability to forego immediate gratification has also been shown to be related to the sense of time. In a situation in which some members of an adolescent group disregarded the fact that their misbehavior would result in loss of privileges at a later date, Levine and Spivack (1959) found that those who exhibited less behavioral control showed a trend toward longer judgment of short time intervals, and a significant constriction of future time perspective. Mischel (1961) using Trinidadian adolescents, found that delinquent subjects preferred smaller, immediate

reinforcement, and that those who preferred immediate reinforcement had lower scores in social responsibility and less accuracy in recall of a past event. In another, related study, Mischel and Metzner (1962) stated, "The ability to delay gratification in various need areas is presumed to increase with age, and hence in a simple, paradigmatic choice situation older children should more often prefer the delayed, larger as opposed to immediate, smaller reward." This hypothesis was confirmed with urban United States children aged 5-12. They based another hypothesis on the theory that with cognitive reality testing taking the place of uncontrolled motor discharge in the attainment of needs, greater delaying capacity would be reflected in greater cognitive facility, such as intelligence. This hypothesis was supported as well. They also found that the immediate-reward preferring subjects tended to have shorter time perspective scores, and that the more intelligent subjects tended to have longer scores. The latter finding confirms an earlier report of a significant positive correlation between time perspective and IQ in adolescents (Levine et al., 1959).

Time estimation via the production method has been shown to be a good index of impulse control capacity in several studies: (Singer and Opler, 1956; Singer, Wilensky and McCraven, 1956; Spivack, Levine and Sprigle, 1959). A more comprehensive account of methodology in time estimation experiments may be obtained from the article by Bindra and Waksberg (1956). The production method requires the subject to delineate a specific period of time, that is, to indicate when a predetermined interval has expired. In all of the above studies using this method, impulsive subjects tended to produce shorter time intervals, believing that more time had passed than had actually expired.

Levine et al. (1959) found that measures of delay such as motor inhibition, cognitive inhibition, time estimation and time perspective were all positively related to IQ, although they did not all correlate among themselves. Time estimation and time perspective were unrelated, while time estimation was related to motor inhibition, although the latter was unrelated to time perspective. The authors suggested that there may be both motor and cognitive aspects to delaying ability, with developmental differences.

On the hypothesis of a relationship between delaying ability and cognitive functioning on an IQ test, as suggested by Fromm, Hartman and Marschach (1954), Spivack, Levine and Sprigle (1959) employed three measures of delay function. Time estimation, the Stroop color-word test, and Barron M total were all significantly correlated with Wechsler IQ in a group of emotionally disturbed adolescents. However, as in previous studies, there was no significant relationship between Rorschach M response and time estimation. The authors pointed out that impulsivity itself might result in lower scores on tests of intelligence, since a more reflective approach could allow for greater use of critical faculties. They cautioned that a normal group might require more sensitive measures of delay, since impulsivity may manifest itself more subtly than in the disturbed group under study.

Thus, a number of studies have shown a significant relationship between a measure of delay -- time estimation -- and cognitive functioning on an IQ test. However, these studies have used as subjects either children or emotionally disturbed adolescents. A more recent report (Siegman, 1962) did not find intelligence to be a significant factor in the time estimations of college students, although the range of intelligence

of the subjects was rather limited. It seems reasonable that the extent to which performance on a test of intelligence depends upon impulse delaying ability would determine the degree of relationship between IQ and measures of delaying ability. Therefore, the question may be asked whether it is intelligence, or a generalized delay factor, which is related to measures of impulsivity in the above studies. The isolation of purely cognitive functions from other ego functions and personality variables is, of course, difficult.

In spite of differences in subjects and methodology, the empirical research which has been reported tends to offer confirmation for the theoretical relationship between the ability to forego more immediate impulse gratification and various ego functions. Among such ego functions may be listed those involving the individual's relationship to time. Certainly only the beginning of an understanding of the nature and significance of such phenomena referred to as time perspective and time orientation has thus far been achieved. While any conclusions should be viewed as tentative, there is nevertheless meaningful consistency in the published results.

The aim of the present study is to extend the investigation of certain aspects of temporal experience as related to impulsivity in adults. Employing techniques found useful by previous investigators, two groups of "delinquent" adults (prison inmates) whose overt behavior manifested markedly different degrees of impulse inhibition, were tested. A description of the experimental tasks and measures may be found in the following section.

CHAPTER III

EXPERIMENTAL TASKS AND MEASURES

I Time Estimation Test

Time estimations were obtained according to the method of production (Bindra and Waksberg, 1956). Subjects were asked to tell, without recourse to mnemonic devices, when they thought certain intervals of time had expired. Instructions were as follows:

> "I would like to see how accurately you can estimate the passage of time. I will start the stopwatch and say, 'Go', and you say 'Stop', when you think 32 seconds has gone by."

Each subject was given one trial estimating intervals of 32, 16, and 64 seconds, in that order. There was no feedback of information until all trials had been completed, at which point each subject was told that it was very difficult to attain complete accuracy, but that he had done "pretty well."

Scores consisted of the actual elapsed time at the point when the subject said, "Stop." There were, therefore, for each subject four scores -- one for each time interval, plus a total time estimation score, the sum of all three elapsed time intervals.

II Future Time Coherence Test

The coherence of the future time perspective was measured by means of a slightly modified version of one of Wallace's (1956) original techniques.

(a) Each subject was asked to estimate how old he might expect to be when each of a number of common events might occur. Subjects who considered a particular event to be of doubtful occurrence were asked to assume

that such an event might happen. Those who felt that an event had already taken place were asked to supply the age at which it had happened. Instructions were:

> "I am going to ask you how old you would expect to be when certain ordinary events might take place in your life. I will read off the event, and you just tell me how old you think you would be when it would occur."

The following is a list of events, each prefaced by the phrase, "How old do you think you might be when...?"

1. Your first grandchild is born?
2. You die?
3. You have your last fist fight?
4. You get your highest paying job?
5. Your oldest child gets married?
6. You retire?
7. Your youngest child leaves home?
8. You achieve your greatest success in life?
9. You feel you have reached old age?
10. Your last sexual intercourse occurs?
11. You feel you have reached middle age?
12. You can say you have most of the things you want?
13. Your last child is born?
14. You feel your life is almost over?
15. You no longer feel as strong as you used to?

This list is in most items identical to that of Wallace (1956) with modifications intended to rely somewhat less on physiological changes. The age ascribed to each event was recorded.

(b) The second part of this task required that subjects order the above events in chronological sequence. Each event was typed on a 3 by 5 card and the cards, shuffled, were presented to the subject with these instructions:

> "Here are some cards on each of which is typed one of the events I asked you about a few minutes ago. This time I would like you to arrange them in the order in which they might happen in your life. Put the event that would happen earliest on top, next the second event, then the third, and so on, with the thing that would happen last on the bottom."

The resulting chronological ordering was then recorded.

A rank-order correlation between the ages ascribed to the occurrence of certain events and the sequence resulting from the forced chronological ordering of these events has been reported to yield a measure of the coherence of the future time perspective (Wallace, 1956). It should be noted that the actual age ascribed to the occurrence of an event is not the measure here. It is, rather, the agreement between the sequence based on ages ascribed to the occurrence of events, and the sequence based on a forced chronological ordering of the events. The greater the degree of correlation (Rho), the greater the degree of future time coherence.

III Future Time Extension Task

According to the results of several studies (Barndt and Johnson, 1955; Wallace, 1956; Davids and Parenti, 1958; Davids, Kidder and Reich, 1962), the story-completion technique has shown good reliability as a measure of the extension of future time. Each of the story stems employed by Wallace (1956) and adapted from those of Barndt and Johnson (1955) was presented individually, with the subject asked to complete the stems by creating some kind of story. No instructions as to temporal features were given. After all four stories had been completed, subjects were asked to indicate how much time had passed in each story, not in the telling of it, but rather in the action of the story itself. The stories, and the durations covered by each story, were recorded verbatim.

The following are the story stems, in the order presented to each subject:

> Story Stem 1. "About three o'clock one bright, sunny afternoon in May, two men were walking along a street near the edge of town..."

Story Stem 2. "Ten o'clock one morning, Al met his friend, Jerry, near the center of town..."

Story Stem 3. "Joe is having a cup of coffee in a restaurant. He's thinking of the time to come when..."

Story Stem 4. "After awakening, Bill began to think about his future. In general, he expected to..."

The scoring system for duration of time in the stories, devised by Barndt and Johnson, and utilized by the other studies employing this technique, was followed in the present study. Scores were assigned as follows:

Score	Duration
1.	Under one hour.
2.	One hour to under five hours.
3.	Five hours to under twelve hours.
4.	Twelve hours to under one week.
5.	One week to under three months.
6.	Three months or more.

IV Time Orientation Test

In measuring time orientation it is necessary to obtain an indication of the relative stress placed by the subject on considerations of the past, present, and future. To this end pictures from the Thematic Apperception Test series (TAT) have been employed, with a frequency count of the tense of verbs in the stories interpreted as reflecting emphasis on each of the temporal dimensions. That is, a relatively greater proportion of verbs in the past tense reflects greater concern for the past, or a greater degree of past time orientation. The same kind of interpretation is placed on a preponderance of present or future tense verbs. This method has been used by Fink (1953), by Bonier and Rokeach (1957), and by Teahan (1958).

In the present study, pictures 2, 4, and 7BM of the standard TAT (Murray, 1943) were employed. These pictures were also used by Fink (1953) and by Bonier and Rokeach (1957). The only departure from the usual

instructions accompanying the administration of the TAT was that in this instance, no reference was made to temporal features. That is, there was no specific instruction mentioning the inclusion of past, present, or future events in making up the stories. Subjects were asked simply to, "Tell some kind of a story" about each picture, and were encouraged to use their imagination.

The stories were recorded verbatim for each subject. A frequency count was subsequently performed for each story, in order to compare subjects with respect to predominant time orientation in fantasy.

CHAPTER IV

EXPERIMENTAL PROCEDURE

All subjects were inmates of the State Prison of Southern Michigan, which is a maximum security institution. The experiment was conducted in the Psychiatric Clinic of the prison.

Introductory Remarks

Each subject was tested individually, and was told that he was being asked to participate as a subject in an experiment, the results of which would have no bearing on his status in prison. Subjects were further assured that their offense played no part in their selection, that their participation was strictly voluntary and their answers confidential, although the experiment did not deal with very personal material. No reward, they were told, could be offered for their efforts, although if they desired, a formal note acknowledging their voluntary cooperation would be filed in their institutional records. Finally, each subject was told that he could decline to participate, with no prejudicial aftereffects. Three men so declined.

Special effort was made to provide subjects with this clear indication of lack of duplicity with regard to their being called to the Psychiatric Clinic of the prison for an experiment. Those who still remained doubtful were told that if, at the end of the experimental session, they felt for any reason that they wished to withdraw the cooperation already offered, the data sheets would be handed over to them for their destruction, and no record of what had transpired would remain. No one subsequently requested this action.

Test materials were presented in the following order:

1. The Future Time Coherence Test was begun by asking subjects at what age they felt certain events would occur (part a.).
2. The Time Estimation Test was administered, with subjects being asked to estimate the three time intervals.
3. The Future Time Coherence Test was completed, with subjects ranking the 15 events in chronological order of occurrence (part b.).
4. Story Completion Stems were read, and responses recorded verbatim.
5. The TAT pictures were presented, and stories recorded verbatim.
6. The Story Completion Test was concluded by asking subjects to indicate the duration of action in each story.

The last part of the Story Completion Test was obtained after the TAT administration, in order to avoid introducing any response set in terms of temporal features on the latter test.

One other point should be mentioned about the recording of duration in the story-completions. A preliminary investigation showed that with Story Stems three and four, subjects occasionally stated that the duration of the story was but a few minutes when they conceived the "action" of the story to be that of "thinking" itself. Yet at the same time, what was being thought about, in the story, might be an event in the far distant future. This could result in extreme differences in scoring, depending on whether the action of the story was considered "thinking" or the event being thought about. It was felt that recording the duration of the story in terms of length of time involved in the thought process would be unrevealing and inappropriate to the scoring system. A more appropriate procedure appeared to lie in determining the extension into the future of the events being contemplated, in those stories in which the hero was "thinking."

Subjects were asked therefore, to indicate how much time was involved in the story, from the "present" time in the story, to the particular events the hero of the story was thinking about. This indication of duration was subsequently scored in the previously described manner.

CHAPTER V

SELECTION OF SUBJECTS

Prior to this study the writer had attempted to determine what characteristics were associated with inmates judged by prison officials to be "ideal" with regard to institutional adjustment. The ten prison counsellors, whose function it is to collate and evaluate reports of institutional progress of all inmates, had been asked to list such behavioral characteristics. The most frequent item cited had to do with the inmate's ability to refrain from frequent or severe violations of prison regulations. In addition to this list, the counsellors had been asked to supply the names of those inmates they knew well enough to judge as either coming very close to the ideal of "good prison adjustment," or as being quite "poorly adjusted." Largely from these lists were selected those who became subjects in this study.

Men were excluded as subjects if there was reason, from their records, to believe that they were psychotic, aged, physically handicapped, mentally retarded, illiterate, of foreign background, non-caucasian, or serving life sentences. Subjects were assigned to the Control Group (high impulse control) on the basis of evidence of an absence of frequent or serious misconduct reports, a stable institutional work or educational record, and other indications of ability to avoid excessive friction with rules of the institution. The Experimental Group (low impulse control) consisted of men with fairly unequivocal institutional histories of frequent and/or severe misconduct reports, much time served in Detention as punishment or other extraordinary restrictions placed upon them as punishment for specific infractions, plus other indications of tendencies to act out impulses in ways prohibited by institutional regulations.

Thus, a global evaluation of the institutional behavior of these men was made by the writer with recourse to institutional records, and on the basis of this evaluation, subjects were assigned to the two groups. Admittedly, this is not a precise procedure, but every attempt was made to ensure that there was sufficient basis for such a differentiation.

In Appendix A are samples of the information pertaining to institutional behavior upon which subjects were assigned to the two groups.

Finally, subjects who in the experimental situation showed signs of severe psychopathology such as might have reflected psychosis, were eliminated. Three men had to be discarded as subjects for this reason.

It can be seen from Table 1 that the composition of the two groups is quite similar with respect to the variables of age, intelligence (as measured by the Army General Classification Test) and level of education. F and T tests reveal no significant differences on any of these measures between the two groups.

Table I. Age, intelligence, and educational achievement of subjects.

	(Impulsive) Experimental Group			(Low Impulsive) Control Group				
	Range	Mean	Var.	Range	Mean	Var.	F	t
Age	22-42	28.96	23.38	22-42	30.00	28.31	1.21	.792
IQ	81-132	102.56	141.97	80-140	108.36	224.76	1.58	1.66
AGR	5.4-11.3	7.91	2.8	5.2-12.4	8.78	4.09	1.46	1.83

IQ measured by Army General Classification Test (AGCT). Academic achievement level measured by Average Grade Rating (AGR). Both scores based on screening examinations taken on entrance into prison. All statistical probabilities non-significant.

Thus, the Experimental Group consisted of 30 white, native, American prisoners whose institutional histories were marked by incidents of acting out of impulses contrary to institutional rules. The Control Group consisted likewise of 30 inmates comparable in such respects as age, education, and intelligence, but with institutional records reflecting much greater control over impulse expression as evidenced by exemplary conduct reports.

CHAPTER VI

HYPOTHESES

Hypothesis I. Time Estimation

Subjects whose behavior indicates low impulse control will tend to experience brief periods of time as of relatively greater duration when compared with subjects with greater ability to delay impulse expression. When time estimations are obtained via the production method, scores based on the actual, elapsed time will be higher for the Control Group than for the Experimental Group.

Hypothesis II. Future Time Coherence

Subjects whose behavior indicates low impulse control will tend to reveal a less well organized future time perspective, compared with subjects of greater impulse control ability. The correlations based on the ages associated with the occurrence of certain events and a forced ordering of these events in chronological sequence will be higher for the Control Group than for the Experimental Group.

Hypothesis III. Future Time Extension

Subjects whose behavior reflects low impulse control will reveal a briefer span of time into the future in current fantasy, when compared with subjects of greater impulse control. The Control Group, therefore, will obtain higher scores, indicating greater extension of future time in fantasy, on the Story-Completion Test, than will the Experimental Group.

Hypothesis IV. Time Orientation

Subjects whose behavior reflects low impulse control will reveal a greater stress on present time and less reference to the future in

current fantasy, when compared with subjects of greater impulse control. A frequency count of tense of verbs in TAT stories will reveal more present and less future tense verbs for the Experimental Group than for the Control Group.

CHAPTER VII

RESULTS

Hypothesis I. Time Estimation

The results of the Time Estimation Test yielded significant differences in the direction predicted by the hypothesis. As may be seen from Table II, the Experimental Group tended to be more variable on this task. For each of the time intervals, and for the sum of the three time intervals, the Control Group obtained significantly higher scores in terms of actual, elapsed time.

Table II. Time estimation results.

	(Impulsive) Experimental Group		(Low Impulsive) Control Group			
Interval	Mean	Var.	Mean	Var.	F	t
16"	10.16	16.49	14.53	7.7	2.14*	4.86**
32"	18.06	45.79	24.30	33.39	1.37	3.79**
64"	36.97	121.55	52.20	92.93	1.31	5.69**
Total (sum of the three intervals)						
(112")	64.87	377.29	92.97	185.96	2.03*	6.49**

*Significant at .05 level
**Significant beyond .001 level

The more impulsive subjects, therefore, tended to overestimate the amount of time actually elapsed, in accord with Hypothesis I.

Hypothesis II. Future Time Coherence

For the analysis of the Coherence of the Future Time Perspective, the rank-order correlations were arranged in order of magnitude. The median for the Experimental Group was .815, the median for the Control Group was

Table III. Analysis of Story-Completion scores

	Mean	Var.	F	t
Story I				
(Impulsive) Experimental	1.66	.662	2.16*	1.50
Control (Low Impulsive)	1.87	1.43		
Story II				
(Impulsive) Experimental	1.53	.740	1.44	1.77
Control (Low Impulsive)	1.97	1.07		
Story III				
(Impulsive) Experimental	2.43	3.70	1.22	1.19
Control (Low Impulsive)	4.40	4.52		
Story IV				
(Impulsive) Experimental	3.50	5.15	3.16**	4.09***
Control (Low Impulsive)	5.43	1.63		
Sum of scores (four stories)				
(Impulsive) Experimental	9.03	16.10	2.28*	5.28***
Control (Low Impulsive)	13.67	7.06		

*p equals .05
**p equals .01
***p equals .001

(Probabilities are for two-tailed tests.)

.886, and the combined median for both groups was .834. Using the Median Test for Chi-square, corrected for continunity (Siegal, p.107) the resulting Chi-square was .267, which has an associated probability of about.50. This result is entirely what might be expected by chance alone. Therefore, no support for Hypothesis II, predicting differences between groups in Future Time Coherence, is offered by this test.

Hypothesis III. Future Time Extension

The mean scores for Future Time Extension on the Story Completion test were in all instances greater for the Control Group, as predicted by Hypothesis III. The magnitude of the differences, however, as analyzed by two-tailed tests, was significant only for Story 4 and for the sum of scores on all four stories. Table III reveals the means, F and t values for the Story Completion Scores.

The significantly greater variability in scores obtained by the Control Group on Story 1 suggests that whereas subjects in the Experimental Group tended to obtain scores almost exclusively at the lower end of the scoring range, the Control Group included a greater number of subjects who scored at the higher end. On Story 4, however, the significantly lower variability in scores obtained by the Control Group may be accounted for in terms of the greater number of subjects who obtained scores of 6, the highest possible value on the scale. While Control Group subjects clustered at the high end of the scoring range on Story 4 (mean score 5.43), the Experimental Group subjects were spread throughout the range of possible scores, but on the average remained near the middle (mean score 3.50).

Because of the skewness of scores on the last two stories, these data were also analyzed by means of the non-parametric Mann-Whitney U Test (Siegal, 1956, p. 116).

Table IV. Non-parametric analysis (Mann-Whitney Test) of Story Completion Test

Story I	U equals 411 Z equals .5865 p equals .56
Story II	U equals 381 Z equals 1.08 p equals .28
Story III	U equals 358 Z equals 1.44 p equals .149
Story IV	U equals 234 Z equals 3.24 p equals .001
Sum of scores (four stories)	U equals 147 Z equals 4.548 p equals .001

All probabilities are for two-tailed tests.

As may be seen from Table IV, the results of this analysis are comparable to those obtained by utilizing parametric tests; scores for Story 4 and the sum of scores for all four stories were highly significant in the hypothesized direction.

A further inspection of the data yielded an unexpected observation. Both groups tended to obtain higher scores on Stories 3 and 4 than on Stories 1 and 2. This observation was subjected to statistical analysis, which appears in Table V. When the sum of scores obtained on Stories 1 and 2 was compared with the sum of scores on Stories 3 and 4, the mean of the latter was significantly greater than the mean of the former, for both groups separately and combined.

Table V. Comparison of scores on Stories 1 and 2 combined, vs. scores on Stories 3 and 4 combined

	Stories 1 and 2		Stories 3 and 4			
	Mean	Var.	Mean	Var.	F	t
Exp. Group	3.10	2.162	5.933	11.788	5.45*	4.15**
Con. Group	3.833	3.178	9.833	6.35	1.99*	10.75**
Both Groups	3.466	2.76	7.833	9.069	3.28*	9.81**

*p equals .01
**p equals .001

In general the data tend to support Hypothesis III, although the results were not as conclusive in terms of significance levels as might be hoped for. The consistent finding of higher mean scores for the Control Group (although not always significant) suggests a trend toward greater Extension of Future Time in current fantasy as predicted. The possible meaning of the significantly greater scores obtained by both groups on Stories 3 and 4 combined, will be discussed in the next chapter.

Hypothesis IV. Time Orientation

The mean proportion of verbs in the past, present, and future tenses on the three TAT stories is presented in Table VI. A Chi-square analysis of the differences between groups in verb tense usage for the mean of the 3 cards yielded a value of 1.51, which has a probability of between .30 and .50. This does not permit rejection of the null hypothesis of no differences in proportion of verbs in each tense.

Table VI. Mean proportion of verbs in past, present, and future tense on TAT cards

	%Past	%Present	%Future
Card 2. (Impulsive)			
Experimental Group	18	76.4	5.6
(Low Impulsive) Control Group	33.6	60.1	6.3
Card 4. (Impulsive)			
Experimental Group	9.6	87.6	2.8
(Low Impulsive) Control Group	15.4	81.2	3.4
Card 7BM. (Impulsive)			
Experimental Group (Low Impulsive)	12.5	84.4	3.1
Control Group	28.6	59.2	12.2
Mean of 3 Cards. (Impulsive)			
Experimental Group (Low Impulsive)	13.4	82.9	3.7
Control Group	25.9	66.8	7.3

It may be seen that the mean proportion of future tense verbs is rather low for both groups. The majority of subjects reported brief stories phrased predominantly in the present tense. In fact, only 9 (30%) of the Experimental Group subjects, and only 15 (50%) of the Control Group subjects, used the future tense at all in any of the three stories. While this does suggest a greater tendency on the part of the Control Group to use the future tense, it is not a significant difference (Chi-square equals .817, p equals about .50).

The foregoing results suggest both groups to be present-oriented (using predominantly present-tense verbs). To answer the question of whether one group was nevertheless more present-oriented than the other, another analysis of verb tenses was performed. In a two by two contingency table, using the categories of use of present tense only vs. use

of other than present tense (past and future) a Chi-square analysis, with correction for continuity (Siegel, 1956, p.107) yielded differences in support of the hypothesis. Table VII indicates the outcome for each of the three TAT cards. For Cards 2 and 7BM, the Chi-square is significant; for Card 4 the probability does not meet acceptable significance levels, although the results are in the predicted direction.

Table VII. Chi-square analysis of use of present tense only vs. use of other (past and future) tenses in TAT stories

	Present Tense	Other Tense	Chi-square
Card 2.			
Con.	14	16	4.51*
Exp.	23	7	
Card 4.			
Con.	15	15	1.09**
Exp.	20	10	
Card 7BM.			
Con.	11	19	5.42***
Exp.	21	9	

*p equals .05
**p equals .30
***p equals .02

Thus, while there was no significant difference between groups in use of future tense, and while both groups tended to be present-oriented, the Experimental Group did tend to use the present tense exclusively to a greater extent than did the Control Group. The Experimental Group, thus, appears to have been more present-oriented in current fantasy than the Control Group, in accord with Hypothesis IV.

CHAPTER VIII

ADDITIONAL FINDINGS AND DISCUSSION

While the attempt to equate the groups on the variables of age and intelligence was successful, it was not possible to do so for the additional variables of time already spent in prison or length of sentence remaining.

Table VIII. Years served and years remaining to be served in prison

Years Served	Mean	Var.	F	t
(Low Impulsive) Control Group	1.88	2.27	1.52	2.24*
(Impulsive) Experimental Group	2.86	3.45		
Years to Serve				
(Low Impulsive) Control Group	7.65	12.31	1.36	4.03**
(Impulsive) Experimental Group	4.25	9.04		

*p equals .05
**p equals .001

As seen in Table VIII, the Experimental Group had served on the average a greater length of time in prison, while the Control Group had by far the greater amount of time ahead of them in prison. These differences were statistically significant. As Tables IX through XII show, however, the factors of time served and time left to serve in prison were not significantly related to any of the dependent variables of this study.

Table VIII may be somewhat misleading without a more complete explanation. In computing time already served, only the time since the current entry into prison was employed. As may be seen from Appendix B, about two-thirds of the subjects in each group had served time in prison

before. Length of time served on prior sentences and time spent in prison outside of Michigan were not included in arriving at a figure for time served in prison. Because of the intervention of time spent on discharge and of paroles and escapes from prison, and because of the difficulty in arriving at an accurate figure as to amount of time served in other states, it was not possible to lump together all prior prison experience.

The actual meaning of the difference between groups in time remaining to be served in prison is also questionable. In arriving at this figure, the maximum sentence was used. Commonly, in the state of Michigan, persons convicted of felonies are sentenced to a term in prison bound by a maximum and minimum number of years (e.g., 2½-5 years). The amount of "time off for good behavior" from the original sentence can be earned at different rates for different lengths of sentence (i.e., longer sentences have a higher rate of "good time"). A man may be released from prison to parole status at any time between his minimum and maximum sentences. Thus, while the figures for remaining time in prison reflect the greatest possible time a man can legally be held in prison on his current sentence, it is not an accurate indication of how soon he will be released. The latter depends on numerous factors, including past record, prison behavior, and factors external to prison, such as home and occupational situation. Because of the questionable meaning of time served and time remaining in prison, as defined in this study, it is not surprising that these variables showed no correlation of any magnitude with the variables under investigation.

In Tables IX through XII appear the correlations among the variables examined in this study, and between them and relevant independent variables.

With regard to future time orientation, the measure used was the presence or absence of any future tense verbs on the TAT stories. In view of this dichotomy, all correlations involving future time orientation utilized the point-biserial coefficient of correlation.

Table IX. Correlations between Total Time Estimation Scores and other variables

Total Story Score	r equals .352*
Future Time Coherence	r equals .013
Use of Future Tense Verbs	r point biserial equals .164
Age	r equals .067
IQ	r equals .352*
Time served	r equals -.052
Time remaining	r equals .214

*p equals .001

Table X. Correlations between Total Story Score and other variables

Future Time Coherence	r equals -.110
Use of Future Tense Verbs	r point biserial equals .071
Age	r equals .208
IQ	r equals -.116
Time served	r equals .081
Time remaining	r equals -.172

Table XI. Correlations between Future Time Coherence and other variables

Use of Future Tense Verbs	r point biserial equals .024
Age	r equals .079
IQ	r equals .235*
Time served	r equals .032
Time remaining	r equals .121

*p is between .05 and .10

Table XII. Point Biserial correlations between use of future tense verbs and other variables

Age	rpb equals .019
IQ	rpb equals .127
Time served	rpb equals -.042
Time remaining	rpb equals .170

The significant correlation between Total Time Estimation score and Total Story score (Table IX) indicates that subjects who showed the greatest ability to delay the immediacy of their response in estimating time by the production method also tended to use a greater extension of future time in the Story Completion Test. Previously, Levine et al. (1959) failed to find a significant relationship between time estimation and time perspective (extension). They concluded that there may be developmental differences in the variables they studied with subjects much younger than those of the present research. In view of the tendency of both groups in the current study to overestimate how much time had actually passed in the intervals they were to produce, it would appear that, at least in the present research, subjects who had a longer future time perspective were also the more accurate in estimation of brief time intervals.

The finding of a significant relationship between time estimation and IQ (Table IX) is consistent with earlier results reported by Levine et al. (1959) and by Spivack et al. (1959). The present results lend further support to the postulation of a positive relationship between delaying ability and intelligence (Mischel and Metzner).

The fact that the two groups differed significantly in time estimation is in accord with the hypothesis, and further supports previous reports of time estimation as a good index of impulsivity (Singer and Opler; Singer et al., 1956; Spivack et al., 1959).

Time estimation has been referred to as the "perception" of time (Wallace and Rabin, 1960) although it is not perception in the same sense as visual or auditory perception. With the absence of specific sensory organs, the uncertain physiological processes involved, and the importance of cognitive factors, time estimation is probably more properly called an

"apperceptive" process. In sensory perception, normality does not imply veridicality. That is, accuracy of perceptual processes is not a normative phenomenon (cf. "optical illusions", normal visual phenomena). It may be, however, that the "apperceptive" process involved in the estimation of time tends toward increasing accuracy with increasing development (maturation) of its components (e.g., ego functions such as intellectual abilities, etc.). Large scale experiments gathering normative data may answer this question.

Although the exact nature of time estimation is complex, affective factors have been shown to be involved. It may be asked whether such factors may be operative here. It has been reported, for example, by Eson and Kafka (1952) and earlier, by Rosenzweig and Koht (1933) that stress tends to increase a subject's estimation of the duration of "chronological" time.

The latter study suggested a "wishful-thinking" mechanism in the face of a stressful situation. Another theory is based on learning or drive-reduction theory (Child, 1954; Taylor, 1956). Assuming that the experience of duration is a function of the number of experienced stimuli, then if stress presents a more complex stimulus situation resulting in a greater number of response tendencies, the perceived duration of "chronological" time will be increased. In the present study, there was no specific stress introduced into the experimental situation, although it may be that some subjects felt uncomfortable about being called to the Psychiatric Clinic of the prison. It is conceivable that subjects whose behavior has brought them into frequent conflict with prison officials may have had reason to feel threatened by and suspicious of a call to the Psychiatric Clinic. Or, it may be that those in the Experimental Group had, for other

reasons, a higher level of anxiety than those in the Control Group. In this regard, a recent study by Siegman (1962) reported a significant, positive correlation between Taylor Manifest Anxiety scores and estimates of short time intervals in college students. Siegman's time estimations were by the method of verbal estimation, wherein a higher estimate would correspond to what in this study has been referred to as a lower score for actual, elapsed (chronological) time. For the present research, there is no direct measure of anxiety level or other personality factors which could have influenced the time estimation task. Unless factors capable of influencing time estimation were peculiarly associated with impulsivity of behavior, there is no reason to believe them other than randomly distributed throughout both groups of subjects.

Siegman's (1962) study also raised the question of whether time estimations obtained by the production method measure the subject's estimation of duration or his ability to delay responding (indicating the end of the interval being produced). Siegman's study did not offer clear-cut support for the hypothesis of a positive correlation between impulsivity (measured by a motor-inhibition task) and the perceived duration of "chronological" time (by the verbal estimation method). The results did appear to warrant further investigation of this question. Future studies might compare the results of time estimations obtained by various methods.

The attempt in this study to tap differences between groups in future time coherence was a noteable failure. The coherence of the future time perspective, a concept introduced by Wallace (1956) appears reasonable. The method of measuring coherence, introduced by Wallace and adapted for this study, also seems to follow logically from the concept. That is, subjects with a more elaborate and extensive future time perspective would

seem likely to derive greater meaning (or saliency) from individual future events, would differentiate these events from one another, and would interrelate and organize these events in an orderly conceptual scheme.

The question may be asked whether the items employed in the current test of future time coherence were appropriate and meaningful to the subjects. Wallace originally used two versions of this test. In one, subjects themselves offered a series of potential future events and the ages at which they expected the events would happen to them. Then they arranged these events in order of occurrence. The other version was that employed in the present study: subjects responded to a standard list of events with the ages at which the events might occur in their lives, then ordered the events chronologically. Wallace found that both versions of this test differentiated well between psychotics and controls. The test employed in the present study is highly similar to the latter test of Wallace. One may of course suggest that research with severely psychotic subjects is likely to reveal them as deficient in a variety of ego-related functions, compared with non-psychotic control subjects. In other words, even crude measures may yield significant results when psychotic functioning is compared with that of more nearly "normal" subjects.

It may be that memory is an important variable, since, if a subject can recall the ages he had associated with events, he would more readily be able to place one event in temporal relationship to another event. Psychotic subjects would be expected to be more confused and less able to recall the ages they had associated with the events. In the current study we do not have a measure of memory per se, although we do have one for general intelligence, which depends in part upon memorial ability. In Table XI there appears a correlation between the coherence score and IQ of .235, which comes close to the .05 level of significance. The

magnitude of this correlation suggests that general intelligence, and perhaps memory, are related to performance on the coherence test, and are certainly more significant factors in this study than is gross impulsivity of behavior. The validity of the concept of coherence of the future time perspective, and of measures of time coherence, deserves further investigation.

The results with the Story-Completion Test yielded some interesting findings. First, as noted in the section on Experimental Procedure, some (pilot) subjects responded to Stories 3 and 4 by referring to the "action" of the story as "thinking", and hence obtained a very low time extension score. It is, therefore, important that experimenters who use this technique be aware of this possible interpretation on the part of subjects, so as to avoid drastically distorting the scoring system.

The fact that both groups had significantly higher scores for future time extension on Stories 3 and 4 as opposed to Stories 1 and 2 suggests differential stimulus value for the story stems. It is noteworthy also that it was the sum of scores on Stories 3 and 4 combined which yielded differences between groups. At this point it is interesting to return again to Wallace's (1956) study of schizophrenics, in which he used the same Story-Completions as were used in this study. Wallace found that the first two stories did not, but that Stories 3 and 4 did differentiate between psychotics and controls. His explanation revolved around the notion of structure vs ambiguity. Stories 1 and 2 are more structured as to time and place, and the psychotics were able to use a longer time span in dealing with them. With the more ambiguous stems of 3 and 4, the psychotics were less able to express fantasies into the future.

The notion of ambiguity, while relevant to the theory of schizophrenia, does not appear relevant to the subjects of the present study. There are at least two other differences between the first and second pair of stories. The first two are interpersonal in nature -- that is, there are two persons suggested in the stems. Only one person is explicitly suggested in Stems 3 and 4. Why this would result in differences in response is unclear. Another difference between story stems lies in the orientation as to plot line. Stories 1 and 2 may be termed "action-oriented," in that some overt activity is explicit. In Stories 3 and 4, there is a minimum of overt activity explicit. Rather, the plot line seems aimed toward covert, mental behavior, which suggests the term "thought-oriented." Stems 3 and 4, therefore, are stimuli which specifically urge a response related to thoughts, plans and anticipations of the future. Consistent with this is the scoring of such a response in terms of the extension into the future of the thoughts and fantasies involved.

In the terms of this analysis, it would appear that neither group in the present study expressed a very long time span when the stimulus indicated an "action-oriented" story. On the other hand, when the stimulus was "thought-oriented," not only did both groups use a significantly greater span of time, but that used by the Control Group was even greater than that used by the Experimental Group.

In other words, when concerned with ongoing behavior, the subjects of this study tended to terminate the action of their fantasies after a brief time. They tended not to pursue sequences of behavior far into the future. In this respect then, they tended to be rather constricted in their extension of future time in fantasy. But when concerned about

wishes, hopes, fears, and plans for the future, they were able to envisage events happening months and years from the present. While the impulsive subjects were able to do this, they did not show this tendency to the same extent as did subjects with greater impulse control, which is in accord with the original hypothesis.

Perhaps the differences in time spans between the first and second pair of stories can be interpreted in yet another way. The lower scores on Stories 1 and 2 suggest that subjects tended not to see far-reaching consequences of behavior in their fantasies. The much higher scores on Stories 3 and 4 suggest that subjects were able nonetheless to indulge in a kind of "wishful-thinking" about the future. There would then appear to be an immediate or "short-term" future (Stories 1 and 2) and a "long-term," distant future (Stories 3 and 4) in the fantasies expressed by these subjects. This would further suggest a kind of compartmentalization or segmentalization of time into discrete "bundles" or "packages" of time. This notion, which has also suggested itself through clinical observation, might be considered a speculation worth further investigation.

The stories offered in response to the TAT cards were on the whole very brief. There was no difficulty in determining the relative frequency of verb tenses (inter-judge reliability was quite high) in view of the objective nature of this task. However, the paucity of future tense verbs in both groups raises some questions. Shall we infer that both groups of subjects are present-oriented, or at least, not future-oriented? This interpretation follows from prior use of the tense of verbs to indicate time orientation.

This raises the question, however, of whether use of the present tense implies an orientation to time, or whether it reflects, more simply,

a grammatical convention. If the latter, probably social class, educational and other environmental influences are expressed more than time orientation. If the use of the present tense in story-telling is largely a grammatical convention for some subjects, such as those of this study, then it remains to be shown whether those who habitually follow this convention in speech also tend to be present, as opposed to future oriented. Jokes, anecdotes, and the like, are often told in the present tense, even though the anecdote or story takes place in the past, and even though it may be possible to trace a sequence of events. Does this mode of expression reflect a present time orientation on the part of the speaker? We would probably think not, although this problem has not been studied.

Both groups of subjects in the present study would likely show a greater tendency toward exclusively present tense verbs in TAT stories than would, let us say, a sample of college students. The inmate sample would, therefore, be judged more present-oriented than the college sample. But, subjects in upper educational and cultural classes might be expected to be less bound to the use of the present tense in their verbalized fantasies than subjects with cultural backgrounds similar to our inmate subjects. Greater stress on acquiring a large vocabulary and on knowledge of and fluency in the use of "proper" grammar should result in linguistic habits reflecting the grammatical conventions so stressed. The question becomes, therefore, that of whether stylistic habits of speech accurately reflect temporal attitudes at all social and educational levels. Such linguistic habits as predominant verb tense usage may, on the other hand, be less indicative of ways of experiencing time at one socio-cultural level than at another.

In the present research, it is the writer's suspicion that such a grammatical convention was followed by the subjects. Therefore, a mere counting of verb tenses is inadequate to measure future time orientation. This problem had not been foreseen, and alternative measures were therefore not included. The brevity of most of the stories, with limited context, provided insufficient data upon which to base other means of tapping future time orientation. Attempts to do so with the current data were unreliable. Previous researchers with this measure have offered no clues as to contextual usage in their publications, if, indeed, they made use of context (Fink, 1953; Bonier and Rokeach, 1957). The inadequacy of this measure of future time orientation in the present circumstances may, therefore, in part account for its low degree of correlation with other variables.

A measure of time orientation which would avoid use of grammatical clues would be the following. After having told the stories, the subject would be presented with a paper on which appears a straight line, representing the continuum of "time," and would be asked to mark off on the line one point at which his story begins, and another point at which the story ends. Referring now to the TAT picture, the subject would be asked to mark off on the same line the point at which the scene depicted by the TAT card begins, and the point where that scene ends. If A and B refer to the total time span of the story, and C and D refer to the beginning and end, respectively, of the scene in the picture only, then the distance A to C indicates past time (before scene C - D) and the distance D to B indicates future time (after scene C - D). The ratio of the distance of the line for length of the scene depicted to the lengths of the other two lines would yield an objective index of time orientation. This type of measure

might also be obtained by verbal inquiry, the technique for which would have to be worked out. This is, of course, a proposal and not a proven measure.

In view of the questions which may be raised regarding the appropriateness of verb tense usage as a measure of time orientation, the finding of significant differences between groups in the present study is all the more noteworthy. The greater degree of present time orientation on the part of the impulsive subjects may very well be reflected in their prison behavior. That is, a greater degree of inhibition of impulse expression could lead to the avoidance of punitive measures directed against them, and the likelihood of their gaining such rewards as more desirable institutional jobs and more favorable recommendations for parole and early discharge from prison. However, a predominantly present time orientation suggests a greater significance and meaningfulness of immediate events, so that the avoidance of future pain and the eventual gaining of future reward are less available in current thoughts and fantasies. As Redl and Wineman have observed (p. 13), threats of punishmnnt and promises of reward have little effect on behavior unless they are meaningful. They are not meaningful without the development of an adequate appreciation of the future -- a modicum of future time orientation.

Other variables which, ideally, might have been controlled or investigated were socio-economic background and type of offense. In terms of the former, it was possible to obtain information as to occupation for many inmates, and for some it was possible to obtain recorded statements as to circumstances of the family. But this information was not available in unequivocal form for all subjects of this study. The variety of kinds of information and the inconsistency of its presence made any accurate

statement as to socio-economic status impossible. The information that was clear suggested that the preponderance of subjects could be classified in the lower class levels, with lower-middle class origin a rarity.

It is uncertain what might be predicted in terms of relationships between social class and temporal experience. Let us assume that patterns of temporal experiencing are a product of early interaction processes with significant others. Insofar as these interpersonal relationship patterns of early childhood are social class related, they might result in differences in such variables as temporal phenomena between subjects of different social classes. The only attempt thus far to examine this question was reported in a study by LeShan (1952) relating social class to time orientation. A recent re-examination of LeShan's results found no significant differences (Greene and Roberts, 1961). This matter is still unanswered, but it is clear that a well defined categorization in terms of social class is necessary.

Earlier in this discussion, the artificiality of the figures for time served in prison and time left was pointed out. It is still quite possible nonetheless, that the experience of penal institutionalization has important effects on one's temporal experiencing. In the present study, perhaps because of the difficulty in arriving at accurate and, therefore, truly representative figures for this variable, no relationships of a significant sort were found between it and the temporal variables studied. Earlier, the uncertainty involved in arriving at an estimate of date of release from prison was mentioned. One wonders whether this reality-induced ambiguity as to release from prison corresponds to the "uncertainty in the future time perspective" in prisoners, mentioned by Farber (1944) and to the "dismal unclarity" and "exaggerated

goal-frustration fears" of the future in college students, cited by Lipman (1957). Can this uncertainty and doubtless anxiety-laden ambiguity as to future release play a role in reducing thoughts and plans for the future (future time orientation) perhaps as a discomfort-avoidant measure? Can the same uncertainty result in a poorly organized, vague and ill thought-out future time perspective (coherence) which would be a reflection of the reality of the future? Is it also likely to result in a constriction of the span of the future time perspective (future extension)? All of this seems quite possible.

On the other hand, it may be the very circumstances of being in prison which affect these temporal variables, regardless of the clarity of the future. Routine, monotony, emphasis on the daily task, all of this, which is common to prison, may play an important role in the experiencing of time. It may be noted that both groups of subjects tended to overestimate time by the production method. They thought much more time had gone by than actually had passed. In prison, where men are "doing time," one highly desirable goal is that time pass quickly. This general attitude may have been reflected in the time estimations. It is possible, too, that the constriction of future time span in the "action-oriented" story-completions reflects the situation in prison where for the most part, sequences of action over a long period are not common. The emphasis is more apt to be on the more immediate, on getting the job for the day done, and on working toward short-range goals. Time perspective would then tend to be constricted and time orientation predominantly present.

If these considerations do affect temporal experience, the question might be at what point does the fact of being in prison, with its way of

life, influence the manner in which time is experienced by an inmate? In other words, does this occur in two years, five years, or when? We have no answer to this question. The subjects in the present study do not represent a great range of time served or length of sentence remaining, and the figures are not reliable. It may be, however, that there is not a straight-line correlation between time served (or remaining) and temporal experience. It is conceivable that much of the effect of incarceration takes place in the first year or two. It may be, for example, that there is a greater psychological difference between one month and one year in prison, than between one year and three years in prison. This is purely speculation, but it is suggested that the first months of incarceration may be more crucial than sheer number of years in terms of the psychological adjustments and adaptations to be made. This hypothesis could be tested by intensive study of first-term inmates at the time of incarceration and over fixed intervals on a variety of measures including those related to temporal experiencing.

A proper study of prison inmates would include subjects representing various types of criminal offence. The grouping of these offences might be along various lines, e.g., direct aggression (violence toward others) and indirect aggression (offences against property and possessions, such as theft, etc.). Apropos of the present research, the circumstances of the offence, aside from its nature, could determine whether a crime were relatively impulsive (spur of the moment) or deliberate (planned and organized). No such grouping was attempted here, although from Appendix C it is apparent that a fairly broad range of offences had been committed by subjects in both groups. The groupings by offence in Appendix C are not according to the official terminology, which is often

more apt to be a legal expedient than a specific, accurate and informative reference. That is, the name under which an offence is subsumed does not necessarily indicate much about the actual criminal act. The subjects in the present study were heterogeneous as to offences for which they were currently serving, with no obviously large differences between groups. As mentioned earlier, most had been convicted prior to the current offence. The earlier offences were not always the same as the later ones, which further complicates the grouping according to type of crime.

In speaking of the variables which must be carefully detailed in a comprehensive study of prison inmates, it should be made clear that the present research was not intended to be such a study. The subjects who composed the two groups examined were procured by a selective process which precluded them from being considered a representative sample of prisoners. Probably neither group was "average" in the sense of a hypothetical normal range of inmate behavior. If it is the consensus of inmates that to be too highly regarded by prison officials is inappropriate to the prison social system, it is probably likewise considered inappropriate to be continually in disciplinary trouble. The selection procedure therefore considerably limits the extent to which the present results may be generalized to prisoners. The findings of this study should not be construed to represent characteristics of inmates of Jackson Prison, much less of prison inmates in general.

This study sought to relate impulsivity in gross behavior (as opposed to impulsivity measured by a test of cognitive or motor inhibition) to some variables of temporal experience. In order to obtain a relatively extreme degree of impulsivity in overt behavior, the prison setting was entered. Some support was found for the theoretical relationship between

ability to delay impulse expression and the ego functions of time estimation and the extension of the future time perspective. Measures of future time orientation and coherence of the future time perspective, however, failed to prove adequate in the present context. As predicted, the impulsive subjects did reveal a greater degree of present time orientation, although neither group showed much future time orientation. Clearly, this relatively new area of research, the investigation of the motivational aspects of temporal experience, requires a great deal more study both in terms of concepts and relationships, as well as in terms of methods and techniques of measurement.

CHAPTER IX

SUMMARY

Thirty inmates whose prison behavior indicated a relatively low degree of impulse control were compared with a control group of thirty inmates with greater impulse control, for the purpose of examining some relationships between impulsivity and temporal experience. As hypothesized, the impulsive group overestimated time, via the production method, to a significantly greater extent, although both groups tended to overestimate brief intervals. When a story-completion test was employed to measure the extension of the future time perspective, it was found that for "action-oriented" story stems, both groups were rather constricted. "Thought-oriented" story stems yielded significantly greater scores on future time extension for both groups, although the control group had significantly higher scores than had the experimental group, as hypothesized. A measure of the coherence of the future time perspective failed to discriminate between groups, but the correlation with IQ suggested the possibility of intelligence or possibly memory influencing this measure. Neither group showed much degree of future time orientation in Thematic Apperception Test stories. The mean proportion of future tense verbs was quite low for both groups due to the few number of subjects who used any such verbs. On the other hand, the impulsive subjects were, as predicted, more present-oriented, as judged by their greater tendency to phrase TAT stories in the present tense only. The question of whether grammatical convention or time orientation is reflected in verb tense usage was raised. While it was felt that the factors of time spent in prison and time remaining to serve could have influenced the

temporal variables examined, the unreliability of figures available for prior and remaining prison time resulted in very low correlations. Some comments and suggestions regarding methodology were made. In general, the relationships between impulsivity and time estimation, time orientation, and future time extension, and between IQ and both time estimation and future time extension were consistent with earlier research findings.

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APPENDIX A

ILLUSTRATIONS OF BEHAVIOR REFLECTING HIGH AND LOW IMPULSE CONTROL

Experimental (low impulse control) Group

Subject E1. This subject received three disciplinary reports for fighting, one for evading his share of work, one for gambling, and one for an "immoral act," as well as several reports for possession of "contraband" (broadly defined as any material not allowed by prison regulations).

Subject E2. This man was considered dangerously hostile, and had stabbed two other inmates, severely injuring them. He had spent six months in the Detention Block, and had other reports for possession of obscene literature and contraband. One report indicated, "He must be handled by kidding along, as a reprimand seems to make his temper flair."

Subject E3. The reports on this man indicated the offences of creating a disturbance in the cell block, being in the wrong place without permission, agitating other inmates, homosexuality, attempting to procure dope, and possession of contraband.

Subject E4. This man had made a knife, was found frequently lying about his whereabouts, and had almost monthly reports of stealing. One statement in his record suggested that with this man, "Stealing is almost a compulsion."

Control (high impulse control) Group

Subject C1. This man received excellent reports from all of his work supervisors, took a course in brick-laying then taught the same, was reported as "very capable" and possessed of a "realistic outlook." His one report for possession of contraband was felt by custodial officers as indicative of unintentional carelessness on the subject's part.

Subject C2. No misconduct reports, and considered as getting along very well with other inmates. He had done very well in various clerical capacities, and was considered by some officials as the best inmate employee they had ever had.

Subject C3. No misconduct reports, and considered a "willing worker." This man was involved in a variety of organized activities, and was recommended for inclusion in a special group which met with people from the community to discuss various enterprises on which inmates could cooperate with civilians.

Subject C4. This man had received no misconduct reports and was highly regarded by work supervisors and custodial personnel. One report stated that he was a "model inmate."

APPENDIX B

NUMBER OF PRIOR OFFENCES FOR SUBJECTS IN EACH GROUP

Experimental Group	Control Group	
8	9	First Offence
10	11	Second Offence
7	6	Third Offence
5	4	Fourth or more offence
30	30	

APPENDIX C

TYPES OF OFFENCES FOR SUBJECTS IN EACH GROUP

	Experimental Group	Control Group
Auto theft	6	3
Checks	6	2
Theft	7	9
Armed Robbery	3	6
Assault	2	4
Sex	4	3
Escape	2	3
	30	30